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THE INDIAN SOCIETY OF EXTENSION EDUCATION
Division of Agricultural Extension, IARI, New Delhi 110 012

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EDITORIAL

Strategy for Market-led Extension Services

Traditionally agricultural extension has focused on increasing food production, which has resulted in food self-efficiency. However, the increasing production has not resulted in increased income for the farmers. As a result India is witnessing a greater level of income divide. Even-though the agricultural production has increased, the nutritional security has not yet improved in India. We are also witnessing problems like suicide of farmers and agrarian unrest due to a low level of profitability in agriculture. The XI Five Year Plan envisages 4.5 per cent growth in agriculture so that we can achieve about 10 per cent economic growth. In order to achieve the above objective as well as to increase the competitiveness of Indian agriculture there is a need for market- led extension. In the present scenario of globalization of the economy there is a need to transform the farmers from producers to entrepreneurs.

The strategy for market led agricultural extension in India has to include establishment of Agribusiness Co-operative Centers at every village or for a group of villages, which may be maintained by trained village leaders (Volunteers). These Agribusiness Centers will have to provide information on market intelligence, production technology and will also supply inputs including marketing and value addition to the produce. At block level a union of 5-6 Agribusiness Co-operatives Centers will have to form a federation to establish infrastructure for marketing the produce through various ways including exports and tie- up with private agencies for marketing and values addition. These Agribusiness Centers will have to reengineer the supply chain management for every produce based upon the collaborative efforts, which will reduce the cost of inputs and lower the transaction cost while marketing. The Agribusiness Centers will have to federated at District and State level. The state agricultural extension machinery may consider establishing Agribusiness Promotion Agency (APA) at District level with the active partnership of various development departments at district level including ATMA, KVKs, Zonal research centers , inputs supply agencies, NGOs etc. The major role of APA will be to make a plan for market led extension as well as facilitation of it's execution in collaboration with farmers organizations at village / district level.

Preparation of a strategic plan in market led extension at district, block and village level will have to be one of the important functions of state machinery of agricultural extension. A multi disciplinary team of experts drawn from local Agriculture University, KVK, NGOs, State Agricultural departments, input agency will have to be involved in preparation of the strategic plan. The major component of strategic plan will be auditing of local resources and facilities as well as identifying markets for different crops and opportunities for value addition. It will also identify the success story of agri-enterprises for traditional and high value crops at various levels to learn the lessons from their success and to incorporate them in the plan of action. Development of an efficient model of supply chain management for different crops or products will also have to be given attention. "A *supply chain* is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers." The existing supply input management is mainly based upon on individual efforts. Reengineering the supply chain through collaborative efforts through agribusiness cooperatives at village, district and state level or self-help-group or farmers organization etc., is essential for promotion of agribusiness

The other steps needed for agribusiness will include identification of market demands (including the demands for high value crops) in terms of produce for the present and the future; training of farmers for production of crops and products ;and value addition and reduction of cost of production. The farmers also need special training on specific standards for export (Euro-gap, Codex standards etc). Further, arrangements have to be made for public private partnership for inputs supply, sales of the produce, export etc.

I am happy to place in your hands the present issue of IJEE. It consists of a total of 22 research papers and research notes covering a wide range of topics such as adoption of aqua farming practices, development of scale for SES, participatory assessment of farm technology, achievement motivation of women entrepreneurs, institutional

innovation and project delivery, livelihood diversification of small farmers, marketing behaviour of glory lily cultivators, effectiveness of privatized extension services etc. I hope that you find these papers useful and interesting.

I profusely thank Dr.R.N.Padaria, Dr.Mrs.Premalata Singh, Dr.Rashmi Singh and Sh. V. Lenin (Ph.D scholar) of the Division of Agricultural Extension, IARI, New Delhi for their help in bring out the issue.



K.Vijayaragavan
Chief Editor

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Adoption of Good Management Practices by Aquafarmers

J. Charles Jeeva¹ and S. Balasubramaniam²

ABSTRACT

A study was conducted among the aquafarmers in Kerala to investigate the extent of awareness and adoption of good management practices. Of the 10 practices evaluated, the adoption scores of aquafarmers were higher for six practices viz., preparation of ponds, eradication of predators and weeds, use of PCR tested seeds, use of recommended feeding schedule, water exchange and quality monitoring and harvesting after prescribed days of culture. The average awareness index among the fish pre-processors was very high and thus, the respondents were well aware about the 15 hygienic practices to be followed in the prawn peeling sheds. The overall adoption index was 81.25 per cent.

The quality of fish reaching the consumers will greatly depend upon how the fish is handled at the harvest and post harvest stages. In aquacultural farms, improved management practices have to be followed to ensure good harvesting without much loss. Stringent quality norms are being enforced by various agencies for seafood export. Due to non availability of required information and inputs, and due to unclean fish handling, contamination of fish occurs which in turn will affect the quality of fish. Hence identification of problem areas and suitable interventions are essential to educate the people involved to ensure better prices for their commodity and to ensure the safety of fish consumers. In this context, a study on awareness and adoption of improved management practices will reveal the present position among the various clientele categories in small scale fisheries for strengthening extension efforts.

The present study was conducted with the following specific objectives: i) to find out the extent of awareness and adoption of good management practices followed in aquaculture farms and preprocessing units ii) to evaluate the impact of popularization efforts undertaken among the pre-processors.

METHODOLOGY

The study was conducted among the aquafarmers in four selected districts viz., Trichur, Alleppey, Ernakulam and Kannur, and among the pre-processors in Alleppey district of Kerala. The data were collected from random samples of 73 aquafarmers and 40 pre-processors. For measuring the extent of adoption, ten improved management practices were selected for aquafarmers and fifteen improved practices were selected for pre-processors. Using structured interview schedules and observation methods, the data were collected from the respondents.

In the case of aquafarmers, the adoption of each improved practice was measured on a three point scale viz., 'adopted', 'partially adopted' and 'not adopted' having scores of 3, 2 and 1 respectively.

In the case of pre-processors, the awareness and adoption on hygienic practices were measured through the indices developed for the study. Training need and impact of popularization efforts were measured on a three point continuum such as 'much needed', 'needed' and 'not needed' for training needs, and 'strongly agree', 'agree'

¹Scientist; ² Principal Scientist & Head
Central Institute of Fisheries Technology, Matsyapuri P.O., Cochin - 682 029.

and 'do not agree' for impact, having scores of 3, 2 and 1, respectively.

RESULTS AND DISCUSSION

Adoption of good management practices by aquafarmers

The results on socio-economic profile of the aquafarmers studied are given in Table 1. The results revealed that on an average, the age of aqua farmers was 46 years, most of them had high school education and had an experience of 12 years in aquafarming. On an average, they had undergone one training programme in aquaculture subjects. The frequently used information sources were friends and neighbours, and input dealers. Most of them availed technical expert services at the farm level and the mostly availed expert service was the consultancy services offered by the private consultants. The data revealed that the average area under culture was 10 acres and the source of water supply for all the respondents were found to be either backwater or river canals near their farms. The 'F' values showed that there was significant difference among the aquafarmers of the four districts on the variables such as age, number of information sources utilized and in availing the expert services, though there was no significant difference among the aquafarmers in four districts in terms of area under prawn culture.

In aquacultural farms, improved management practices have to be followed to ensure good harvesting

without much loss due to frequent occurrence of viral diseases. The extent of adoption scores measured for ten improved practices in the selected districts and as a whole are given in Table 2 and the average adoption scores were higher for the following practices viz., preparation of ponds (93.15%), eradication of predators and weeds (85.39%), use of PCR tested seeds (84.47%), use of recommended feeding schedule (77.63%), water exchange and quality monitoring (71.69%) and harvesting after prescribed days of culture (70.32%). Pre-mature harvesting due to viral attack after 60 days was reported in a few cases. Partial adoption was more seen in two practices such as the use of organic manures and fertilizers (68.95%), and use of recommended stocking rate (64.38%). Non-adoption was more in two practices such as the use of aerators and use of probiotics probably, due to extensive or traditional pattern of shrimp farming. The overall adoption index was 70.09. These results are comparable with the findings of Lekshmi *et al* (2005) who reported that the adoption behaviour of the shrimp farmers in Tamil Nadu was high with respect to practices such as harvesting at prescribed stage without viral attack, pond bottom conditioning, pond bottom sterilization, acclimatization and stocking of fry, liming of pond, feed management and health management.

The 'F' values indicated that there were significant differences among the aquafarmers of four districts in the adoption of almost all the improved practices. About 88 per cent of the aqua farmers had reported the occurrence of viral diseases in their farms at least once during the

Table 1. Socio-economic profile of aquafarmers

S.No.	Variables	Overall (N=73)		Trichur (n ₁ =21)		Alleppey (n ₂ =19)		Ernakulam (n ₃ =18)		Kannur (n ₄ =15)		'F' value
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
1	Age (years)	46.05	10.89	40.29	9.50	49.32	10.71	51.17	11.81	44.00	7.88	4.640**
2	Education (scores)	3.19	0.68	3.38	0.86	2.89	0.57	3.22	0.55	3.27	0.59	1.889
3	Experience (years)	11.96	8.33	10.43	8.27	13.47	7.28	15.94	9.96	7.40	4.58	3.693*
4	Number of training programmes undergone	0.81	1.23	1.38	1.69	0.26	0.45	1.00	1.28	0.47	0.64	3.642*
5	Number of information sources utilized	1.73	1.47	2.86	2.10	1.26	0.56	0.78	0.43	1.87	0.92	9.997**
6	Expert services availed (scores)	1.78	1.59	2.38	2.11	2.32	1.00	1.28	1.45	0.87	0.83	4.541**
	Area under culture (acres)	10.00	14.70	5.83	6.91	9.77	11.09	17.78	23.65	6.80	9.54	2.652

Significant at 1% level : * Significant at 5% level

Table 2. Extent of adoption of improved practices

S.No.	Improved practices	Adoption Indices										*F' value
		Overall (N=73)		Trichur (n ₁ =21)		Alleppey (n ₂ =19)		Ernakulam (n ₃ =18)		Kannur (n ₄ =15)		
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
1.	Preparation of ponds	93.15	0.53	80.95	0.81	100.00	0.00	94.44	0.38	100.00	0.00	6.286**
2.	Eradication of predators and weeds	85.39	0.80	69.84	0.94	96.49	0.46	79.63	0.92	100.00	0.00	6.472**
3.	Use of organic manures and fertilizers	68.95	0.92	69.84	0.94	45.61	0.68	68.52	0.87	97.78	0.26	11.784**
4.	Use of recommended stocking rate	64.38	0.77	57.14	0.64	56.14	0.89	59.26	0.55	91.11	0.46	9.236**
5.	Use of PCR tested seeds	84.47	0.83	68.25	1.02	92.98	0.63	81.48	0.86	100.00	0.00	5.450**
6.	Use of recommended feeding schedule	77.63	0.90	73.02	0.93	78.95	0.90	62.96	0.96	100.00	0.00	5.175**
7.	Use of probiotics	47.95	0.83	58.73	1.00	33.33	0.00	40.74	0.65	60.00	1.01	4.816**
8.	Use of aerators	36.99	0.43	46.03	0.74	33.33	0.00	33.33	0.00	33.33	0.00	4.559**
9.	Water exchange and quality monitoring	71.69	0.78	65.08	0.92	64.91	0.23	62.96	0.83	100.00	0.00	10.590**
10.	Harvesting after prescribed days of culture	70.32	0.79	61.90	0.91	75.44	0.56	51.85	0.51	97.78	0.26	14.557**
11.	Overall Adoption Index	70.09	0.56	65.08	0.77	67.72	0.18	63.52	0.50	88.00	0.09	7.641**

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

Table 3. Correlation and regression analyses between the socio-economic variables and adoption scores (N=73)

S. No	Variables	Correlation coefficients (r)	Regression coefficients (b)	SE of 'b'	't'
1.	Age (yrs)	-0.114	0.014	0.006	2.201*
2.	Education	0.207	0.002	0.093	0.019
3.	Experience (years)	-0.416**	-0.025	0.009	-2.905**
4.	Number of training programmes undergone	0.421**	0.124	0.056	2.222*
5.	Number of information sources utilized	0.394**	0.079	0.047	1.685
6.	Expert services availed	0.326**	0.032	0.043	0.758
7.	Area under culture	-0.248*	-0.003	0.004	-0.644

** Significant at 1% level ; * Significant at 5% level ; R²=0.373 ; F=5.514**

last three years, and the yield rate varied from 600 to 1600 kg per hectare in most of the farms depending upon the species cultured (*Penaeus indicus*/ *P. monodon*) due to the use of traditional prawn farming techniques. Most of the respondents had perceived the sources of virus infection as seeds/ feeds/ water and the stage of disease occurrence was found to be during 40-60 days.

The correlation and regression coefficients calculated between the socio-economic characteristics and

adoption scores are given in Table 3. Among the aquafarmers, the variables age and education did not have any association with the adoption while only two variables viz., experience and area under culture were found to have negative correlation with adoption scores. The variables viz., number of training programmes undergone, number of information sources utilized and expert services availed, were found to have positive relationship which indicated that when these scores

improve, the adoption scores could be more and vice versa. It is inferred that periodical training programmes and continued extension and educational efforts would improve the adoption of good management practices. Regression coefficients were worked out to find out the relative contribution of each of the socio-economic characteristics with the adoption of improved practices. The R^2 value indicated that, all the variables taken together served as cause for 37.30 per cent of variation in the adoption level. The significant F value revealed the overall significance of the regression. Of the seven variables, only two variables viz., age and number of training programmes undergone had contributed significantly towards the extent of adoption of improved practices, while experience had negative influence over the adoption behaviour.

The major constraints reported by the respondents were, increased cost of culture (86.30%), lack of financial assistance (68.45%), risk due to mortality (46.58%) and lack of technical guidance (43.84%), followed by lack of infrastructural facilities (17.81%), lack of remunerative price for the commodity (17.81%), water pollution (13.70%), lack of policies/ governmental schemes (10.96%), frequent occurrence of diseases (8.22%), absence of an enforcement agency to monitor the supply of good quality seeds and feeds, and non-availability of quality seeds (6.85%), absence of synchronized/ group farming approach (2.74%) and lack of access to laboratory facilities (1.37%).

Adoption of hygienic practices among pre-processors

The socio-economic profile of the pre-processors is given in Table 4. The average age of respondents was 48 years with a background of high school education and they had 16 years of experience in prawn peeling. On an average, each peeling unit had employed 63 workers. The mean investment in a peeling unit was Rs. 1.45 lakhs among small scale units due to the use of rented sheds and these peeling units had handled about 221 tonnes of fresh shrimps per year per unit with an average of 253 days of operation. The average quantity of shrimp peeled per day per worker was 22 kg. The average annual income per unit was Rs. 1.74 lakhs.

The mean training need index scores on the major subject areas are given in Table 5. The average training need index score among the pre-processors was 60.52 per cent with the standard deviation of 10.34. The mean training need scores were high for the two subject areas viz., infrastructural facilities required for peeling (69.17%) and post harvest handling of raw materials

Table 4. Socio-economic profile of preprocessors (N=40)

S. No	Variables	Mean	SD
1.	Age (years)	48.45	8.04
2.	Education (scores)	3.45	0.75
3.	Experience (years)	16.38	5.24
4.	Number of personnel employed	62.80	8.52
5.	Quantity peeled per day per worker (kg)	22.00	4.21
6.	Quantity peeled per year (tonnes)	221.00	40.45
7.	Number of working days per year	252.70	28.08
8.	Total investment (Rs. in lakhs)	1.45	0.24
9.	Annual income (Rs. in lakhs)	1.74	1.66

Table 5. Extent of training needs on various subject matters

S. No	Training subjects	Training need index	
		Mean	SD
1.	Infrastructural facilities required for peeling	69.17	0.76
2.	Post harvest handling of raw materials	66.67	0.32
3.	Storage of raw materials & peeled materials	59.17	0.66
4.	Water and ice to be used in pre-processing	63.33	0.30
5.	Types of tables, containers and utensils required	55.83	0.47
6.	Cleaning schedules to be used	58.33	0.59
7.	Hygiene and sanitation in the peeling shed	62.50	0.33
8.	Packing and transportation methods	49.17	0.55
9.	Overall Training Need Index	60.52	10.34

(66.67%). This was followed by water and ice to be used in pre-processing (63.33%), hygiene and sanitation in the peeling shed (62.50%) and storage of raw materials and peeled materials (59.17%). The training need as expressed by the pre-processors was low for the subject viz., packing and transportation methods.

The extent of awareness and adoption scores are given in Table 6. The average awareness index among the fish pre-processors was very high (97.83%) and it could be inferred that the respondents were well aware

Table 6. Extent of awareness and adoption of hygienic aspects in pre-processing

S. No	Improved practices	Awareness		Adoption	
		Mean	SD	Mean	SD
1.	Availability of drainage facilities in the pre-processing unit	100.00	0.00	92.50	0.36
2.	Availability of toilet facilities	100.00	0.00	96.25	0.27
3.	Use of fly proof netting for doors and windows	100.00	0.00	70.00	0.50
4.	Facility for feet and hand washing	100.00	0.00	95.00	0.30
5.	Suitable and clean place for peeling	100.00	0.00	88.75	0.42
6.	Use of adequate potable water for washing	100.00	0.00	97.50	0.22
7.	Use of adequate quantity of soap & detergents	100.00	0.00	83.75	0.47
8.	Use of chlorinated water for washing	100.00	0.00	83.75	0.47
9.	Use of recommended cleaning schedule	100.00	0.00	80.00	0.50
10.	Maintaining a high degree of personnel cleanliness	100.00	0.00	56.25	0.33
11.	Availability of adequate lighting & ventilation	100.00	0.00	96.25	0.27
12.	Efficient & prompt system of waste disposal	100.00	0.00	75.00	0.51
13.	Handling of ice hygienically to avoid bacterial contamination	100.00	0.00	51.25	0.16
14.	Adequate availability of clean utensils for fish handling	100.00	0.00	93.75	0.33
15.	Use of adequate rodent control measures	67.50	0.48	58.75	0.38
16.	Overall Awareness/ Adoption Index	97.83	1.61	81.25	6.48

about the 15 hygienic practices to be used in the prawn peeling units. The overall adoption index was 81.25 per cent with the standard deviation of 6.48. Of the 15 improved practices measured among the pre-processors, practices such as the use of adequate potable water for washing (97.50%), adequate lighting and ventilation (96.25%), toilet facilities (96.25%), facilities for feet and hand washing (95.00%), use of clean utensils for handling shrimps (93.75%), availability of drainage facilities (92.50%), clean place for peeling (88.75%), use of adequate quantity of soaps and detergents (83.75%), use of chlorinated water for washing (83.75%), use of recommended cleaning schedule (80.00%) and prompt system of waste disposal (75.00%) were adopted by most of the respondents. This was followed by use of fly proof netting for doors and windows, use of adequate rodent control measures, maintaining high degree of personal cleanliness and handling of ice hygienically to avoid bacterial contamination.

The post harvest handling of catch is getting high priority since this is the first as well as the most important step in the production of a high quality finished product (Devadasan, 2004). The factors such as delay in handling and chilling of the material, poor temperature control, damage from rough handling, poor standards of gutting, bleeding and washing the fish and crushing due to overfilling of container have deleterious effect on the quality of fish, reduction in shelf life, and weight loss

(Wheaton & Lawson, 1985). Because of the importance of hygienic pre-processing, big seafood factories have also started their own peeling units.

The extent of popularization was evaluated by studying the awareness and adoption of various practices. The scores on impact of popularization efforts undertaken are given in Table 7.

The overall impact perception index was 57.83 with the standard deviation of 10.82. The impact index was moderately good for the four impact factors viz., use of adequate water for pre-processing (73.33%), improvements in post harvest handling of raw materials with ice (69.17%), use of adequate quantity of chlorine for washing (65.00%) and use of adequate quantity of detergents (61.67%). The results revealed that inspite of repeated efforts through lectures, discussions, demonstrations, exhibitions etc., the impact of popularization efforts is yet to be improved due to the operation of several small-scale peeling units in and around the factories.

The correlation and regression coefficient values calculated between the socio-personal characteristics and adoption scores are given in Table 8. Among the pre-processors, the variables age, education, experience, quantity peeled per year by the unit, number of working days and annual income did not have any association with the adoption. Only one variable viz., quantity peeled per

Table 7. Impact of popularization efforts undertaken

S. No	Impact factors	Impact index	
		Mean	SD
1.	Improved the infrastructural facilities	43.33	0.52
2.	Post harvest handling of raw materials with ice has improved	69.17	0.53
3.	Awareness about the hygienic handling practices has increased now	59.17	0.48
4.	Adequate water is used for pre-processing	73.33	0.56
5.	Proper cleaning schedules are used in the peeling shed	54.17	0.59
6.	Floor Tables, containers & utensils are now well cleaned	60.83	0.55
7.	Hygiene and sanitation are improved in the peeling shed	54.17	0.59
8.	Adequate quantity of detergents are used now	61.67	0.48
9.	Adequate quantity of chlorine is used for washing now	65.00	0.32
10.	Developed favourable attitude towards hygienic handling practices	37.50	0.40
11.	Overall Impact Perception Index	57.83	10.82

Table 8: Correlation and regression analyses between the socio-economic variables and adoption scores (N=40)

S. No	Variables coefficients (r)	Correlation coefficients (b)	Regression	SE of 'b'	't'
1.	Age (years)	0.021	-0.003	0.003	-1.186**
2.	Education (scores)	-0.242	-0.021	0.027	-0.776
3.	Experience (years)	0.108	-0.003	0.005	-0.642
4.	Number of personnel employed	0.357*	0.007	0.003	2.384*
5.	Quantity peeled per day per worker (kg)	-0.499**	-0.009	0.005	-1.886
6.	Quantity peeled per year (tonnes)	-0.061	-0.001	0.001	-0.921
7.	Number of working days per year	-0.049	0.000	0.001	0.315
8.	Total investment (Rs. in lakhs)	0.448**	0.119	0.084	1.416
9.	Annual income (Rs. in lakhs)	-0.104	Negligible	0.000	-0.151

** Significant at 1% level ; * Significant at 5% level ; $R^2=0.451$; $F=2.742^*$

day per worker was found to have negative correlation with adoption scores, which indicated that while the quantity peeled per day per worker was low, the adoption of hygienic practices was higher and vice-versa. The variables, number of personnel employed and total investment were found to have positive relationship which indicated that when these scores improve, the adoption scores could be more and vice versa. The contribution of socio-economic variables towards adoption is also indicated by the regression coefficients given in the table. The R^2 value indicated that all the variables taken together served as cause for 45.10% of variation in the adoption level. The significant F value revealed the overall significance of the regression. Of the nine variables, age had negative influence while number of personnel

employed had contributed significantly towards the extent of adoption of improved practices.

The major constraints in adoption of hygienic practices were found to be more investment and less profits (72.50%), time lag in getting the information on improved practices (60.00%) and non-availability of skilled workers (35.00%). This was followed by other constraints such as unfavourable attitude among workers (32.50%), increased electricity charges (17.50%), seasonal nature of the activity (7.50%) etc., among the small scale units.

CONCLUSION

The greatest concern of the consumers is the quality of food they eat. To achieve 'safe fish' and to

ensure the safety of the fish consumer, it is of utmost importance to popularize good hygienic practices in harvest and post harvest stages of fish handling. The acceptance of a new idea is not a unit act but a complex process involving a sequence of thoughts and actions among the members of the society. Usually these decisions are made on the spot and also through multiple contacts with various communication channels and extension efforts. The findings of the present study would be helpful in planning and implementing the suitable extension mechanisms and schemes through both government as well as private sector interventions in the selected areas.

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Development and Standardization of Socio-Economic Status Scale

U.G. Thakare¹ and P.O. Ingle²

ABSTRACT

A study was undertaken to develop Socio-economic status scale with relevant indicators to suit the present scenario. The scale consists of nine main indicators: occupation, landholding, family education, caste, household, socio-political participation, annual income, material possession, and other attributes. Relevant sub-items against each main indicators were also identified. The scale consists of 29 sub-items to get the accurate indication of socio-economic status. The reliability of the scale was ascertained through test-retest method. The validity of the scale was established through content, concurrent and construct validity.

Socio-economic status is the position an individual occupies with reference to the prevailing average standard or cultural positions, effective income, material possession and participation in the group activities of the community (Bertrand, 1958). Socio-economic status is not uni-dimensional but multidimensional construct having three important factors: social influence (or quality of living), caste (or occupation) and land (or economic status of the income) making up what is denoted by the blanket term 'Socio-Economic Status'.

The Socio-Economic Status (SES) of the beneficiary respondent referred to the position of an individual or his family member held in the society. The socio-economic status scales developed earlier are not exactly suitable in the present changed socio-economic scenario and agriculture and rural situations. The need for appropriate socio-economic status scale has been felt for long. The present Socio-Economic Status Scale has been developed with relevant indicators to suit the present scenario.

Development of socio-economic status scale for farmers

The socio-economic status of the farmers plays an important role in differentiating the individuals from each other. The situations in the rural society show that the

individuals have considerable differentiation and a few are acclaimed as important persons. Distinguishing the farmers on socio-economic parameters has gained importance for their development purposes.

For development of the instrument following steps were followed :

1. Identification and selection of indicators of socio-economic status
2. Judges rating for ranking to indicators of socio-economic status
3. Assigning weightages of the different socio-economic status indicators and calculation of weighted score of each main indicator.
4. Testing the reliability of the scale
5. Testing the validity of the scale
6. Final format of socio-economic status scale
7. Norms for the use of the scale to the farmer's population, maximum and minimum score and categorization.

Identification and selection of indicators of SES

The indicators of level of SES of farmers were identified on the basis of reviewed literature specifically

1. Research Associate, Cotton Research Unit, Dr. PDKV, Akola.

2. Professor and Head, Department of Extension Education, Dr. PDKV, Akola.

published on the farmers. The officials, social workers and the personnel from various government and non-government organization were consulted for identification of indicators. The SES of farmers has special reference to the tradition and culture, in addition to social reference to the tradition. Hence, adequate consideration was given to these items. In all following nine major indicators were identified.

1. Occupation
2. Land holding
3. Family education
4. Caste
5. Household
6. Socio-political participation
7. Annual income
8. Material possession
9. Other attributes

Thus, initially nine main items were selected, relevant sub-items against each main item were also identified. Thus, in all 29 sub-items were prepared and arranged logically for the detailed analysis, to get the accurate indication of SES. The sub-items under each main item were enlisted below :

1. Occupation
 - i. Occupation of family head
 - ii. Occupation of other dependent (son/brother, etc.)
2. Land holding
 - i. Farm size
 - ii. Type of soil
 - iii. Type of cultivation
 - iv. Cropping pattern
 - v. Source of irrigation
 - vi. Ownership of land
 - vii. Contingency paid / permanent labour
3. Family Education
 - i. Husband's education
 - ii. Wife's education
4. Caste
5. Household
 - i. Type of house
 - ii. Family size
 - iii. Family type
 - iv. Lightening facility
 - v. Condition of the house
 - vi. Ownership of house
 - vii. Other facilities
 - viii. Rooms in the house
 - ix. Storage house availability

6. Socio-political participation
7. Annual income
8. Material possession
 - i. Farm implements / equipments
 - ii. Transport facility
 - iii. Household equipments
 - iv. Information sources
 - v. Animal possession
 - vi. Farm structure
 - vii. Listening to radio
 - viii. Television watching
 - ix. Farm visit / Exhibitions / Extension Personnel
9. Other attributes

These main and sub items were then put for further analysis by identifying relevant items in each of the sub item. Thus in total 174 items were identified, indicative of the SES. These were arranged logically for further analysis.

Judges rating for ranking of indicators of SES

The selected indicators of SES of farmers were referred to the experts, researchers, social scientists, government and non government organisation working in the field of rural and agricultural development. In all 50 selected judges were contacted.

Out of 50 judges to whom the indicators of the scale were mailed, only 32 of them could respond despite reminders. Thus 64 per cent responses from the judges could be obtained which was quite satisfactory in this regard to draw the valid conclusion.

The judgements given by the judges were used to work out mean relevancy score with the help of formula as follows.

$$MRS = \frac{\sum s_{ji}}{N_j}$$

Where,

- MRS = Mean relevancy score
 $\sum s_{ji}$ = Total of scores given by judges to each item
 N_j = Number of judges

Out of 9 main items, one item was deleted because it was considered to be less important or sometimes irrelevant to the SES of farmers and having mean relevancy score less than overall mean relevancy score (2.57). Hence 8 items were selected. The Judges were asked to indicate the relevancy of the items and were

Table 1. Weightage for main indicators of SES for farmers

S.No.	Indicator	Rank score	Difference in rank score	Cumulative weightage
1.	Occupation	1.48	0.10	7.52
2.	Land holding	1.58	1.84	7.42
3.	Family education	3.42	1.26	5.58
4.	Annual Income	4.68	0.97	4.32
5.	Socio-political participation	5.65	1.19	3.35
6.	Households	6.84	0.64	2.16
7.	Material possession	7.48	0.52	1.52
8.	Other attributes	8.00	0.00	1.00

further requested to rate sub-items and give relevant score to them according to their importance in measuring the SES of the farmers. Out of 50 judges, 32 judges finally responded. On receiving the judge's responses, the rank averages were worked out for the main items and then were rearranged. The indicator to which most of the judges ranked first was placed at rank one and in the same manner other indicators were arranged. The average of the scores allotted by judges to the SES items with maximum average score was placed at rank one and other sub-items were ranked in the descending order.

Assigning weightages to the different SES indicators and calculation of weighted score of each main indicator

Raw score as such have limited utility. The raw scores earned by an individual or a particular group does not indicate relative position of the individual or group in the total distribution of the population. Therefore, for giving meaning to the raw scores and making them more precise, norms were decided. Such norms are helpful in providing a basis for understanding and interpreting the raw scores. It also helps in determining the relative position of an individual on a scale precisely.

Weightages to each main item was given depending upon its importance and contribution to the socio-economic status. The weightages were given as follows.

The items were arranged chronologically depending on the MRS. The difference between the MRS of immediately preceding and succeeding indicator adequately depicts the importance of the preceding indicator over the succeeding item. This criterion was used to calculate the weightages for each main indicator of the SES as shown in Table 1.

The weight of each main indicator was used to calculate the weighted score of the indicator. The SES weighted score was calculated by using following formula

$$SES = \frac{\sum Sw_i s_i}{\sum w_i}$$

Where,

- SES = Socio-economic status
 w_i = Weightage of 'i' the indicator
 s_i = Raw score of 'i' the indicator
 $\sum w_i$ = (32.87) Total of cumulative weightage

Testing the reliability of the scale

The reliability of the scale indicates that it is stable and it measures the variables consistently from one time to another. For assessing the reliability of the present SES scale following tests were used:

1. Test - Retest method
2. Inter-judge reliability

The content of internal consistency does not apply to the present scale as the consistency in relationship between different indicators / items socio-economic status of farmers is not comparable.

Test - retest method

For testing the temporal reliability of the socio-economic status scale, test-retest method was used. The scale was applied to the 15 beneficiaries other than the sample and the scale was applied to them two times at an interval of a fortnight.

The co-efficient of correlation of the scale scores, taken at two different times was observed to be 0.82. It indicates quite high temporal reliability and stability of the scale.

Inter judge reliability

For testing the stability of the scale, it was applied to 15 randomly selected beneficiaries by the two independent persons. The rank order correlation between the scores obtained by two independent judges was very high (0.86). This established the reliability of the scale as far as the interviewer bias was concerned. The results of the test and retest method and the inter judge reliability test in the present case have established the reliability of SES scale in terms of its stability in measurement of SES of farmers.

Validity of the scale

The validity is the property of the scale that ensure that the obtained SES score correctly measure the variable they are supposed to measure. In the present case the validity of the scale was established by the using following methods.

- i. Content validity
- ii. Concurrent validity
- iii. Construct validity

Content validity

Content validity is also called face validity (Garrette and Woodworth, 1967). The content or face validity is the validity when it appears to measure whatever the author had thought he was measuring. Judgement of face validity is very helpful in helping the author to decide whether the items are relevant to some specific situation. Therefore, the choice of the item in content validity depends upon the judgement of competent person about its suitability for the purpose of the test.

Final format of SES scale

S. No.	Item/indicator	Score	Cumulative weight
1.	Occupation		7.52
	(a) Occupation of family head		
	i. Agriculture + labour	2	
	ii. Agriculture (Farming)	3	
	iii. Agriculture + allied occupation (Goat Farming/poultry/apiculture/sericulture)	4	
	iv. Agriculture + business (Professional/non professional)	5	
	v. Agriculture + service (job with monthly salary)	6	
	(b) Occupation of other dependent (son/brother etc.)		
	i. Landless labour (Daily wage earner)	1	
	ii. Agriculture + labour	2	
	iii. Agriculture (Farming)	3	

The content validity of the present scale was established on the basis of incision of the appropriate indicators of SES of farmers. The parameters of farmers SES are obviously distinct from the other community like servicemen or tribals etc. and hence, care was taken to include all such indicators that differentiate the farmers from each other on SES dimensions. The selection of items was based on careful examination of the literature and the judgements of the specialists of the government and non government personnel working for agricultural and rural development. The selection of items and assessment of their importance was also decided on the basis of the judgements of the experts. Although there is no numerical way to express the contents in itself established the content validity.

Concurrent validity

The criterion related validity of the present SES scale for the farmers was established on the basis of concurrent validity which tests the usefulness of the scale relating to how well the score corresponds to some outside criterion of the variable being measured. In the present scale the relationship of scale scores with the known group was used as criterion for testing validity. A random sample of 15 farmers with relatively high status and 15 farmers with relatively low status were judged. The rank order correlation between the scores of the two categories was quite high (0.83) and significant at 1 per cent level of probability. It strongly indicates the validity of the scale.

Thus, these content validity and concurrent related validity had established the validity of the present SES scale for measurement of SES of farmers.

S. No.	Item/indicator	Score	Cumulative weight
	iv. Agriculture + allied occupation (Goat farming/poultry/apiculture/sericulture)	4	
	v. Agriculture + business professional/non professional)	5	
	vi. Agriculture + service (Job with monthly salary)	6	
	Weighted Score = Raw score \times 7.52 = (score a + b) \times 7.52		A
2.	land holding		
	(a) Farm size		
	i. Marginal (upto 1 ha)	1	
	ii. Small (1.01 to 2.00 ha)	2	
	iii. Semi-medium (2.01 to 4.00 ha)	3	
	iv. Medium (4.01 to 10.00 ha)	4	
	v. Large (Above 10 ha)	5	
	(b) Type of cultivation		
	i. Rainfed	1	
	ii. Irrigated	2	
	(c) Cropping pattern		
	i. Seasonal cropping / single cropping	1	
	ii. Double / Multiple cropping	2	
	iii. Biannual cropping	3	
	iv. Orchards	4	
	(d) Source of irrigation		
	i. No source	0	
	ii. River	1	
	iii. Well	2	
	iv. Canal	3	
	(e) Ownership of land		
	i. Land leased out : ___ ha	1	
	ii. Land leased in : ___ ha	2	
	(f) Contingency paid yearly worker		
	No	0	
	Yes	1	
	Weighted Score = Raw score \times 7.42 = (score a + b + c + d + e + f) \times 7.42		B
3.	Family education		5.58
	(a) Husband's education		
	i. Illiterate	0	
	ii. elementary (can read and write only)	1	
	iii. Primary	2	
	iv. Middle school	3	
	v. High school	4	
	vi. Technical college	5	
	vii. Non technical college	5	
	viii. Professional (medical / engineering / agriculture)	6	
	(b) Wife's education		
	i. Illiterate	0	
	ii. Elementary (can read and write only)	1	
	iii. Primary	2	
	iv. Middle school	3	
	v. High school	4	
	vi. Technical college	5	
	vii. Non-technical college	5	
	viii. Professional (gardening/training for entrepreneurship)	6	
	Weighted Score = Raw score \times 5.58 = (score a + b) \times 5.58 =		C

S. No.	Item/indicator	Score	Cumulative weight
4.	Annual Income		
	i. Below poverty line	1	
	ii. Upto Rs. 50,000/-	2	
	iii. Rs. 50,000/- to 1,00,000/-	3	
	iv. Rs. 1,00,000 to 1,50,000/-	4	
	v. Rs. 1,50,000 to creamy layer	5	
	vi. Above creamy layer	6	
	Weighted score = Rawscore \times 4.32 =		D
5.	Socio-Political Participation		
	i. Without any position in social or political organisation	0	
	ii. Membership of one social or political organisation	1	
	iii. Membership of one social and political organisation	2	
	iv. Involved in community work though not having membership or official position in any social or political organisation	3	
	v. Financial contribution / raising common funds	3	
	vi. Official position in social or political organisation	4	
	vii. Village leader / opinion leader	5	
	viii. Wide public leader	6	
	Weighted score = Raw score \times 3.35		E
6.	Household		
	(a) Type of house		
	i. Shed thatched (stalk frames)	1	
	ii. Mud wall and thatched	2	
	iii. Brick wall and tiled	3	
	iv. Concrete house	4	
	v. Double storied	5	
	(b) Ownership of house		
	i. Rented	1	
	ii. Own	2	
	(c) Other facilities		
	i. Toilet / soak pit available	1	
	ii. Well inside the yard	2	
	iii. Bio gas connection / LPG connection	3	
	(d) Condition of the house		
	i. Need much repair	1	
	ii. Need some repair	2	
	iii. Neat and well kept without court yard	3	
	iv. Neat and well kept with court yard	4	
	(e) Lightening facility		
	i. Kerosene lamp / petromax	1	
	ii. Electricity	2	
	(f) Family type		
	i. Single	1	
	ii. Joint	2	
	(g) Family size		
	i. Small (1 to 3 members)	1	
	ii. Medium (4 to 6 members)	2	
	iii. Large (7 to 9 members)	3	
	iv. Very large (10 and above)	4	

S. No.	Item/indicator	Score	Cumulative weight
	(h) Storage house available		
	i. No.	0	
	ii. Yes	1	
	Weighted score = Raw Score \times 2.16 = (score a + b + c + d + e + f + h) \times 2.16 =		F
7.	Material possession		
	(a) Farm implements / equipments		
	i. No farm implements / Equipments	0	
	ii. Harrow	1	
	iii. Hoe	1	
	iv. Wooden plough	1	
	v. Wooden seed-drill	1	
	vi. Mould - bould plough	2	
	vii. Ferti-hoe	2	
	viii. Iron seed - cum - fertilizer drill	2	
	ix. Duster	3	
	x. Sprayer	3	
	xi. Diesel engine	4	
	xii. Electric pump	4	
	xiii. Thresher / harvesters	5	
	(b) Household equipments		
	Grain storage		
	i. No grain storage facility	0	
	ii. Silo pits	2	
	iii. Pev	2	
	iv. Kangi	1	
	v. Metallic bins	1	
	Furniture		
	i. No furniture availability	0	
	ii. Chair	1	
	iii. Tables	1	
	iv. Almira	2	
	v. Devan	3	
	vii. Sofa	3	
	Other household equipments		
	i. No other household equipments	0	
	ii. Watch/torch	1	
	iii. Fan	2	
	iv. Camera	2	
	v. CD player	3	
	vi. Mixer/grinder	3	
	vii. Tape-recorder	3	
	viii. Telephone	4	
	ix. Cooler	5	
	x. Refrigerator	5	
	(c) Animal possession		
	Farm animals (Bullock)		
	i. No farm animals	0	
	ii. Non Discrete	1	
	iii. Discrete	2	
	Milch animals		
	i. No milch animals	0	
	ii. Non discrete	1	
	iii. Discrete	2	

S. No.	Item/indicator	Score	Cumulative weight
	Goat/sheep		
	i. No Goat/sheep	0	
	ii. Non discrete	1	
	iii. Discrete	2	
	Poultry		
	i. No poultry possession	0	
	ii. Possesses poultry	1	
(d)	Information sources		
	No information sources	0	
	i. Books	1	
	ii. Farm publications	2	
	iii. Agricultural bulletins / magazines	2	
	iv. News paper - daily / weekly / fortnight	3	
	v. Radio	3	
	vi. TV - Black and white / coloured	4	
	vii. Internet access (common)	5	
(e)	Farm structure		
	Cattle shed		
	i. No cattle shed	0	
	ii. Katcha	1	
	iii. Pucca	2	
	Implements shed		
	i. No implement shed	0	
	ii. Katcha	1	
	iii. Pucca	2	
(f)	Transport		
	No transport facility	0	
	i. Cycle	1	
	ii. Bullock cart	2	
	iii. Motor cycle / moped	3	
	iv. Jeep / lorry / van	4	
	v. Tractor / truck	4	
(g)	Farm visits / Exhibitions / Extension activities		
	i. Always	3	
	ii. Sometimes	2	
	iii. Never	1	
	Weighted score = Raw score \times 1.52 = (score a + b + c + d + e + f + g) \times 1.52		G
8.	Other attributes		
	No other attributes	0	
	i. Seed producer	1	
	ii. Progressive farmer	2	
	iii. Prize winner - village / tahsil / district level	3	
	iv. <i>Krishi pandit</i>	3	
(a)	Loans		
	i. Borrowed	1	
	ii. Not borrowed	2	
(b)	Repayment behavior		
	i. Defaulter	1	
	ii. Non defaulter	2	
	Weighted score = Raw score \times 1.00 = (score a + b) \times 1.00 =		H

$$\text{SES weighted average score} = \frac{\sum w_i s_i}{\sum w_i}$$

$$\text{SES score} = \frac{A + B + C + D + E + F + G + H}{32.87}$$

$$\text{SES Score} = \text{-----}$$

Norms for the use of SES scale

The SES scale developed for the farmers is useful for measurement of SES of different farming communities. As the raw score did not discriminate very clearly the respondents on the socio-economic conditions hence it is advocated to convert raw score into the weighted score.

After converting the raw scores of all the items in the SES scale, finally as described earlier SES weighted average score may be calculated with the help of following formula.

$$\text{SES weighted average score} = \frac{\sum w_i s_i}{\sum w_i}$$

Where,

- S_i = The raw score of the i th item
 w_i = Weight of the i th item (Table)
 $\sum w_i$ = Summation of the cumulative weight of the i th item (i.e. 32.87) which is constant.

The maximum obtainable weighted SES score is 17.83 and the minimum weighted SES score is 02.06. The categorization according to SES score on the basis of minimum and maximum obtainable score has been done in five categories, keeping an equal interval. The scale was used for measuring the SES of the farmer respondents in the study area of Akola District of Vidarbha region of Maharashtra state.

While categorizing respondents on SES, the class interval between different categories was decided using following formula.

$$\text{Class interval} = \frac{\text{Maximum obtainable score} - \text{minimum obtainable score}}{5}$$

$$= \frac{17.83 - 02.06}{5} = 15.76 / 5 = 03.15$$

Thus, on the basis of total weighted SES score obtained by the respondents, their categorization was made as follows :

S.No.	Weighted score range	Category
1.	Up to 05.21	Very low
2.	05.22 to 08.37	Low
3.	08.38 to 11.52	Medium
4.	11.53 to 14.67	Medium High
5.	14.68 and above	High

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Participatory Assessment of Managing Alternate Bearing in Mango With Application of Paclobutrazol

R.N. Padaria¹ and V.K. Singh²

ABSTRACT

The study examines the effectiveness and appropriateness of paclobutrazol application for managing the physiological problem of alternate bearing of mango. Participatory assessment trials were laid out in villages of mango belt of Lucknow and Meerut regions. With application of paclobutrazol @ 3.2 ml per meter canopy diameter of trees ensured yield in range of 40-118 kg per tree during off year of fruiting as against 0-40 kg per tree in control plots in cultivar Dashehari, while in case of cultivar Chausa the respective figures of yield were 100-260 kg per tree in treated plot and 0-40 kg per tree in control plots. Participating in the assessment trials growers learnt the know-how and do - how as well as the principle of the technology and after care management practices. They also developed favourable perception about the technology on parameters like efficacy, profitability and compatibility of the technology.

Mango (*Mangifera indica* L.) is one of the most important fruit crops in India owing to its great significance in social, economic and cultural realm of the society. However, its long-standing problem of alternate bearing renders mango cultivation less remunerative particularly to the orchardists of northern India. Alternate bearing is a kind of physiological disorder wherein there is a tendency to bear a heavy crop in one year (on-year) and very little or no crop in the succeeding year (off-year). Most of the commercial varieties of north India, namely, Dashehari, Langra, Chausa, etc., are biennial bearers as a result growers have to suffer tremendous economic loss. Mango being the mainstay of livelihood support system for the growers, management of alternate bearing has been a challenging task for the researchers and extensionists.

Certain growth regulators have been found to induce the flowering in mango during "off" year. Among such chemicals paclobutrazol has been used as a broad spectrum growth retardant, which exerts profound effect on vegetative and flowering behaviour in fruit crops.

Researches conducted at several research centers across the country have shown that application of paclobutrazol ensures effective management of tendency of alternate bearing. With application of 5.0 ml paclobutrazol per meter canopy diameter 120 days before bud break, highest yield of 60 kg per tree of cultivar Baneshan was secured at research station Sangareddy, while maximum percentage of flowering was recorded in cultivar Dashehari at GBPUA&T, Pantnagar.

Besides soil application, paclobutrazol applied as foliar spray also gives good result. It has been reported that 1000 ppm foliar spray of paclobutrazol was also effective in inducing flowering and fruiting in off-season. In case of cultivar Mallika, yield of 39.5 kg/tree was obtained with soil application of 4 g paclobutrazol while 29.5 kg/tree with 1000 ppm foliar application of paclobutrazol as against 17.0 kg/tree in control plot.

Considering the potential of this technology standardized at Central Institute for Subtropical Horticulture, Lucknow, it was subjected to farmer

¹ Senior Scientist (Agricultural Extension), IARI, New Delhi - 110 012.

² Senior Scientist (Plant Physiology), CISH, Lucknow - 227 107.

participatory assessment trials to judge its on-farm performance and compatibility in growers production system. Glaring cases of non-adoption and rejection of technologies by farmers on account of their inappropriateness and incompatibility to production system have necessitated assessment of technologies prior to their deployment for large-scale dissemination.

The present study was undertaken with the objective of investigating the effectiveness and appropriateness of the technology and the constraints in its acceptance among the mango growers.

METHODOLOGY

The study was conducted in the mango-belts of Lucknow and Meerut regions of Uttar Pradesh. Assessment trials were laid out at villages Kakori, Pathakganj, Jallabad, Kurakhar, Budharia, and Shahmau in Lucknow region and at villages Lisari, Jeewana and Mehafa in Meerut region. Mango trees of cultivars Dashehari and Chausa which had witnessed normal (on-year) fruiting in the previous season were selected for the trials and subjected to soil application of paclobutrazol @ 3.2 ml m⁻¹ tree canopy diameter in trenches made around tree trunk in the month of September. At village Mahefa, instead of soil application, trees of cultivar Chausa were sprayed with 1000 ppm paclobutrazol. Control plots of respective cultivars were maintained at each trial location for comparative assessment of effect of paclobutrazol in inducing flowering and fruiting in mango trees during their off-year season.

Farmer-friendly simple with and without experimental design was followed for easy understanding, implementation, observation, comprehension and interpretation by the farmers and also to ensure meaningful participation of growers in the assessment trials. Regular monitoring was done by the experimenters (crop physiologist and extensionists) along with the growers to ensure validity of trial and observation as well as to maintain the continuity of the latter in the trials. Growers' perception about the potential of the technology was quantified through a likert type 3-point continuum scale: agree, undecided, and disagree with relative weightage of 3, 2 and 1, respectively. Information and training needs were assessed on 3-point continuum, namely most needed, some what needed and not needed with respective weightage of 3, 2 and 1.

RESULTS AND DISCUSSION

Application of paclobutrazol was found effective in inducing flowering and fruiting as evidenced by

discernible results in treated and control plots. The yield ranges (kg/tree) obtained in case of Dashehari were 60-70, 60-65, 100-120 and 90-118 from trial sites at Kakori, Pathakganj and Jallabad and Kurakhar, respectively for Lucknow region as against 10-20, 0-20, 10-30 and 30-40 kg/tree from respective control trees. At Lisari and Jeewana villages the yield ranges in treated trees of Dashehari were 70-80 and 40-60 kg/tree as against 0-20 and 0-10 kg per tree from respective control trees (Table 1). Percentage increase in yields ranged from 362 to 745. Orchards treated with paclobutrazol yielded three to over eight times higher yield as compared to control group in case of Dashehari.

For cultivar Chausa, the yield (kg/tree) range recorded were 180-210.5, 100-120, 90-110, 200-220, 120-150 and 200-260 from trial sites at villages Budharia, Kurakhar, Kakori, Jallabad and Shahmau (Lucknow region) and Mahefa (Meerut region), respectively as against 30-40, 10-30, 0-40, 10-20, 0-10 and 0-10 from respective control plots of untreated trees (Table 2). The mean yields ranged from 92 to 211 kg/tree. Percentage increase in yield was observed in range of 435 to 3736. Enhancement in yield was found to be manifold (5 to 38 times) in treated plot as compared to untreated plot. With the results of the trials, growers concluded that application of paclobutrazol was quite effective in inducing flowering and fruiting in off-year trees and thus was helpful in managing irregular bearing in cultivars Dashehari and Chausa.

Growers' perception of the technology

Growers perceived the technology to be efficacious, profitable and compatible with the production system, which is evident by the respective mean perception scores of 2.83, 2.83 and 2.73 (Table 3). They stated that compatibility would be more if the chemical was readily available at cheaper rate. Since the alternate bearing is a recurrent problem, the technology was perceived to be highly compatible. However, they shared that the technology is labour intensive as extra labour manpower would be required to make double rings in the basin for application of paclobutrazol. They also perceived that paclobutrazol might exhaust the mango trees with forced bearing in successive years and plant health would deteriorate. Therefore, their mean perception score were low (2.24). With mean perception score of 2.93, growers shared that the result of paclobutrazol was quite discernible. The treated trees witnessed flowering and fruiting even in their off year, while no to very low level of flowering and fruiting were observed in control

Table 1. Yield obtained from validation trials on use of paclobutrazol in mango cultivar Dashehari

Trial site	Yield (kg/tree)				Percentage increase
	Trees treated with paclobutrazol		Untreated trees		
	Range	Mean	Range	Mean	
Lucknow region					
Kakori	60-70	63.25	10-20	11.50	450
Pathakganj	60-65	61.33	0-20	13.25	362.9
Jallabad	100-120	105.25	10-30	14.00	651.8
Kurakhar	90-118	92.50	30-40	32.25	186.82
Meerut region					
Lisari	70-80	71.50	0-20	10.50	581.00
Jeewana	40-60	42.25	0-10	5.00	745.00

Table 2. Yield obtained from validation trials on use of paclobutrazol in mango cultivar chausa

Trial site	Yield (kg/tree)				Percentage increase
	Trees treated with paclobutrazol		Untreated trees		
	Range	Mean	Range	Mean	
Lucknow region					
Budharia	180-210.5	183.33	30-40	34.25	435.3
Kurakhar	100-120	104.50	10-30	11.50	808.7
Kakori	90-110	92.33	0-40	15.50	495.7
Jallabad	200-220	205.50	10-20	12.25	1577.5
Shaila Mau	120-150	122.50	0-10	4.25	2782.4
Meerut region					
Mahefa*	200-260	211.00	0-10	5.50	3736.4

*Trees were treated with 1000 ppm foliar spray of paclobutrazol.

Table 3. Farmers' perception about the potential of the technology (N = 200)

Parameters	Mean perception score
Efficacy	2.83
Profitability	2.83
Complexity in use	1.33
Compatibility with production system	2.73
Labour intensiveness	2.91
Sustainability	2.24
Observability	2.93
Trialability	2.93
Communicability	2.54

trees. Some growers used paclobutrazol for trial in one to few trees. Their successful results affirmed their perception that the technology could be applied in even small scale for trial. They felt that technical know-how could be communicated to fellow farmers by them but they needed training for correct flow of information about technical aspects like preparation of solution, making of double rings around tree trunk, measuring the canopy diameter etc.

Dissemination of the technology

Successful assessment trials in growers orchards and favourable perception about the technology among the growers, except for sustainability parameter, provided the background for designing and execution of extension interventions for effective dissemination and greater adoption of the technology. Firstly, the information and

Table 4. Information and training needs of mango growers in use of paclobutrazol

Areas of information and training need	Mean score	Level of information and training need (N = 200)		
		Most needed	Somewhat needed	Not needed
Dose of paclobutrazol (@ 3.2 ml per meter of canopy diameter)	2.89	180 (90.00)	18 (9.00)	2 (1.00)
Method of calculating canopy diameter	2.84	174 (87.00)	20 (10.00)	6 (3.00)
Preparation of paclobutrazol solution	2.91	184 (92.00)	14 (7.00)	2 (2.00)
Preparation of double rings around tree trunk	2.83	164 (82.00)	28 (14.00)	8 (4.00)
Method of application of paclobutrazol	2.88	178 (89.00)	20 (10.00)	2 (1.00)
Time of application (first fortnight of September)	2.90	184 (92.00)	12 (6.00)	4 (2.00)
After care management practices	2.94	189 (94.50)	9 (4.50)	2 (1.00)

Table 5. Potential constraints in adoption of the technology

Constraints	Frequency	Percent
Chemical not available readily	200	100.00
Unavailability of chemical in smaller pack	162	81.00
High cost of chemical	149	74.50
High labour intensiveness	153	76.50
Complexity of the technology		
Method of calculating tree canopy diameter	52	26
Preparation of paclobutrazol solution	51	25.5
Preparation of double rings around tree trunk	43	21.5
Risk of long term impact of use of paclobutrazol on plant and soil system	123	61.5
Management intensiveness	109	54.5

training needs of the growers were assessed. It was observed that about nine in ten growers showed high need of information and training in method of calculating canopy diameter, per tree dose of paclobutrazol, preparation of paclobutrazol solution for spray, preparation of double ring around tree trunk, method and time of application and after care practices in orchard treated with paclobutrazol (Table 4).

Extension interventions like *gosthies*, demonstrations, trainings, field visits, distribution of literature, etc. upgraded the knowledge and skill of

growers in use of paclobutrazol i.e. dose of paclobutrazol (3.2 ml per meter of canopy diameter), method of calculating canopy diameter i.e. average of criss - cross measurements of canopy shades through the trunk, preparation of paclobutrazol solution, preparation of double rings around tree trunk and application of paclobutrazol solution in rings and time of application i.e. first fortnight of September. Growers were educated about after care management practices and were guided to make utmost care of nutritional management with farmyard manure to maintain the health and vigour of trees.

Constraints in adoption

Though the growers found the technology effective in managing alternate bearing, their intention to adopt was affected by factors like higher cost, unavailability of paclobutrazol readily, unavailability in smaller pack so that growers could purchase and use at smaller scale, labour intensiveness, perceived risk of paclobutrazol on soil and plant system, difficulty in preparation of solution, etc. (Table 5). The chemical should be available in smaller pack for greater level of use. The growers were educated for group action so that they could procure chemical at group or village level and bargain for cheaper rate.

CONCLUSION

The assessment trials showed that the application of paclobutrazol was quite effective in managing alternate bearing in mango. Participating in the assessment trials growers learnt the know-how and do - how as well as the principle of the technology and after care management practices as well as developed favourable perception about the technology on parameters like efficacy, profitability and compatibility of the technology. The findings on perception, information and training need and constraints helped in designing the strategy for effective dissemination of the technology. Growers realized the importance of group action in adoption and utilization of costly technology.

Determinants of Block Supervisors' Perceptions of On-the-Job Training and Off-the-Job Training in Bangladesh

Mohammad Jiaul Hoque¹, Usami Koichi²

ABSTRACT

The main purpose of this study was to determine the Block Supervisors' (BSs) perceptions of on-the-job training (OJT) and off-the-job training (Off-JT). A survey research design was used for the study with a population of 236 BSs working at the Kishorganj district, Bangladesh. Data were collected from a sample of 102 respondents with the use of a set of questionnaires during a period from July 15th to August 20th in 2004. The result showed that the proportion of BSs with higher and lower perceptions of both OJT and Off-JT were similar (about 50%). BSs' age and service tenure showed significant relationships with their perceptions of OJT as well as Off-JT. BSs' mass contact showed significant and positive relationship with their perception of OJT while BSs' group contact showed significant and positive relationship with their perception of Off-JT. The result of the linear multivariate regression indicated that 44.7% ($R^2 = 0.447$) and 25.1% ($R^2 = 0.251$) of the variance in the BSs' perceptions of OJT and Off-JT respectively could be explained by their age and group contact.

The economy of Bangladesh is predominantly agrarian, with the agricultural sector accounting for about 35 per cent of gross domestic product (GDP). The government is committed to the continued development of this sector and its sustainability in order to maintain food supplies for the growing population. The Department of Agricultural Extension (DAE) as an agency with the Ministry of Agriculture has the overall responsibility for effective implementation of government policy in agricultural extension with intention of development of agriculture. The DAE employs more than 12,000 Block Supervisors at the block level. Each BS is responsible for providing agricultural extension services to 1200-1500 farm families (DAE, 1999) acting as the main link between farmers and sources of information and assistance. They can help farmers get access to DAE extension services, services from non-government organizations and other government departments. But theoretically, the BSs are now expected to not only provide extension services but also facilitate the capacity building of farmers and rural communities in the trend of privatization of inputs and outputs distribution along

with the reduction of subsidy. As a result of this, the DAE has over the years invested huge resources in trainings and continues to do so with intention to equip BSs with necessary skills. The necessary cost for these trainings is provided by national government as well as international organizations or donors.

Davis (1973) indicated that in arranging and allocating training resources for learning, the primary responsibility of the training organization must be to ensure the effectiveness of the training program. The theoretical framework for this study was therefore based on Davis conceptual model for training effectiveness (Maybey, 1989; Davis, 1973) as only the effective training can ensure the skill development of the BSs. On the other hand, the criteria or indicators of effectiveness of training are the successful achievement of course objectives, successful overall assessment of the course, quality of design and delivery, and enhanced motivation of the trainees (Davis, 1973). As a result of this, an attempt was made to determine the extent of BSs' perception of overall assessment of agricultural extension

¹ Doctoral Student, The United Graduate School of Agricultural Sciences, Tottori University, Tottori, Japan.

² Professor, Faculty of Agriculture, Yamaguchi University, Yamaguchi, Japan.

training. Unless the BSs have favourable perception on extension training, it would be very difficult to improve their skills through training. Moreover, their favorable perception on training could ensure effective utilization of time, money and effort on training provided by national government, as well as international organizations/donors.

In this study BSs' perceptions were measured separately for off-the-job training (hereafter, Off-JT) and on-the-job training (hereafter, OJT). In order to maintain quality skills of BSs and to maximize the use of limited resources of DAE, a large number of training programs was planned for which no fund was required. On-the-Job Training (OJT) is one of the training program for which no fund is required (Jacob, et.al. 1992). Nowadays, all the BSs are encouraged to develop their own abilities through practicing OJT along with attending Off-JT as Off-JT is completely class oriented training. Although the DAE has introduced OJT recently but there are no specific structures and instructions of OJT that could help BSs to practice it effectively and perfectly. BS's understandings about the OJT are the prerequisite to adopt this new concept of training for their skill development.

Hence a study was undertaken to examine the perceptions of the BSs of OJT and Off-JT, and the specific objectives were:

1. To examine the relationships between the selected characteristics of the BSs and their perceptions.
2. To determine how much of the variance in BSs' perceptions of OJT and Off-JT could be explained by their selected characteristics.

METHODOLOGY

Kishoreganj district was selected as the locale of the study. Out of 13 upazilas in Kishoreganj district 4 upazilas were selected randomly. In total 236 BSs were working in different blocks of Kishoreganj district during the study, which constituted the population. In the selected upazilas, 111 BSs posted in different blocks were purposively selected as a sample for the study. However, data were collected personally using a set of questionnaires from 102 BSs who were available during the data collection. Questionnaire reliability was estimated (based on pre-test) by calculating Cronbach's alpha. Reliability for the overall instruments was 68 per cent.

The dependent variable, BSs' perceptions of OJT and Off-JT was measured by a four-point Likert scale (Likert, 1932) with 16 statements. These statements indicate the predisposition of a BS to the perceptions of

OJT and Off-JT. A respondent was asked to indicate his extent of agreement or disagreement with each of the statements along a four point Likert scale: strongly agree, agree, disagree and strongly disagree. Weights assigned to these responses were 4, 3, 2, and 1, respectively. The perception scores of a respondent were determined by adding up the weights for responses against all the 16 statements and could range from 16 to 64, where 16 indicating less perception and 64 for high perception. Independent variables like age, service tenure, educational level, individual contact, group contact and mass contact were selected from previous studies relevant to the perception of extension worker on training.

Before starting the collection of data, the researcher met the respective *Upazila* Agriculture Officer, other Officers and the BSs. The researcher explained the purpose of the study and requested the BSs to provide actual information and the necessary co-operation to collect data. Most of the data were collected during the weekly conference day in the respective *upazilas*.

Data were compiled, tabulated and analyzed in accordance with the objectives of the study. To find out the relationships between selected characteristics of the BSs and their perceptions, Pearson's product moment coefficient of correlation was used. Linear regression analysis was conducted to determine how much of the variance in BSs' perceptions of OJT and Off-JT could be explained by their selected characteristics.

RESULTS AND DISCUSSION

General Socio-economic characteristics of the study population

More than half of the BSs (52 per cent) were in middle-aged category (Table 1). Only 5 per cent were young. The BSs had, on an average, 22 years of service tenure with extension organization. However, the majority of the BSs (53 per cent) had more than 24 years of service tenure. The majority of the BSs (46 per cent) had a higher secondary degree along with agricultural diploma while 38 per cent of the BSs had a secondary degree along with agricultural diploma and only 16 per cent held a graduate degree with agricultural diploma. The highest proportion (51 per cent) of the BSs had high individual contact, while 32 per cent had low and 17 per cent of the BSs maintained medium contact with individual like model farmer, dealers, officers etc. for getting necessary agricultural information as well as to provide services. As regards to group contact, about half of the BSs (46 per cent) had low group contact and 46 per cent had high group contact while only 13 per cent had medium group contact like attending demonstration programs, group meeting, training programs etc. In the case of mass contact, about

farmers where individuals should realize where they need extra assistance and ask for it, and supervisors should recognize where staff required extra guidance and provide it. Practicing tasks in the presence of a "mentor" provides opportunity for advice on improving the BSs' skills.

So, to improve the BSs' skills, the DAE should (i) motivate the BSs who had a low perceptions of OJT and Off-JT to practice "trial and error" in their skill development activities through group contact, (ii) give great importance to practice OJT in the BSs' routine works, and (iii) rethink the planning of training from the aspect of "accumulation rather than repetition". Especially at the time of planning training the DAE should consider Off-JT as a node in the career of the BSs' skill formation and could utilize a complementary relationship between OJT and Off-JT.

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Achievement Motivation of Women Entrepreneurs

Rashmi Singh¹

ABSTRACT

The present study aimed at finding out the need for achievement among established women entrepreneurs of Delhi region through semi-projective TAT type test. In general, the level of motivation of the respondents was found to be low. Further comparison between the Low Profit Earners (LPE) and High Profit Earners showed that it was the latter which was found superior than LPE members in terms of their motivational status. Most of the high profit earners indulged in researching their environment continuously and persisted with difficulties and obstacles faced. Personal achievement motivation was found to be the most verbalized motive of women entrepreneurs, followed by influence motive. Only a small number of stories had social achievement imageries.

Global changes have created economic opportunities and women entrepreneurs have emerged as a distinct class so much so that their contribution to the national economies is now substantial. Depending on which nation is referred to, women entrepreneurs constitute 15 per cent to 35 per cent of all entrepreneurs of that nation's economy. In India too, women entrepreneurship development had come a long way since it was systematically initiated in 1979. It is estimated that presently women entrepreneurs comprise about 11 per cent of the total entrepreneurs in India and it is expected that 25-30 per cent of the entrepreneurial force in India would be women by 2020. However, women entrepreneurs are still a minority of all entrepreneurs and though their economic impact is considerable, we still lack a reliable picture in terms of data.

Of all the important driving forces, which contribute to the development of entrepreneurship, need for achievement is the significant factor. Studies have shown that it is need for achievement through self-study, goal setting and inter personal support, which drives an entrepreneur. Achievement motivation has been found to be significantly correlated with both choice of an entrepreneurial career and entrepreneurial performance.

Both projective and self-report measures of achievement motivation were found valid. But, its specificity among women remained to be probed earlier whereby entrepreneurship development had been taken as a process. The present study was conducted to understand the need for achievement among women entrepreneurs owning tiny and micro-enterprises.

METHODOLOGY

The research design followed in the investigation was 'Ex-post facto'. Women headed/managed enterprises constituted units of investigation and women entrepreneurs were the respondents. The women entrepreneurs' experiences, their socio-economic and entrepreneurial antecedents yielded necessary data for the exploration. The study was conducted in the National Capital Region of Delhi including Gurgaon (Haryana) and Noida (Uttar Pradesh). The area is endowed with good infrastructure for manufacturing, servicing and marketing along with some functioning entrepreneurship parks. In addition, there are many institutions in the area, which are engaged in Entrepreneurship Development for women. The institutions contacted to prepare a list of women headed enterprises operating in the region were: Consortium of Women Entrepreneurs of India (CWEL),

¹ Senior Scientist, Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi 110 012.

FICCI Ladies Organisation (FLO), World Assembly of Small and Medium Enterprises (WASME), Federation of Women Entrepreneurs of India (FIWE), Rural Development and Self Employment Training Institute (Rudset-I) and Bhartiya Yuva Shakti Trust (BYST). The total sample size comprised of 210 women entrepreneurs (CWEI-41, FIWE-23, FLO-2, WASME-69, RUDSETI-47 and BYST-28). The data were collected through personal interviews and motives of respondents were measured by subjecting them to a Thematic Apperception Test (Mehta, 1989).

Scoring : Stories obtained were scored following the scoring system developed by Mehta (1994). Each story was scored for the three main needs; i.e. PAI, SAI and Inf; and eight sub categories. A score of one was given to each main category i.e. the imagery and sub-category excluding theme which was not scored when the story contained more than one main imagery. The story having unrelated imagery (UI) was assigned zero score. Thus, the total score where a story containing only PAI, SAI or Inf would range between 0 and 9 and the combined score of any two of these categories would also range between 0 and 9. The obtained total scores were used for identifying the need profile of each woman entrepreneur. Reliability of scoring was also calculated as per the formula suggested by Mehta (1994).

$$R = \frac{2 C_{12}}{C_1 + C_2}$$

Where R, is inter scores reliability coefficient, C_{12} is number of times the investigator and the expert agreed on the presence of a category or a sub-category, C_1 is number of times the investigator scores a category

or sub-category and C_2 is the number of times the expert scores a category or sub-category. Three stories of twenty respondents i.e. a total of 60 stories were randomly selected and scored by experts as well. The reliability score was found to be 0.86, which indicated that the investigator's scoring was sufficiently reliable. Total score obtained by every respondent was calculated by adding up the scores of the three stories written by him or her.

RESULTS AND DISCUSSION

Motivational status of the respondents

Twelve point six per cent respondents (16.2 in Low Profit Earners and 8.9 in High Profit Earners) wrote all the three stories with unrelated imageries. The remaining respondents were categorized into four quartiles based on the scores obtained by them (Table 1).

The total obtainable score for each respondents could range from 0 to 27 with a mid value of 14. The actual scores obtained ranged from 0 to 24 with a mean value of 8.44. Thus the group's mean was much below the obtainable scores mid value of 14 (ranging from 0 to 27). In general, women entrepreneurs' motivational status was found to be on the lower side. Only 17 per cent occupied the first quartile and 46 per cent of the respondents second and third quartile. Not only that the mean obtained score was below the mid value of obtainable score, but 89.32 per cent of the respondents got their motivation score less than the mid value of obtainable score. Above 12 per cent of respondents obtained zero score on motivation scale. Therefore, level of motivation of the respondents was much lower. Comparing the two groups, LPE and HPE, it was the latter

Table 1. Motivational status of the respondents - need for achievement

Quartiles	Scores	Low profit Earners		High Profit Earners		Total	
		f	%	f	%	f	%
I	1 to 5	14	13.3	21	20.8	35	16.99
II	6 to 8	29	27.6	19	18.8	48	23.3
III	9 to 12	26	24.8	21	20.8	47	22.8
IV	13 to 24	19	18.09	31	30.69	50	24.3
	0	17	16.2	9	8.9	26	12.6
		105	100.0	101	100.0	206	100.0
Range	0 to 24	0-9		0-24			
Mean	8.44	7.5905		9.3267			
IQR	7.0						
t value	-2.42187						
Degree of freedom	204						
2 tail prob.	1.97						

which was found superior than LPE members in terms of their motivational status. This was evident from the fact that only 8.9 per cent of HPE respondents wrote UI stories as compared to 16.2 per cent of zero scores in LPE group and secondly, 14.9 per cent of HPE obtained scores above the possible mid value of 14 as compared to only 6.7 per cent such respondents among low profit earners. Also, maximum score obtained by low profit earners was 19 whereas there were six such respondents in the high profit earners group who scored 19 and above, the maximum score being 24. Mean score for LPE was 7.59 whereas for HPE group it was 9.33. To further probe the difference between the two groups, low profit earners and high profit earners, in terms of their achievement motivation status, paired "t-test" was applied to the data. The t value obtained was -2.42187, which was found to be significant at 0.01 level indicating that the difference was highly significant. High profit earners were found to have significantly higher motivational status as compared to low profit earners. Most of the high profit earners indulged in researching their environment continuously and persisted with difficulties and obstacles faced. Also "profit" served as a measure of their achievement for them, which reinforced their drive to enhance their goals further. It acted as a positive stroke for women entrepreneurs and thus increased their motivation to work harder to scale up on the ladder. The stories written by the respondents clearly reflected three motives - Personal Achievement Motivation, Social Achievement Motivation and Influence Motivation.

The motivational profile of women entrepreneurs in respect of motives is reported in Table 2. Personal

achievement motivation was found to be the most verbalized motive of women entrepreneurs. As many as 91.9 per cent of AI stories contained personal achievement cues either alone or in combination with either or both of the other two motives, namely social achievement and influence motivation. In other words, of all the stories (618) written by the respondents (206), 56.95 per cent possessed personal achievement either as the only motive or in combination with other motives.

Out of the 383 stories which contained motivational cues, an overwhelming number of 352 stories (92%) contained personal achievement motivation cue. Hence the women entrepreneurs have personal achievement (nAch) as the most dominating motive. This was followed by Influence motive which was reflected in 98 stories (25.5%). This was the second motivational concern of the respondents. Influence appeared to be a supplementary motive since this was verbalized in over 20 per cent stories along with PAI. This clearly suggested that those entrepreneurs who directly dealt with financial or credit institutions, market players like input suppliers, and product purchasers and consumers etc. and had big establishment with a number of employees, needed to exert influence on all the other players or functionaries to facilitate smooth and effective functioning of the enterprise. Hence, such entrepreneurs could verbalise influence motivation in their stories. Only a small number of stories (38) had social achievement imageries. Entrepreneurs in our society were in fact social elites who must have concern for the social well-being. But most of the entrepreneurs included in the sample were small with earnings hardly sufficient to make a decent living.

Table 2. Motivational orientation of the respondents - frequency distribution

No.	Scores	Low profit Earners		High Profit Earners		Total	
		f	%	f	%	f	%
1.	PAI	126	68.5	121	60.8	247	64.5
2.	SAI	5	2.7	6	3.02	11	2.9
3.	Inf Imagery	6	3.3	14	7.0	20	5.2
4.	PAI + SAI	15	8.2	12	6.0	27	7.05
5.	PAI + Infl	31	16.8	40	20.1	71	18.5
6.	SAI + Inf I	0	0.0	0	0.0	0	0.0
7.	PAI + SAI + Inf I	1	0.54	6	3.02	7	1.8
8.	UI	131	41.5*	104	34.3*	235	38.0*
	Total respondents	105		101		206	
	Total stories	315		303		618	
	Total eligible stories	184	58.4**	199	65.7**	383	61.9**

*Per cent is calculated from total no. of eligible stories

**per cent from

Hence they were basically preoccupied with their personal and family economic needs. This pre-occupation, in fact, seems to have made their motivational orientation towards self rather than others in the society. Despite such self centered pre-occupation, it was quite gratifying to note that at least seven stories were such which contained all the three imageries. Thus, there is need to bring these into focus and heighten their motivation in a more balanced perspective where self was important but also social well being of others. Needs of people like coworkers were catered to and women entrepreneurs were adept at influencing their market and surroundings also if they are made aware of social achievement motives also.

As revealed by earlier Table 1, the motivational status of women entrepreneurs was found on the lower side of the scale. The reason for such scores was that many of them were not able to verbalise quite a few of the subcategories of the motivational scale. It was therefore, at best desirable to see the verbalisation pattern of the respondents of the subcategories of the motivation score. For this, the data were reset and presented in Table 3. The motivational intensity was judged by the presence of eight following components in a story. These were personal action (Ap), social action (As), anticipated action (Aa), strength (S), hope (H), personal social awareness (PSA), vigilance (V), and Thema (Th).

The reset data revealed that in more than 90 per cent of stories personal action (Ap) was verbalized by the respondents followed by 70 per cent of stories where thema was verbalized. Verbalization or expression of remaining six sub categories was made in less than half of the AI stories written by respondents. The verbalization of such categories like As, Aa, vigilance (V) were extremely poor.

Over 90 per cent of the stories were not conscious of impending danger which could cause failure in their endeavour or which could impede their entrepreneurial performance. Lack of this consciousness was a matter of serious concern. It was important that women entrepreneurs may be made conscious of the obstacles in the path of their enterprise success and they must have the ability to take care of obstacles so that failure could be avoided. Similarly verbalisation of social action (As) was extremely poor. About 84 per cent of the AI stories written by respondents did not visualize this aspect. It appeared that the women entrepreneurs were not conscious of the group strength. The strength of people around, family members, coworkers and others associated with the enterprise was extremely important and if they all take combined action then chances of entrepreneurial success would be quite high. But women entrepreneurs were not conscious of this strength available to them and

Table 3. Subcategories of achievement motives - frequency distribution of respondents

No.	Motive sub-categories	PAI			SAI			Inf Imagery			Total
		LPE	HPE	Total	LPE	HPE	Total	LPE	HPE	Total	
1	Ap	158 (91.3)	168 (93.9)	326 (92.6)	2 (40.0)	1 (16.7)	3 (27.3)	6 (100.0)	12 (85.7)	18 (90.0)	347 (90.6)
2	As	23 (13.3)	25 (13.96)	48 (13.6)	5 (100.0)	5 (83.3)	10 (90.9)	2 (33.3)	1 (7.1)	3 (15.0)	61 (15.9)
3	Aa	30 (17.3)	48 (26.8)	78 (22.2)	0 (0.0)	2 (33.3)	2 (18.2)	0 (0.0)	2 (14.3)	2 (10.0)	82 (21.4)
4	S	61 (35.3)	74 (41.3)	135 (38.4)	2 (40.0)	1 (16.7)	3 (27.3)	0 (0.0)	5 (35.7)	5 (25.0)	143 (37.3)
5	H	65 (37.6)	82 (45.8)	147 (41.8)	0 (0.0)	0 (0.0)	0 (0.0)	2 (33.3)	6 (42.9)	8 (40.0)	155 (40.5)
6	PSA	59 (34.1)	74 (41.3)	133 (37.8)	0 (0.0)	3 (50.0)	3 (27.3)	2 (33.3)	9 (64.3)	11 (55.0)	147 (38.4)
7	V	7 (4.04)	18 (10.1)	25 (7.1)	1 (20.0)	0 (0.0)	1 (9.1)	1 (16.7)	1 (7.1)	2 (10.0)	28 (7.3)
8	Th	119 (68.8)	121 (67.6)	240 (68.2)	5 (100.0)	4 (66.7)	9 (81.8)	6 (100.0)	13 (92.9)	19 (95.0)	268 (69.9)
	Total motive strength	522	610	1132	15	16	31	19	49	68	1231

were more conscious of their own efforts as part of personal action. They relied more on their own action and undermined the strength of their coworkers. Therefore, there was a need to bring to their attention the strength that lies in the action to be taken by the group.

In addition, in about 80 per cent of the stories, respondents could not visualize what action to be taken in anticipation of failure. They must be able to visualize the pitfalls or loopholes which could cause failure in their entrepreneurial endeavours. For that they need to prepare themselves for such pitfalls coming in their way. This required an action to be taken in advance which they were not very conscious of. It was because of this their motive strength had gone down to such an extent.

A great majority of the AI stories (72%) written by the women entrepreneurs were found lacking in Personal-Social Awareness (PSA) indicating that women entrepreneurs were not aware of the blocks that exist within them and the blocks that exist outside in the environment. Unless one is aware of the blocks, one cannot take care of these which may hamper the entrepreneurial progress and consequently affect the performance adversely. It might even cause partial failure of their enterprises. If one was aware of these blocks, these could be taken care of by the entrepreneur to avoid failure. Awareness of blocks, which lie inside the self sphere of the entrepreneur and outside in the environment sphere surrounding the entrepreneur included in the sub-category of personal social awareness, required to be brought into the consciousness of a great majority of the respondents. It was quite disheartening to note that about 60 per cent of stories did not have hope of success as their content. Unless an entrepreneur was hopeful of success and full of optimism for positive results, her total efforts in the direction of entrepreneurial endeavour and towards

making achievement would not be substantial. Unless there was hope, the self-confidence would be missing, and in absence of self-confidence, it would be difficult to achieve success. Therefore, an entrepreneur must have hope in the enterprise and also must have hope of success to devote substantial efforts in enterprise. If this aspect was lacking, the motivation of an entrepreneur would also be lacking. Therefore it was important for would be entrepreneurs to be made aware of this aspect of hope of success, which may prove critical in their performance later.

CONCLUSION

The motivational level of respondents was much lower than expected because of their lack of awareness or consciousness of dimensions represented by sub-categories of their motivation. To take care of this and bringing these shortcomings to their attention, there was need to impart motivational training to women entrepreneurs. There was known methodology of enhancing achievement motivation and recognized groups of trainers who impart such motivational trainings. Hence, women entrepreneurs may be exposed to such trainings and behavioural scientists working in the area of entrepreneurial motivational training may be involved in the process of heightening their motivational strength. Motivational training may be designed in such a way where special emphasis was given on heightening the components like anticipated action, vigilance and personal social awareness. While designing such training programmes, low profit earners (LPE) required more attention as their verbalization was much poorer as compared to high profit earners (HPE). Thus LPE may be given more attention while planning out such programmes.

Institutional Innovation and Project Delivery : A case study of *Salaha Samithis*

C.A. Rama Rao, Sreenath Dixit, K. Nagasree and K.V. Subrahmanyam¹

ABSTRACT

In a study that was carried out by Central Research Institute for Dryland Agriculture, Hyderabad a novel institutional arrangements was tried for both leveraging better project administration and eliciting higher community participation. *Salaha samithis* that were formed to liaise between project staff and the poor people of the project area came out as useful arrangement that could go beyond achieving project goals. This case study shares experiences in which institutional innovation evolved as a result of consultations between the project staff and the stakeholders facilitated the process of best natural resource management practices for improved livelihoods.

The agricultural technology generation and transfer programmes have been trying to be more participatory with an increased emphasis on on-farm programmes as against on-station programmes. This focus is more pronounced in programmes related to natural resource management, especially in the watershed research and development programmes. A look into the evolution of guidelines with respect to watershed projects will only emphasize the role of community participation and the institutional mechanisms that facilitate participation. A number of community based organisations (CBO) have been formed since the 1990s with a variety of purposes ranging from encouraging thrift to investment to livelihood opportunities. Using the CBO for better management of natural resources is best reflected in case of such initiatives as Joint Forest Management (JFM), water users' associations, commodity interest groups and others.

Best practices in natural resource management research and development point to situations in which community members, research or development team members and other stakeholders jointly identify research or development parameters and participate in the

decision-making process. This process goes beyond community consultation and participation in activities identified by researchers or programme managers. In best case scenarios, the research or development process itself generates a situation of empowerment in which participants transfer their view of reality and are able to take effective action (Bessette, 2006). This paper presents such an experience in which institutional innovation evolved as a result of consultations between the project staff and the stakeholders to facilitate the process of best NRM practices for improved livelihoods. It also examines the process used into promoting institutional innovation.

METHODOLOGY

This study was undertaken by the Central Research Institute of Dryland Agriculture (CRIDA) in partnership with Acharya NG Ranga Agricultural University (ANGRAU), Hyderabad University of Agricultural Sciences, Bangalore (UAS-B), BAIF Institute of Rural Development, Karnataka (BIRD-K) and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh (AP).

¹Central Research Institute for Dryland Agriculture, Hyderabad 500 059.

It was concerned with improving the access and management of natural resources for better livelihoods in Mahabubnagar and Anaparthi districts of AP and Tumkur district of Karnataka. These districts are a few of the most drought-prone districts in the Deccan plateau. Erratic rainfall, frequent crop failures and eroding natural resource base, high rate of migration are issues challenging the livelihood security of majority of the poor of this region (Osman *et al.*, 2001). Therefore, project was so designed that it gave equal importance to institutional and technological interventions wherein all the interventions were arrived after a consultation process with the primary stakeholders. This process of flexible decision making and implementation of the interventions so arrived triggered the need for an institution that would be of support to the project implementing agencies as well as to the stakeholders in the project sites. This institution named as Salaha Samithi (SS) (Advisory Committee) was formed in each of the three clusters where the project was implemented (CRIDA, 2006). In the remaining part of the paper, the process of formation of, the roles played by, and the future of Salaha Samithi are discussed.

Formation of Salaha Samithi (SS)

Formation of a Salaha Samithi in the cluster was an important institutional innovation by the communities and the project and put in place in all the three clusters. The SS, an advisory group of villagers, was formed considering the need expressed by the villages for an institution that could facilitate the implementation of the project activities in association with the project staff. Members who were voluntarily willing to work for the common good of the villages and who were acceptable to the community as a whole formed the SS. It was an informal and inclusive body in which existing CBOs (PRIs and SHGs) were also represented in order to achieve coherence in the activities and to keep the PRI informed of what was going on in the project. Women and weaker sections (SC, ST) of the society were also included in the SS.

The steps in formation of SS were as follows:

- i) Arriving at a decision to form an SS : Based on the PRA outcome, both the community and the project staff desired to initiate a community institution that would articulate community priorities and problems.
- ii) Identification of individuals willing to participate in SS : Individuals volunteered or were nominated during interactions with the community.

iii) Obtaining the broad consensus of the villagers: The candidature of the individuals for participation in SS was discussed in gram sabha (Village Council) and a consensus obtained.

iv) Agreeing upon the roles and responsibilities of the members: Discussions were held with the SS members as to how they could act as catalysts to promote technology adoption.

v) Capacity building of the SS : The members were trained to work certain tools that build consensus and transparency to their work, for instance in book keeping and writing minutes of meetings (to be able to track the cash flow). On-the-job backup however was provided by project field staff (BIRD-K).

Once the SS was formed, the functional aspects were captured during various interfaces such as field visits, focused group interactions and workshops. The minute of the SS meetings were also analyzed to gain an insight into the functioning of SS. The project scientists were later interviewed to find out if an institution like SS made any difference to the implementation of the project activities and in dealing with the community. Data were collected on the number of mandays a scientist would invest in the absence of institutional support like the one provided by SS. The responses were subjected to t-test.

RESULTS AND DISCUSSION

Role of SS

The SS as an informal body and its members played the following roles during project implementation: the SS helped elicit and assure people's participation in all the project interventions. In doing so, it made the implementation of the project activities more transparent. In those interventions which needed large amounts of earth work and financial investment (e.g. check dam construction, farm ponds, trench-cum-bunds in private and common properties), SS was actively involved in implementation by bringing forth peoples' contribution in terms of money and labour. It was also actively involved in selecting sites for soil and water conservation measures such as check dams, farm ponds, etc.

It acted as a liaison agency between the project staff and the village community in general and through open meetings. It also facilitated communication and interaction among the community as well as between the community and external agencies including the project. SS played a major role in obtaining the necessary permissions and clearance from the district administration

in providing the access to the endowment land by the poor in Anantapur cluster. Similarly in Mahabubnagar cluster, the SS played a crucial role in negotiating with the PRI for providing temporary use rights for the tank bed for cultivation by the poor and, in conjunction with the project staff was instrumental in reaching a written agreement between the users and the PRI. It was also instrumental in negotiating with a farmer whose land was identified as suitable for construction of a check dam in Anantapur cluster. Thus, it helped to use the private property for the common good of the community.

Some members of the SS assumed the role of early adopters of technological interventions, which helped others to accept the technologies. In Mahabubnagar cluster, people were initially reluctant to take up vermicomposting as an option for better crop nutrient management. Then, some of the members of SS took up the activity following which others accepted the technology. Thus, SS also helped to hasten the technology adoption and diffusion among the village community.

The SS was responsible for the final decisions on targeting the technological interventions. By identifying the needy and appropriate clientele for different interventions, the SS guided the technology testing to those households that could benefit from the technology and hence enhanced the chances of technology acceptance and minimized possible conflicts.

Identifying potential technology adopters and taking them for an exposure visit is often a very tricky issue in the villages. The SS identified people for exposure visits and training programmes for capacity building. All these activities were done in a transparent and interactive manner in which the rationale for selecting the participating villagers was openly discussed. The composition of SS, with all socio-economic groups represented also ensured that the decisions were fair and the process of decision making was transparent. The

landless poor were given preference in interventions related to livestock, especially sheep and poultry. In Tumkur cluster, SS organized an exposure visit for farmers without any assistance from the project staff, which is a testimony to the post-project sustainability.

The SS also took up the responsibility of maintaining the assets created in the project. In Tumkur cluster, the SS was instrumental in discouraging the over-use of ground water by coaxing the villagers not to dig bore wells subsequent to the construction of check dam. By way of providing space and identifying the participants, the SS also provided a foundation to the custom hiring centers that the project initiated for enabling the small and marginal farmers to access the improved tools and implements.

A coincidental but important benefit from the SS was the time saved for the project staff. It was felt by the project staff that because of SS they could save 30-50% time in their interactions with the community. It also saved the time of villagers in the sense that they did not have to wait until the next visit of the project staff to obtain the information they needed and also they could contact the SS for advice at their convenience. The members of SS did have to spend more time in communicating with project staff and the villagers and also in planning for the project activities. However, since most of these activities were carried in an informal manner and within the village, they saw little in terms of transaction costs. Thus, SS proved as an effective and efficient mechanism for faster communication and technology diffusion.

In this context an effort was made to see how the institutions such as SS would help reduce the transaction costs of the scientists involved in on-farm research activities. Data on the number of visits required to implement the project activities at different phases of the project were obtained from 15 scientists involved in on-farm research with no local institutional support and scientists in this project and were compared. It was

Table 1. Average mandays spent while dealing with community with and without *Salah Samithi*.

Phase of the project	Without SS [@]	With SS [*]	t-value	P value
Early	5.97 (0.81)	5.83 (0.96)	0.41	0.68
Mid	4.1 (0.51)	2.30 (0.56)	9.22	< 0.01
Final	3.43 (0.70)	1.97 (0.64)	5.92	< 0.01

* The averages are obtained from responses of 15 scientists working in this project

@ The averages are obtained from responses of 15 scientists working on on-farm projects.

Figures in parentheses are standard deviations.

observed during the initial phases of the project there was no significant difference between the average number of mandays (about 6) spent dealing with the community (Table 1). As the project got going, the number of visits required by the scientists with SS support became less (2.3 and 2.0) compared to those without such support (4.1 and 3.4). Thus the differences were significant during the middle and towards the end of the project. Formation of SS was proceeded by continual interaction with the community which in itself required scientists make frequent visits which is why the difference between responses of the two groups of scientists was not statistically significant.

Inter-cluster differences in SS

The formation and performance of SS differed across the clusters. There were nineteen members in SS in Tumkur cluster compared to 12 (later increased to 14) in Mahabubnagar and 13 in Anantapur. In all the clusters, people from different social strata (backward castes, scheduled castes and tribes, etc.) were represented in the SS. In Mahabubnagar, some members of the SS were nominated by the village president but no women and landless were included as no one came forward voluntarily (subsequent to the discussions in the regional workshop, two women came forward to be a part of SS and were included). The representation of women was more in Anantapur (5 out of 13) compared to other two clusters. In Tumkur, the SS members were selected by the gram sabha and the gram sabha had the authority to dismember any individual from SS if it felt so. Thus, a conflict resolving mechanism was put in place in Tumkur. The frequency of SS meetings differed across clusters. In Anantapur, SS was more active and decided to meet once in every fortnight instead of once a month, which was the practice in Mahabubnagar.

These differences in the functioning and effectiveness of SS were due to the differences in individual motivation of the members as well as the effectiveness of the facilitating staff. For example, the villagers in the Tumkur cluster were well aware of the functioning of the community organisations in the neighbouring villages. In Anantapur, one of the project partners had already earned the faith of the villagers because of some past work. In these terms, the situation in Mahabubnagar was not so conducive. However, it was found that the functioning of SS could be improved if the members were sufficiently motivated. This was evident in the case of SS in Mahabubnagar cluster whose performance was found to improve subsequent to an exposure visit to the Anantapur cluster.

Assets of SS

All three SS were able to build an asset base. They did this by charging a membership fee (Rs. 100) to their members, who were willing to pay because of the access the SS gave them to development resources (information, contacts and interventions). As well as this, where the community or participants were mobilized to make cash payment as their contribution to project interventions or were mobilized to make an in-kind contribution whose value was greater than that agreed with the project, the balance was credited to the SS account. In Tumkur cluster, SS constructed a building, which is being hired out for different needs of the village and also used as a storage facility. This facility is also hosting a Tailoring Training Center and also used to keep the implements. In Anantapur, people voluntarily contributed land for construction of an office for SS and sought project support for construction. In Mahabubnagar, the SS is planning to construct a building and use it as a community hall and Artificial Insemination Centre in addition to using it as a meeting hall for SS. Thus, in all the three clusters, SS could mobilize and create assets. These resources are put to use for the benefit of the community and providing resources through which the SS intends to survive and operate in the post-project period.

CONCLUSION

In spite of the motivation and willingness of the individuals to work for the village development, no organisation such as SS had already been formed in the villages. The project experience suggests that motivation and willingness still needed to be inspired around a cause and that an external stimulus (such as a project of this nature) and resources were needed. In the absence of such stimulus, the innate motivation may go unrealized without being crystallized into action. The tendency of the government initiated development programmes to rely on the PRIs was another reason why organisations such as SS would not evolve naturally. The perceived benefits from the contacts with the external agencies would also stimulate the individuals to participate in such initiatives.

Formation of SS proved to be an effective institutional innovation both from the project's as well as the clientele's (community) perspectives. Motivation and commitment of individuals constituting SS, transparency and flexibility in arriving at the decisions, liaison with the existing local organisations especially the PRI and the continuous support from the project staff were the important reasons why the institutional arrangement in the form of SS was successful and likely to be sustainable

beyond the project. The feasibility of post-project sustainability of SS is best seen in the way the assets have been created and operated in the three clusters. The continued presence of the NGO beyond the project period, which is very likely, would augur well with these initiatives. Such a continued hand-holding relationship would result in further strengthening of the capacity of SS and also ensure fair play in handling the assets created.

Whether SS should continue to operate after the project period is a question to be researched upon and answered. The creation of assets is likely to result in continued operation of the SS. At the same time, as the value of assets grows, the very assets may become source of undue competition and conflicts with other CBOs, especially the PRI. Another consequence would then be that it might cease to be an advisory body and rather become a political body. In the event that it continues in the village, then there is a need for certain conventions to evolve, (which must be flexible enough to suit each community) as to who should be the members, how and how often the members should be changed, how to resolve possible conflicts, etc. However, it can be concluded

from the project experience that partnership with existing organizations, which can play the roles that the SS assumed or the formation of an organisation such as the SS would be of great help whenever a developmental project is initiated in rural villages.

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Farmers' Perceptions on Groundnut Based Intercropping Systems

Satish Kumar G.D., Devi Dayal, Singh Y.V. and V.K. Sojitra¹

ABSTRACT

In aberrant rainfall years, intercropping seems to be a good proposition to sustain the production of groundnut in rainfed areas. Besides, in normal season, it increases the farm income and aims at efficient utilization of solar energy, moisture and nutrients. The present study was undertaken to ascertain the status of intercropping systems and constraints associated with intercropping systems in Junagadh district of Gujarat. The most important intercropping systems for the farmers of Junagadh district were groundnut + castor and groundnut + pigeon pea. The important constraints perceived by farmers in adoption of intercropping systems was low rainfall, timely non-availability of inputs, and transfer of technology efforts. Certain researchable issues emerged from the study viz., development of suitable seed drill for ICS, determination of highly profitable row ratios and development of soil moisture conservation techniques for intercropping system.

Groundnut (*Arachis hypogaea*, L) is grown mostly under rain-fed conditions during kharif season. The wider spacing practiced for cultivation of groundnut made it possible to grow an intercrop with many other annual oilseeds, legumes and cereal crops. There is now ample evidence that net returns are higher with intercropping over sole cropping (Ashokraj *et al.*, 1987; Reddy and Willey, 1980) besides compensating the risk of crop failure during aberrant rain fall years. One of the main reasons for such advantage is that the component crops are able to use resources differently (Shinde and Umarani, 1988), so that when grown together they supplement each other and make better use of resources than growing separately. Besides increasing productivity of the component crops, intercropping also reduces weed competition infestation of insect pests (Nath and Singh, 1996) and diseases in the system and improves soil productivity. In aberrant rainfall years, intercropping seems to be a good proposition to sustain the production of groundnut in rainfed areas. Besides, in normal season, it increases the farm income and aims at efficient

utilization of solar energy, moisture and nutrients (Gujjari *et al.*, 1994).

Two decades of research on groundnut based intercropping systems at National Research Centre for Groundnut (NRCG) and other research centers throughout India have generated lot of information on crop combinations, row ratios, fertilizer schedule and economics. But it appears that the information has not percolated to farmers. Hence, the present study was undertaken to ascertain the status of intercropping systems and constraints associated with intercropping systems in Junagadh district of Gujarat.

METHODOLOGY

The study was conducted in Junagadh district of Gujarat. Seven villages were selected randomly from the district and a total of one hundred and twenty two farmers were selected from seven villages by proportionate random sampling based on size of land holding. A semi structured interview schedule was used to collect the data from the respondents. The data were collected by personal interview method.

¹National Research Centre for Groundnut, Post box No. 5, Junagadh, Gujarat.

RESULTS AND DISCUSSION

Adoption of groundnut based intercropping systems (ICS)

The data given in Table 1 indicated that the most important ICS to all categories of farmers was groundnut + castor (41.80 per cent) followed by groundnut + pigeon pea (34.42 per cent), groundnut + cotton (12.29 per cent), groundnut + sesame (6.55 per cent), groundnut + green gram (3.27 per cent), groundnut + black gram (0.81 per cent). The groundnut + castor and groundnut + pigeon pea systems were adopted by more than 80 per cent of

the sampled farmers. These results were in consonance with the results of Ghosh and Sojitra (1997). These two systems were more popular with small farmers compared with medium and large farmers where as, groundnut + cotton was more popular with large farmers because the system needed higher investment compared to other ICSs.

Advantages of intercropping system based on economics and sustainability

All the sampled farmers irrespective of farm size perceived risk management, increased Land/ Water/ Fertilizer Use Efficiency (LUE/WUE/FUE) and complimentary effect of each crop were the important

Table 1. Adoption of different ICS by farmers in Junagadh district

S. No.	ICS	f				%			
		Small	Medium	Large	Total	Small	Medium	Large	Total
1.	Groundnut + castor	17	17	17	51	43.59	42.50	39.53	41.80
2.	Groundnut + pigeon pea	15	16	11	42	38.46	40.00	25.58	34.42
3.	Groundnut + cotton	2	4	9	15	5.12	10.00	20.93	12.29
4.	Groundnut + sesame	3	2	3	8	7.69	5.00	6.97	6.55
5.	Groundnut + black gram	1	0	3	4	2.56	0	6.97	3.27
6.	Groundnut + green gram	1	1	0	1	2.56	2.50	0	0.81

Table 2. Farmers' perception of advantages of groundnut based ICS

S. No.	Advantage	f				%			
		Small	Medium	Large	Total	Small	Medium	Large	Total
I. Based on economics									
1.	Production of higher biomass	16	16	12	44	41.03	40.00	27.91	36.07
2.	Reduced use of inputs (fertilizer, chemicals)	22	19	18	59	56.41	47.50	41.86	48.36
3.	Maximizing productivity	28	21	30	85	71.79	52.50	69.77	69.67
4.	Remunerative prices	24	22	35	81	61.54	55.00	81.40	66.39
5.	Risk management	39	40	43	122	100.00	100.00	100.00	100.00
6.	Revival of crops after relief of drought	39	38	43	120	100.00	95.00	100.00	98.36
7.	Capitalizing later rains by long duration crop	37	35	33	105	94.87	87.50	76.74	86.07
II. Based on sustainability									
8.	Increase LUE/WUE/FUE	39	40	43	122	100.00	100.00	100.00	100.00
9.	Soil improvement (physical characteristics)	31	35	32	98	79.49	87.50	74.42	80.33
10.	Legume effect	34	23	24	81	87.18	57.50	55.81	66.39
11.	Complimentary effect of each crop	39	40	43	122	100.00	100.00	100.00	100.00

advantages of intercropping (Table 2). This might be due to the fact that during poor monsoon season/ inadequate rainfall the component crops pigeon pea and castor sustained the drought period and provided some monetary returns to the farmers. Farmers felt that fodder from pigeon pea was highly palatable to their cattle (Ghosh and Sojitra, 1997). Apart from this the stubbles could be utilized as firewood, making thatched houses and storage bins (Ghewande *et al.*, 2004).

The other advantages of groundnut based ICSs perceived by farmers were revival of crops after relief of drought (98.36 per cent), capitalizing on later rains by long duration crop (86.07 per cent), improvement of soil physical properties (80.33 per cent), maximizing productivity (69.67 per cent), legume effect and

remunerative prices (66.40 per cent, each), reduced use of inputs like fertilizers and chemicals (48.36 per cent) and production of higher biomass (36.07 per cent).

Factors influencing yields in ICS

The most important factor influencing yield in groundnut based intercropping system for all the categories of farmers was timely sowing of crop (100 per cent) followed by rainfall distribution (98.36 per cent), plant protection measures (86.88 per cent), preceding crop grown on the same field (78.69 per cent), crop combinations (18.85 per cent), crop geometry and fertilizer application for component crops (10.65 per cent each) (Table 3).

Table 3. Factor influencing yeilds in groundnut based ICS

S. No.	Factors	f				%			
		Small	Medium	Large	Total	Small	Medium	Large	Total
1.	Crop combinations	6	10	7	23	15.38	25	16.28	18.85
2.	Crop geometry	0	8	5	13	0.00	20	11.63	10.66
3.	Timely sowing of the crop	39	40	43	122	100.00	100.00	100.00	100.00
4.	Rainfall distribution	38	39	43	120	97.44	97.50	100.00	98.36
5.	Application of fertilizers for component crops	8	5	0	13	20.51	12.50	0.00	10.66
6.	Plant protection measures	34	29	43	106	87.18	72.50	100.00	86.89
7.	Preceding crop	34	29	33	96	87.18	72.50	76.74	78.69

Table 4. Constraints in adoption of groundnut based ICS

S. No.	Constraints	f				%				Rank
		Small	Medium	Large	Total	Small	Medium	Large	Total	
1.	Lack of suitable seed drill	12	22	10	44	30.77	55.00	23.26	36.07	VII
2.	Low market price	1	2	4	7	2.56	5.00	9.30	5.74	X
3.	Lack of irrigation facilities	31	35	27	93	79.49	87.50	62.79	76.23	V
4.	Imbalanced row ratios	25	0	14	39	64.10	0.00	32.56	31.97	VIII
5.	Soil unsuitable to ICS	5	29	32	66	12.82	72.50	74.42	54.10	VI
6.	Inadequate transfer of technological interventions	27	39	43	109	69.23	97.50	100.00	89.34	III
7.	Non availability of inputs	39	37	40	116	100.00	92.50	93.02	95.08	II
8.	Low/inadequate rainfall	38	39	43	120	97.44	97.50	100.00	98.36	I
9.	Lack of awareness on plant nutrition for component crops	8	5	0	13	20.51	12.50	0.00	10.66	IX
10.	Lack of knowledge on plant protection for component crops	34	28	43	105	87.18	70.00	100.00	86.07	IV

Constraints in adoption of ICS

A perusal of data in Table 4 reveal that the important constraint perceived by farmers in adoption of ICS was low rainfall (98.36 per cent), non-availability of inputs (95.08 per cent), inadequate transfer of technological interventions (89.34 per cent), lack of knowledge on recommended plant protection measures (86.07 per cent), lack of irrigation facilities (76.23 per cent), soils unsuitable for intercropping (54.10 per cent), lack of suitable seed drill for sowing (36.07 per cent), imbalanced row ratios (31.97 per cent), lack of awareness on plant nutrition for component crops (10.66 per cent) and low market price (5.74 per cent).

The most important constraint for small farmers was non-availability of inputs followed by inadequate rainfall and lack of irrigation facilities where as for medium and large farmers, they were inadequate transfer of technological interventions and inadequate rainfall.

CONCLUSION

The most important intercropping system for the farmers of Junagadh district were groundnut+castor and groundnut + pigeon pea. The farmers of the region were not aware of the recommended plant protection and production practices of groundnut based intercropping systems. There is acute lack of transfer of technology efforts. Hence, the extension agency should take the lead role in transferring the research recommendations to the farmers of this area. Timely availability of inputs like seed, fertilizer and plant protection chemicals are important for getting higher yields. Hence these may be

taken care by the policy makers/ extension agency and providing suitable price to groundnut, pigeon pea and castor will go a long way in sustaining these intercropping systems in the region. Also, certain researchable issues emerged from the study viz., development of suitable seed drill for ICS, determination of highly profitable row ratios and development of soil moisture conservation techniques for intercropping system. These issues may be given priority in research for developing the required technology for groundnut based ICS.

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Livelihood Diversification of Small and Marginal Farmers of Kerala

Smitha Baby¹ and Baldeo Singh²

Rural livelihood diversification is defined as the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living (Ellis 1998). Households combine their livelihood resources within the limits of their social and political context and their institutional connections to pursue a number of different livelihood strategies. Such strategies can include various types of production and income generating activities (e.g. agricultural production, off-farm employment and formal sector employment) and a combination of the two. Thus each household can have several possible sources of entitlement, which constitute its livelihood. These entitlements are based on the endowments that a household has and its position in the legal, political and social fabric of the society (Drinkwater and McEwan, 1992). The sustainable livelihood approach assumes that any development intervention for the rural people should be congruent with their existing livelihood strategies and ability to adapt. Hence, an attempt is made in the study to understand the livelihood diversification strategy of small and marginal farmers, which may help to learn from them about the highly varied activities they undertake to sustain their livelihoods and to identify their most pressing constraints and most promising opportunities.

METHODOLOGY

The study was carried out in Kerala State following purposive and random sampling. Two districts namely Malappuram and Ernakulam, from the northern and the central region, representing different socio-cultural background of Kerala were identified randomly and then, from each district, one block and from the block one village was selected randomly. The respondents of

the study comprised of two categories namely marginal farmers and small farmers. Thirty households of each category from the two study villages were randomly selected to constitute a total sample size of 120. The data were collected through personal interview method using a pretested semi-structured interview schedule.

RESULTS AND DISCUSSION

The data in Table 1 present the livelihood diversification strategies of marginal farmers and small farmers. Majority of the farmers followed diversified livelihood options. Small farmers (87%) adopted more diversified livelihood than marginal farmers (75%). Only 13 per cent of the small farmers and 25 per cent of the marginal farmers followed agriculture as their only livelihood option. This may be due to the fact that the small farmers had better access to financial and human resources like skill and education which are needed to diversify towards non farm livelihood activities compared to the marginal farmers. However, majority of the households under the marginal farmer category also followed non-farm activities along with farming. It is also important to note that some of the farmers (13% of small farmers and 15% of marginal farmers) had highly diversified livelihood, which included farming, non-farming and migration. It can be safely concluded from the data in the Table that farming along with non-farming is the dominant livelihood strategy of farmers.

Farm diversification strategies of marginal and small farmers: The study has also made an attempt to analyse the farm diversification strategies of both marginal and small farmers. The types of farm diversification followed by the farming community are presented in Table 2. A bird's eye view of the Table reveals that small farms are more diversified than marginal farms. Majority of the

¹ Ph.D Scholar, Division of Agrl. Extension, IARI, New Delhi.

² Joint Director (Extension), IARI, New Delhi.

Table 1. Livelihood diversification of farmers (N=120)

Category	Small farmers (n=60)		Marginal farmers (n=60)	
	f	%	f	%
Farming alone	8	13.00	15	25.00
Farming + non-farming	25	42.00	22	37.00
Farming + migration	19	32.00	14	23.00
Farming + non farming+migration	8	13.00	9	15.00

Table 2. Farm diversification strategies of small and marginal farmers (N= 120)

Category	Small farmers (n=60)		Marginal farmers (n=60)	
	f	%	f	%
Food crops + cash/ plantation crops + livestock/poultry	24	40.00	12	20.00
Cash plantation crops+livestock/ poultry	15	25.00	14	23.00
Food crops+cash/ plantation crops	10	17.00	12	20.00
Cash plantation crops alone	11	18.00	22	37.00

marginal farmers were found to follow cash/ plantation crops and/or food crops based cropping system while most of the small farmers had adopted mixed farming, which included both crops and livestock /poultry. It is also found the small farmers grew food crops (57%) more than the marginal farmers (40%). This is because the marginal farmers cannot afford the lower profit from growing food crops compared to small farmers. Hence, majority of the marginal farmers had adopted cash/ plantation crops like rubber/ coconut based cropping system. In fact this is reason that rubber, a highly remunerative plantation crop has occupied even the homesteads of Kerala, threatening its ecological security. All these findings pointed towards the fact that sustainable development could be achieved only through ensuring sustainable livelihood security of the farming community, especially the marginal farmer group.

Table 3. Non-farm diversification of farmers (N=120)

Category	Small farmers (n=60)		Marginal farmers (n=60)	
	f	%	f	%
I. Enterprise				
(a) Agriculture	3	9.10	0	0.00
(b) Non agriculture	13	39.40	8	25.00
Total	16	48.50	8	25.00
II. Service sector				
(a) Organized sector	13	39.40	7	23.00
(b) Unorganized sector	4	12.1	16	52.00
Total	17	51.50	21	75.00

Non-farm diversification strategies of marginal and small farmer

An analysis of the livelihood strategies of farmers revealed that 42 per cent of the small farmers and 37 per cent of the marginal farmers followed non-farm activities as their livelihood option. The data in Table 3 present the kinds of non-farm activities followed by farming community. A perusal of the Table reveals that service sector employment including both the organized and unorganized sector was the major non-farm option for farmers. While the small farmers (39%) had more access to the organized service sector, the marginal farmers (52%) mostly depended on the unorganized sector. It was also important to note that a good number of small farmers (48%) could adopt enterprise type self employment while only very few marginal farmers (25%) followed that. This again support the view that it is the resource scarcity of the marginal farmers which push them towards the low skilled, low capital intensive and low income earning activities in the unorganized service sector.

Migration as a livelihood strategy

An analysis of livelihood diversification strategy of the respondents in the study showed that migration was one of their important livelihood option (Table 1). About 45 per cent of the small farmers and 38 per cent of the marginal farmers followed migration abroad as one of their livelihood option. This finding has to be analysed in the peculiar socio-economic context of Kerala, where seasonal or circular migration is less compared to migration abroad, especially to Gulf countries. Prakash

(1998) also reported that migration to the Gulf countries and the inflow of remittances was a basic factor determining all the economic activities in northern Kerala, especially in the five districts; Trichur, Malappuram, Calicut, Canannore and Kasaragod. An analysis of the characteristics of the migrants in the study revealed that majority were male with low skill and less formal education and belonged to the Muslim community. The 'push' factors of migration identified in the study included limited scope for agriculture due to their small land holdings, lack of skill or qualification to find employment in the service sector and non-availability of employment opportunities in the domestic industrial sector.

The pull factors like expectation of wider employment opportunities and higher income, even for low skilled and semi-skilled works in the Gulf countries also played a major role favouring this phenomenon. The general conclusion is that though migration had resulted in the reduction of unemployment, it had created shortage of labourers with upgraded skills, caused increased wage rate and thereby promoted the inwards migration of workers from neighbouring states. However, the higher level of income resulting in higher rate of consumption and acquisition of assets like better housing could help to increase the livelihood security of these migratory households.

CONCLUSION

An analysis of the livelihood strategies of rural people Kerala revealed that the adoption of farming as a single livelihood option has been significantly declining. Instead, multiple livelihood options were adopted by the

rural households, which included non-farm employment and migration along with farming. This kind of diversified livelihood could be seen as a good sign of sustainability of livelihoods as it indicated that the rural households could cope with and recover from stress and shocks and thereby reduce their vulnerability. However the in depth analysis of the livelihood systems of rural community revealed that the growth of non-farm employment in the unorganized sector and migration due to push factors were not sustainable livelihood strategies. The factors which act as constraints to follow agriculture as livelihood were in fact the push factors behind the adoption of diversified livelihood by the farming community of Kerala. This indicates a crisis in the State's path towards the goal of sustainable agriculture and food security. Therefore, a sustainable livelihood approach should be the thrust area of any development intervention for the rural households in the State.

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Technological Gap in Wheat Production Technology in Arid Zone of Rajasthan

Bhagwan Singh¹

ABSTRACT

The study was conducted in selected districts of Rajasthan revealed that a majority (64.06%) of the farmers belonged to medium technological gap category. Majority of the farmers had high technological gap in seed treatment, weedicides application and plant protection measures. Out of sixteen variables, 7 variables namely education, occupation, sources of information, scientific orientation, risk orientation and knowledge were found to be negatively and significantly related with overall technological gap, where as, age was found to be positively and significantly related with technological gap in wheat production technology. All the sixteen independent variables taken together explained 45.19 per cent of the variation for technological gap in wheat crop.

Wheat is an important cereal crop of Rajasthan (India). It occupies about 186-lakh hectare area in Rajasthan with total production of 48.78 lakh tonnes. It shares 13.62 per cent of cropped area. The average productivity of wheat is 27.09 q/ha in the state, which is low as compared to other wheat growing states. To increase the per unit area production of wheat crop, enough suitable technologies are being generated in the ICAR Institutes and State Agricultural Universities but only a few technologies developed at Research Station are followed by farmers. Keeping this in view the present study was undertaken with the objective of investigating the technological gap in wheat production technology.

METHODOLOGY

The study was conducted in four districts namely Jodhpur, Pali, Bikaner and Jaisalmer of Rajasthan during 2003. Two Panchayat Samities, namely Bilada and Osian of Jodhpur District, Rohet and Jetaran Panchayat Samities of Pali District, Nokha and Linkaran Panchayat Samitis of Bikaner District and Pokharan and Jaisalmer Panchayat Samiti of Jaisalmer District were selected randomly. From each Panchayat Samiti one village and from each

village 16 wheat growing farmers were selected randomly. Thus the sample size was 128. The data were collected using pre-tested structured schedule by personal interview method.

For studying the technological gap, 11 important cultivation practices i.e. high yielding varieties; seed rate; seed treatment; time and method of sowing; method of sowing, spacing, dose, time and methods of nitrogenous fertilizers application; dose, time and methods of phosphatic fertilizers, weedicides application; plant protection measures and irrigation were considered. Sixteen independent variables namely age, education, caste, occupation, land holding, irrigation facilities, family type, family size, farming experience, annual income, extension contact, sources of information, economic motivation, scientific orientation, risk orientation and knowledge were considered for computation of correlation co-efficient in order to find out their relationship with the dependent variable i.e. technological gap.

The term technological gap refers to the gap between the recommended package of practices and

¹ Scientist, selection grade (Agricultural Extension), Division of Agricultural Economics, Extension and Training, Central Arid Zone Research Institute, Jodhpur-342 003.

practices actually applied in farming. The formula used for measuring the technological gap was as follows:

$$\text{Technological gap index} = \frac{R - A}{R} \times 100$$

Where, R - Recommended technology

A - Technology actually adopted by the farmers.

RESULTS AND DISCUSSION

Practice wise technological gap in wheat production technology

The responses received from the farmers were categorized into three as low (up to 33.33%), medium (33.34 to 66.66%) and high technological gaps (above 66.66%). Practice wise extent of technological gap in wheat production technology is presented in Table 1.

It is evident from Table 1 that a majority (76.56%) of the farmers belonged to low technological gap category followed by medium (20.32%) and high technological gap (3.12%) in the use of high yielding varieties of wheat. Similar finding was also reported by Singh *et al.* (1999). In case of seed rate, 75, 14.06 and 10.94 per cent of the farmers belonged to low, medium and high technological gaps respectively. In respect of seed treatment, majority (89.06%) of farmers were found in high technological gap category. This might be due to lack of knowledge about the practice. It is also clear that majority of the farmers (61.72%) had adopted seed technology in terms of adoption of correct spacing followed by medium technological gap (35.16%). A majority (82.31%) of respondents were found to be in low technological gap category in case of time of sowing. With regards to method of sowing, majority (83.59%) of the farmers were in low technological gap category, 9.38 per cent in medium and 7.03 per cent of respondents were in high technological gap category.

Table further indicates that majority (79.91%) of farmers belonged to medium technological gap followed by low (13.28%) and high technological gap (7.81%) in dose of nitrogenous fertilizers application. Forty-eight and 55.47 per cent farmers adopted the nitrogenous fertilizer in terms of recommended methods of application and time of application. In case of phosphatic fertilizer, 43.75, 53.12 and 61.72 per cent respondents had adopted the recommended dose, method of application, and time of application respectively.

Table 1. Practice wise technological gap in wheat production technology

S. No.	Technology	Technological gap (in %)			Total
		Low (upto 33.33%)	Medium (33.34to 66.66%)	High (Above 66.66%)	
1. Seed technology					
	1.H.Y.V. seed in terms of area	98 (76.56)	26 (20.32)	4 (3.12)	128 (100.00)
	2. Seed rate	96 (75.00)	18 (14.06)	14 (10.94)	128 (100.00)
	3. Seed treatment	8 (6.25)	6 (4.69)	114 (89.06)	128 (100.00)
	4. Spacing	79 (61.72)	45 (35.16)	4 (3.12)	128 (100.00)
	5. Time of sowing	105 (82.03)	15 (11.72)	8 (6.25)	128 (100.00)
	6. Method of sowing	107 (83.59)	12 (9.38)	9 (7.03)	128 (100.00)
2. Fertilizer technology					
A. Nitrogenous Fertilizer					
	1. Dose/ha	17 (13.28)	101 (78.91)	10 (7.81)	128 (100.00)
	2. Method of application	62 (48.44)	47 (36.72)	19 (14.84)	128 (100.00)
	3. Time of application	71 (55.47)	40 (31.25)	17 (13.28)	128 (100.00)
B. Phosphatic fertilizer					
	1. Dose/ha	56 (43.75)	44 (34.38)	28 (21.87)	128 (100.00)
	2. Method of application	68 (53.12)	45 (35.16)	15 (11.72)	128 (100.00)
	3. Time of application	79 (61.72)	46 (35.94)	3 (2.34)	128 (100.00)
3. Plant protection technology					
	1. Plant protection chemicals	4 (3.12)	6 (4.69)	118 (92.19)	128 (100.00)
	2. Weedicides Chemicals	7 (5.46)	13 (10.16)	108 (84.62)	128 (100.00)
4. Irrigation technology					
		73 (57.03)	50 (39.06)	5 (3.91)	128 (100.00)

(Figures in parentheses indicate percentage)

With regards to plant protection measures, majority (92.19%) of the farmers were found in high technological gap category. Sharma and Sharma (2003) found 75.02 per cent technological gap in plant protection measures in gram crop. This might be due to lack of knowledge and high cost of plant protection chemicals. It was found that majority (84.38%) of the farmers had high technological gap in case of weedicides application. The reason for high gap might be due to lack of knowledge and high cost of weedicides.

In case of irrigation technology, majority (57.03%) of the respondents had low technological gap followed by medium (39.06%) and high technological gaps (3.91%).

Distribution of respondents according their overall technological gap in wheat production technology

Overall 64.06 per cent farmers were found in medium technological gap category, whereas the rest 19.53 and 16.41 per cent were in high and low technological gap respectively (Table 2). Prasad and Pal (1991), Nikhade *et al.* (1997) and Singh and Chauhan (2000-2001) also reported similar findings.

Table 2. Distribution of farmers according to their overall technological gap in wheat crop

S. No.	Technological	Frequency	Percentage
1.	Low technological gap	21	16.41
2.	Medium technological gap	82	64.06
3.	High technological gap	25	19.53
	Total	128	100.00

Relationship between socio-economic characteristics of the farmers and technological gap in wheat production technology

To find out the relationship between socio-economic characteristics of the farmers and technological gap in wheat production technology, correlation coefficient was worked out and presented in Table 3.

The age of the farmers had shown positive and significant relationship with technological gap. It shows that old farmers had high technological gap. It might be due to low education, less enthusiasm and low mass media exposure. The findings are in conformity with the finding of Bhoite and Thorat (1984).

Out of sixteen variables, education, occupation, sources of information, scientific orientation, risk orientation and knowledge of the farmers were found to be negatively and significantly correlated with technological gap in wheat production technology. This shows that the farmers who had better education, consulted more sources of information, had more scientific orientation, more risk preference and good knowledge had lower technological gap.

Shaktawat (1982) and Bhati (2002) found negative and significant correlation between education and technological gap.

Table 3. Correlation between socio-economic characteristics of the respondents and technological gap

S. No.	Socio-economic characteristics	Correlation coefficient efficient (r)
1.	Age	0.39381**
2.	Education	-0.34405**
3.	Caste	0.00277 NS
4.	Occupation	-0.19973*
5.	Land holding	0.7552NS
6.	Irrigation facilities	-0.15814 NS
7.	Type of family	-0.16646 NS
8.	Size of family	-0.11104 NS
9.	Farming experiences	0.16731 NS
10.	Annual income	-0.07647 NS
11.	Extension contact	-0.17556 NS
12.	Sources of information	-0.29075**
13.	Economic motivation	-0.17048 NS
14.	Scientific orientation	-0.19876*
15.	Risk orientation	-0.26359**
16.	Knowledge	-0.52351**

N.S.=Non-significant

*-Significant at 5% level

**-Significant at 1% level

The variables like caste, land holding, irrigation facilities, family type, family size, farming experience, annual income, extension contact and economic motivation of farmers did not show significant relationship with technological gap. It clearly indicated that these variables did not have any impact on technological gap.

Regression analysis

Table 4 elucidated that all the sixteen independent variables taken together explained 45.15 per cent of the variation for technological gap. The 'F' value 5.82302 was significant at 1 per cent level of probability. The result implied that all the sixteen variables accounted for significant amount of variation for technological gap.

Further, it was also observed that 't' test of significance expressed in coefficient of regression 'b' values were negatively significant for caste and occupations where as coefficient of regression 'b' value

Table 4. Regression coefficient between independent variables and technological gap

S. No.	Independent variables	Reg. coefficient ('b' value)	Standard error	't' value
1.	Age	0.05923	0.06631	0.89323
2.	Education	-0.075761	0.62288	-1.21628
3.	Caste	1.04656	0.47989	2.18082*
4.	Occupation	2.58289	0.85400	3.02446**
5.	Land holding	0.01526	0.01283	1.18940
6.	Irrigation facilities	-0.40379	1.00668	-0.40111
7.	Type of family	-1.02714	0.80627	-1.27394
8.	Size of family	-0.12845	0.10414	-1.23343
9.	Farming experiences	0.02926	0.06483	0.45143
10.	Annual income	-0.01033	0.00685	-1.50688
11.	Extension contact	0.051583	0.45361	0.11371
12.	Sources of information	0.01131	0.09561	1.18323
13.	Economic motivation	-0.29102	0.28911	-1.00659
14.	Scientific motivation	0.22873	0.28113	0.81359
15.	Risk orientation	0.01037	0.27356	0.3792
16.	Knowledge	-0.45609	0.08703	-5.24041**

R²=.45194; F=5.82302**, *-Significant at 5 per cent level; **, Significant at 1 per cent level.

was positively significant for knowledge at 1 per cent level of probability. On the contrary, coefficient of regression 'b' values were non-significant for age, education, land holding, irrigation facilities, type of family, size of family, farming experience, annual income, extension contact, sources of information, economic motivation, scientific motivation and risk orientation.

The results of the analysis were indicative of the fact that caste, occupation and knowledge of the farmers were most important predictors in technological gap in wheat.

CONCLUSION

On the basis of above discussion, it can be concluded that over all majority (64.06%) of the farmers belonged to medium technological gap category. Majority of the farmers had high technological gap in seed treatment, weedicides application and plant protection measures in wheat production technology. Out of sixteen variables, 7 variables namely education, occupation, sources of information, scientific orientation, risk orientation and knowledge were found to be negatively and significantly related with overall technological gap where as, age was found to be positively and significantly related with technological gap in wheat production technology.

Marketing Behaviour of Glory Lily Cultivators in Tamil Nadu

K. Kalimuthu, Anita Jhamtani and R.N. Padaria¹

ABSTRACT

Glory lily is commercially cultivated in Tamil Nadu, Karnataka and Andhra Pradesh. Tamil Nadu state leads in production and export of seeds of glory lily. The objectives of the study were to analyse the marketing behaviour of the glory lily cultivators and to identify the constraints faced by the farmers in marketing of glory lily. The study was conducted at Oddanchatram block in Dindigul district of Tamil Nadu. Fifty farmers were selected randomly for the study. The most popular channel for marketing of tubers was collector-broker-local trader-farmer and for marketing of seeds it was farmer-broker-collector-broker-local trader-farmer and for export of seeds it was farmer-broker-exporter. The local sources like fellow farmers and friends, brokers and local merchants were the important sources of market information. The attitude of farmers towards various aspects of marketing was considerably low. The major constraints in marketing were lack of organized marketing, uncertainty about future price and unavailability of quality planting material.

Despite its inherent strength in Ayurvedic and other traditional systems of medicine, India accounts for only a small portion of the world trade in medicinal and aromatic plants, which is dominated by China. While China held a handsome share of 40 per cent in the USD 60 billion world trade in medicinal plants, India accounted for a share of just USD 100 million. During 2004-2005, the total trade in medicinal plant in India was Rs. 4530 crore of which export accounted for Rs. 3423 crore and import to the tune of Rs. 1107 crore. India has rich bio diversity to harness the vast potential available in the international market. Tamil Nadu has been at the forefront in commercial cultivation and marketing of several medicinal plants. Glory lily is commercially cultivated in Tamil Nadu, Karnataka and Andhra Pradesh. However, Tamil Nadu state leads in production and export of glorigiosa seeds in India. In Tamil Nadu, it is grown in Erode, Dindigul, Athur, Salem and Madurai covering an area of about 1000 ha. The annual production of seed is about 400 tonnes, and about Rs.80 million worth of seeds are exported to other countries especially Italy and USA (Rajamani and Selvaraj, 2004).

In this context, the paper focusses on the following objectives:

1. To analyse the marketing behaviour of the glory lily cultivators.
2. To identify the constraints faced by the farmers in marketing of glory lily.

METHODOLOGY

The study was conducted in Tamil Nadu. Dindigul district was selected purposively for the study, as this district has more acreage under glory lily and experienced sharp expansion in the area. Oddanchatram block was selected purposively from among the blocks, as it had the largest area under glory lily cultivation. Five villages Paraivalasu, Ambilikai, Kallimandayam, Rotupudur and Kappalpatty were selected randomly from Oddanchatram block. A sample of 50 farmers was selected randomly from among the glory lily cultivating farmers in the selected villages.

¹Division of Agricultural Extension, Indian Agricultural Research Institute, New Delhi-110 012.

RESULTS AND DISCUSSION

Marketing channel for glory lily

The predominant marketing channel was 'collector-broker-local trader-farmer' because the brokers paid advances to collectors to collect from the wild. Further, they were able to contact a large number of collectors. The second popular channel was 'collector-broker-farmer'. The advantage was that they could get tubers at a comparatively lower price. Further, farmers could select the type of planting material they wished. Notwithstanding, this channel was not so popular as the farmers had to stay away from farm activities and also farmers could not get enough as a local trader could get.

There were mainly three kinds of channels that were used to market the seeds of glory lily. The most widely used channel was farmer-broker-exporter. Fifty two per cent of the respondents followed the above channel. The brokers used to provide required planting material. Farmers perceived the brokers to be more credible rather than anybody else. The second major channel was 'farmer-exporter'. Forty two per cent of the farmers were found selling seeds directly to exporters. Generally, this category of farmers were organised as a group in selling their produce to exporters. They were of the opinion that complete dependence on broker would not serve the interest of the farmers. The broker might be making huge profit as intermediary.

Sources of market information

The localite sources like fellow farmers and friends, brokers and local merchants obtained the mean score of above two (Table 1). This might be due to the advantages of the localite sources like informal nature, frequent interaction, easy access, and credibility. Brokers

Table 1. Sources of market information for Glory lily

S. No.	Sources	Mean score	Rank
1.	Fellow farmers and friends	2.63	I
2.	Brokers	2.17	II
3.	Local merchants	2.13	III
4.	Exporters	0.94	IV
5.	Input dealers	0.81	V
6.	University sources	0.12	VI
7.	Internet	0.06	VII
8.	Extension personnel	0.00	VIII
9.	Print media	0.00	IX
10.	TV/Radio	0.00	X

were also important because they maintained a close contact with exporters and farmers cultivating glory lily in that area.

Cosmopolite sources like exporters and input dealers, university and Internet were the other sources of information with a score ranging between 0-1.0. The accessibility of exporters to farmers was limited because of language barrier, manipulation of information by local agents of the exporters and the tendency of the exporters not to disclose all the information. Input dealers were also consulted by farmers for getting information related to supply of tubers, pest and disease incidence and predicted yield, expected price and position of various farmer groups about selling the seeds.

University sources were of minor importance. The accessibility to these sources was limited because of long distance, difficulty in getting appointment with scientists and relevancy of the information to farmers' needs. Interestingly, the Internet did find a place, though with a very low mean score. This revealed the changing pattern of information seeking behaviour by farmers as well as the introgression of newer tools in rural systems for precise and timely information.

Ironically and shockingly, the cosmopolite sources like extension personnel, print media and television and radio did not find feature among information sources used by the farmers. Though they were readily accessible to farmers, they did not provide any information on marketing. The extension personnel were not aware of marketing of this crop.

The sources of information were identified with the frequency with which they were contacted and qualification level of contact was made through a scale of four-point continuum (with relative weightage of 0, 1, 2, 3 and 4).

Perception of farmers towards marketing of glory lily

The average perception score of farmers towards various aspects of marketing of seeds of glory lily with scale of measured five point continuum (strongly agree, agree, undecided, disagree and strongly disagree with respective weightage of 5, 4, 3, 2 and 1) was considerably low (116.9), indicating the dissatisfaction of farmers and various intricate and pressing issues in marketing of glory lily.

Farmers stated that there was no unwarranted deduction in marketing (Table 2). Therefore, the farmers

Table 2. Perception of farmers towards marketing of Glory lily (N=50)

S. No.	Statements	Score	Rank
1.	There is no unwarranted deduction in marketing	207	I
2.	Market price for glory lily is better than that of other commodities	155	II
3.	Payment by traders for transaction is satisfactory	150	III
4.	The handling of the produce does not result in much loss	122	IV
5.	Marketing of glory lily is very easy and simple	102	V
6.	Availability of information is sufficient regarding marketing	101	VI
7.	Farmers get the due share in the consumer price	95	VII
8.	Availability of marketing facilities is sufficient	78	VIII
9.	The institutional support is sufficient for marketing of glory lily	77	IX
10.	The government support for marketing is sufficient	63	X
Average Score		116.9	

expressed their high positive opinion towards this aspect. The farmers perceived that the market price for glory lily was better than that of other commodities. In the last few years, the seed of glory lily had been sold in the price range of Rs.400-500 per kg. The payment by traders for transaction was perceived to be satisfactory. The brokers/exporters settled the amount within a week or ten days.

A majority of farmers perceived that the handling of the produce did not result in much loss. The seeds of glory lily were not perishable in nature and did not require any specific post harvest treatment or processing except winnowing and sun drying. There was somewhat unfavourable perception among farmers as they faced many difficulties in marketing of glory lily. The other commodities could be sold in regulated markets, co-operative societies, commission mandies, shanties and villages and there was no dearth of buyers for such

commodities. On the contrary, there were few exporters and brokers for glory lily. Therefore, farmers had a limited number of buyers and at the same time, it had to be sold at any cost, as it could not be used for any other purpose locally.

Farmers expressed dissatisfaction with the price paid to them by brokers and exporters. They believed that market intermediaries earned huge margin in international market, while they did not get their due share in consumer price. Availability of marketing facilities obtained a low score of 78 due to insufficiency of drying yards, storage structures, transportation, processing facilities, and packing and packaging materials. Availability of institutional support for marketing of glory lily got poor score of 77. This reflected the grim situation being faced by economically prospective crop. The high value and export-oriented crops desperately need institutional support like banking services, insurance coverage and market intelligence. Government support for marketing getting the least score amply suggest revamping and redefining the roles of agricultural marketing and extension departments to cater to the needs and challenges emerging in the era of market economy. Promotion of medicinal plants needs effective marketing strategies and institutional support in the interest of cultivators.

From the above discussion, it could be concluded that exporters were the only key sources from whom marketing information emanated to others. However they might not provide accurate information to cultivators owing to their vested interest for maximizing the profit and not providing chance for others to enter into the trade. The localite sources topped the list of information source but were not capable enough to provide details on export-oriented crop like glory lily. The government source and mass media had minimal or no role. The medicinal plants boards, at centre and state, should take initiatives to promote marketing. Extension personnel need to gear up to meet the divergent needs of the farming sector.

Constraints in marketing of glory lily

Lack of the organized marketing was the major problem for all the respondents. Local traders carried out the supply of tubers to farmers. They procured from collectors dispersed in various regions. The companies and government institutions were not involved. The sale of seeds was also highly unorganized. It appeared to be oligopolistic in nature where farmers could not get their due share.

About 92 per cent of glory lily cultivators opined that uncertainty about the future price was a major problem. It was largely due to unavailability of statistics about present and future demand for glory lily seeds.

About 88 per cent of respondents reported that unavailability of quality tubers for planting as their major constraint. So far, there was no quality parameter standardized and prescribed for glory lily tubers. To meet the increasing demand, the local traders purchased tubers collected from disease-infected fields. The poor quality of planting material was the prime reason for loss of tubers during storage. Further, poor quality tubers became susceptible to many diseases in later stage of growth and registered very low yield.

Lack of institutional credit facility was expressed as a constraint by 72 per cent of the respondents. The investment requirement for glory lily cultivation was the highest among all other crops in this area. However, the institutional credit utilization pattern was generally low among the farmers. The credit institutions were not forthcoming to provide credit support especially for glory lily.

CONCLUSION

The study highlight that marketing of glory lily was unorganised and predominance of intermediaries in

the marketing channels affected the economic returns to the cultivators. Collector-broker-local trader - farmers was the predominant marketing channel for tubers while for marketing of seeds of glory lily the most popular channel was 'farmer-broker-exporter'. Localite source like fellow farmers, friends, brokers, local merchants, etc. were the major sources of information on marketing of glory lily. Study of farmers' perception about marketing system of glory lily revealed their dissatisfaction. They expressed dissatisfaction with the prices paid to them by the brokers and the exporters as well as for poor infrastructural support system for facilitating cultivation and marketing of glory lily. Lack of organised marketing, price uncertainty and instability, unavailability of quality tubers, lack of institutional credit and market facilities as well as predominance of intermediaries with vested interest as the major constraints in marketing of glory lily. Formulation and implementation of appropriate information system and marketing strategies are suggested to provide a fillip to glory lily trade.

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Labour Discrimination in Paddy Cultivation in Sundarbans Delta of West Bengal

Hema Tripathi¹ and S.K. Das²

ABSTRACT

The study was carried out in purposively selected four villages from four selected blocks of Sundarbans delta of West Bengal. The life in rural Sundarbans was found revolving around *aman* paddy cultivation. It required a huge number of skilled and easily available labourers from sowing of paddy to making of rice. Men and women were not equally considered suitable for all operations/activities involved therein. Various labour hiring practices such as *jan*, *furon*, *chopura*, *daol*, *haddar* and *Khoali* exist in the study area for performing a particular agricultural operation or a combination of operations. Among these *furon* and *khoali* were the common practices across the study villages.

Paddy cultivation and that of *aman* monsoon paddy, as called by the villagers was the only and one of the most important means of living found in the rural Sundarbans. The life of rural Sundarbans revolved around *aman* paddy (Das, 2005). Paddy left trail in every sphere of rural life. Women have a pivotal role in agriculture especially paddy cultivation, which has already been acknowledged world wide. In Asia, women perform 80-90 per cent work in the fields. They are involved in planting, transplanting, weeding, harvesting and processing to marketing. Studies on participation of women in India in rice cultivation indicate that women participate in 15-18 rice-farming operations either alone or jointly with male counterparts. Though the work share of women is greater in rice cultivation, men also perform certain important operations (Pandey, 2004). Therefore, attention is important on gender issues, labour discrimination practices etc. so that suitable interventions can be planned. From cultivation of paddy to making of rice, a number of operations are needed to be performed. Each activity and operation needed huge skill and easily available labourers. Therefore, a study was undertaken to study genderwise, activitywise and castewise analysis of

labour discrimination practices in paddy cultivation in Sundarbans delta of West Bengal.

METHODOLOGY

The study was carried out in Sundarbans delta of West Bengal. Spread over India (one-third) and Bangladesh (two-third), it is the one of the world's largest delta, largest mangrove forest area and one of the few existing mangrove ecosystems in the world. Indian part of Sundarbans spreads over the districts of South and North 24 Parganas in West Bengal state in the mouth of Bay of Bengal about 80 km south of Kolkata.

In this region, people are poor, their livestock are hardy but yields are poor. Agriculture is the mainstay of people's livelihood as about 90 per cent of the population depends on agriculture. The region is not industrially advanced (Chattopadhyaya, 1999).

Four villages were selected purposively from four blocks situated in the districts of South and North 24 parganas. They were Bagulakhali (Basanti block), Moukhalli (Canning-II block), Jemspur (Gosaba block)

¹ Senior Scientist and in-charge KVK, IVRI, Izatnagar.

² Assistant Professor, Department of Veterinary and Animal Health Extension, CVSc&AH, CAU Selish, Mizoram, 796 014.

villages in south 24 Parganas and Samser Nagar village (Hingalgan block) in North 24 Parganas district.

Villages were selected on the basis of their livelihood, location, culture, backwardness-forwardness, etc. for the purpose of capturing the diversity of the region. Among the study villages, Samser Nagar was situated at Indo-Bangladesh border besides Kalindi river on the fringe of mangrove forest. Jemspur too was a forest fringe village. Bagulakhali and Moukhali were two non-forest fringe villages. Among the villages Bagulakhali was the most well communicated with urban area and Samser Nagar was the most interior with poor conveyance facilities.

A participatory case study method (Mukherjee, 1993) was used for the study. Each of the selected villages was considered as a case. Semi structured interview, listing, narrative, on-site observation, micro-analysis, seasonal analysis, etc. were used as participatory appraisal tools/methods for data collection staying at a villager's home in each of the study villages.

RESULTS AND DISCUSSIONS

The study revealed that agriculture was the base of livelihood in rural Sundarbans. Other livelihood typical to the study villages was fishing, honey collection, and woodcutting, besides animal husbandry and other miscellaneous/off-season livelihood that were complementary and supplementary to agriculture. *Aman* paddy was the principal crop. Ups and downs in *aman* paddy production had a definite impact on the livelihood of the people. Paddy left trails in every sphere of rural life. Table 1 shows the existing cropping pattern in the

study villages during monsoon (rainy), rabi (winter) and kharif (summer) season. *Aman* paddy, the golden grain was cultivated during monsoon across the study villages. Thus activities and actions of the villagers centered around *aman* paddy. Besides the season of *aman* paddy cultivation (Jaistha-Asarh) and harvesting (Aghrayan-Poush), other seasons were perceived as off-season when activities and actions required to earn a living were available and accessible in a limited way. However, villagers kept themselves engaged round the year to complement and supplement their means of sustenance.

Summer paddy was cultivated by many in Moukhali vilage and to some extent that is upto 5-10 kotha (1 bigha = 20 Kotha and 1 hectare = 7.5 bigha) land per household in Jemspur. Irrigation problems and soil salinity owing to its close proximity to the estuarine river might be the factors constraining summer paddy cultivation by majority of the villagers.

The life of rural Sundarbans was found revolving around *aman* paddy cultivation. It requires a huge number of skilled and easily available labourers from sowing of paddy to making of rice. Men and women were not considered equally suitable for all operations/activities involved therein. Various labour hiring practices; *jan*, *furon*, *chopura*, *daol*, *haddar* and *khoali* exist in the study area for performing a particular agricultural operation or a combination of operations. Among these *furon* and *khoali* were the common practices across the study villages. *Aman* paddy was the principal cash crop, prices of which varied with the season and variety. It costed maximum during *Bhadra-Kartik* and minimum during *Poush-Chaitra*. Selling of rice was not being practised

Table 1. Cropping pattern : an analysis of seasonality of agricultural production

Villages	Seasons		
	Monsoon (Rainy) Jaistha-Aghrayan	Rabi (Winter) Aghrayan-Chaitra	Kharif (Summer) Chaitra-Jaistha
Bagulakhali	Paddy, vegetables	Vegetables	Vegetables
Moukhali	Paddy, vegetables	Vegetables	Paddy, vegetables, pulses, oil seeds
Jemspur	Paddy, vegetables	Vegetables	Paddy, oil seeds, pulses, vegetablers
Samser Nagar	Paddy vegetables	Vegetables	Vegetables

Note : The corresponding English months were : Baisakh: Mid-April to Mid-May; Asarh: Mid-June to Mid-July; Aswin: Mid-September to Mid-October; Kartik: Mid-October to Mid-November; Magh: Mid-January to Mid-February; Falgun: Mid-February to Mid-March; Chaitra: Mid-March to Mid-April.

Table 2. Labour discrimination in major paddy operations : a gender analysis

Works/activities	Performed by				
	Men only	Women only	Men and women both	Men assisted by women	Women assisted by men
Ploughing and sowing	✓	x	x	x	x
Uprooting paddy saplings from seed bed for transplantation	✓	x	x	x	x
Transplanting	x	x	✓	x	x
Applying fertilizers, pesticides etc.	✓	x	x	x	x
Harvesting and carrying	x	x	✓	x	x
Threshing and trampling	x	x	x	✓	x
Winnowing	x	x	x	x	✓
Boiling and sun drying of paddy	x	x	x	x	✓
Winnowing rice by winnowing flatter	x	✓	x	x	x
Weeding in paddy field (Khoali)	x	x	✓	x	x
Making paddy straw stack	✓	x	x	✓	x

in the study villages. *Byapari* (vendor) used to purchase paddy from the owner's house. By-product of paddy included paddy straw, paddy husk, rice bran, broken bits of rice, stubble etc. which were mainly used as fuel besides as livestock feed and for meeting other domestic needs.

Labour discrimination in different agricultural operations

The data in Table 2 point out that men and women were not considered equal/suitable for a or combinations of operations. In some operations (transplanting and weeding), men and women were considered equal. Whereas works like threshing, boiling etc. were being done by men and women jointly. Interestingly, in Moukhali village women rarely/did not work as agricultural labourer.

Study further revealed different practices of agricultural labourer hiring for performing different types of operations across the study villages. The data in Table 3 show local practices of hiring agricultural labourer, gender discrimination in hiring practices and similarities and differences regarding the above issues across the villages. *Furon*, one of the labourer hiring practices, was found common in agricultural operations across the villages. *Jan* refers to the day labourer working from early morning to dusk. Some labourer hiring systems was followed exclusively in a particular village. *Chopura*, *daol* and *haddar* were exclusively followed by Bagulakhali, Samser Nagar and Moukhali villages, respectively.

The data in Table 4 reveal agricultural operations, which were being performed by different terms practices such as *jan*, *furon*, *chopura*, *khoali*, *daol*, across the study villages..

Table 3. Labour hiring practices across the village

Hiring practices	Begulakhali	Moukhali	Jemspur	Samser Nagar
Chopura	Women get Rs. 30/day/head with light food during mid-day working from 7 a.m. to 4 p.m.			
Jan	Men get Rs. 40/day/head, with two times food and women get Rs. 30/day/		Men and women get Rs. 50/day/head with two times food	Men and women get Rs. 55-60/day head without food

Hiring practices	Begulakhali	Moukhali	Jemspur	Samsar Nagar
<i>Furon</i>	head with food during morning only working from 7 a.m. to 12 noon and 3 p.m. to dusk Men and women, work done on contract basis	Transplanting and harvesting being done by Hindu men on contract in Muslim neighbourhood	working from 6 a.m. to 11 a.m. and 2 p.m. to 5 p.m. Men and women both work on contract basis generally get Rs. 250 for threshing one bigha paddy with Rs. 40/day/ extra as rent for threshing machine	working from 6 a.m. to 11 a.m. and 2 p.m. to 5 p.m. Men and women work on contract basis, generally one gunny bag (69 kg) paddy is offered as wage to finish the work from harvesting to threshing one bigha paddy
<i>Daol</i>				Men and women work on contract basis for paddy harvesting and get 10-15 bunches of paddy for cutting 100 bunches
<i>Hadder</i>		Hadder = Sardar = leader or a middleman involved in the hiring system. He gathers the labourers as per need. Wages are paid daily basis. On the last day intermediary entertains his group of labourers at a feast and gifts a shirt/Guernsey to every labourer. Each labourer gives Rs. 50 to him. Men and women both are hired.		
<i>Khoali</i>	Men and women, weeding in the paddy field from 5/6 a.m. to 11 a.m./12 noon, get Rs. 25-30 per head	Men and women, weeding in the paddy field from 5/6 a.m. to 11 a.m. / 12 noon, get Rs. 25-30/head	Men and women, weeding in the paddy field from 5/6 a.m. to 11 a.m./12 noon get Rs. 25-30 per head	Men and women, weeding in the paddy field from 5/6 a.m. to 11 a.m./12 noon, get Rs. 25-30 per head

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Table 4. Activitywise labour hiring practices and tools/equipments/materials used from sowing of paddy to making of rice

Operations	Tools/equipments/materials used	Hiring practices
Cultivation	Country plough/power tiller, bullock/he-buffalo/she-buffalo spade and ladder	Jan, furon
Uprooting seedlings	Nothing	Jan, furon
Transplanting	Nothing	Jan, furon, chopura
Weeding	Nothing	Khoali
Applying fertilizer	Bamboo basket/gunny bag	Jan
Spraying pesticide	Sprayer (plastic/brush)	Jan
Harvesting & binding paddy	Sickle	Jan, daol, furon, chopura
Carrying harvested paddy	Yoke/van-rickshaw/carrying on head, bamboo, rope	Jan, furon
Stacking harvested paddy	Nothing	Jan, furon
Threshing, trampling and winnowing paddy and trampled straw	Threshing machine/dharat/chcharat/cheli, bullock (5-10), winnowing flatter, bamboo basket bamboo, broom, polythene sheet/mat	Jan, furon
Steaming, soaking, boiling and drying	Pit, polythene sheet, bamboo basket, haidga, Fireplace Fireplace handi/taha, bucket, large boiling pan	Jan
Dehusking of paddy	Husking machine, polythene sheet/mat, gunny bag	Jan, furon
Winnowing of rice	Winnowing flatter, polythene sheet/mat, bamboo basket, gunny bag	Jan, furon

CONCLUSION

The study conducted in Sundarbans delta of West Bengal showed that cultivation of *aman* required a huge number of labourers. Men and women were not considered equal for a particular on combination of operations. For operations such as transplanting and weeding men and women were considered equal. The operations such as threshing, boiling etc. were done by men and women jointly. The study also revealed different labour hiring practices such as *jan, faron, chopura, kholi and daol*.

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Extent of Adoption of Improved Cashew Cultivation Practices

B. Johnson¹ and M. Monoharan²

ABSTRACT

The study was conducted to investigate the extent of adoption recommended improved cashew cultivation practices by new and old garden farmers of Cuddalore district. The sample size consisted of 45 respondents each from old garden and new garden. The overall analysis indicated that majority of respondents had medium level of adoption about recommended cashew cultivation practices. The adoption was practically nil for the practices of improved varieties and NAA spray with old garden respondents. The adoption was very less for the practices like propagation and gap filling with grafts and irrigation with the old garden respondents. Majority of old garden respondents partially adopted stem borer management, method and time of manure and fertilizer application. The manure and fertilizer application, pruning month and method and tea mosquito bug management had partial adoption by majority of new garden respondents.

Cashew is grown in tropical and sub-tropical tracts in laterite red and coastal sand. Cashew was introduced in India by the Portuguese in the 16th century, primarily as a tree to prevent soil erosion, wasteland development and help afforestation. It is considered as a saviour of environment, generally referred to as a self-ploughing crop due to its ability to penetrate even in moderately hard layered soils. The most suitable soils for cashew are the forest soils rich in organic matter found on the western slopes of Western Ghats. The importance of this cash crop have been strengthened among the farmers by the scheme "Model Clonal Cashew Garden" (MCCG). Under this scheme improved varieties are supplied to farmers. Majority of the recommended cultural practices are adopted in these gardens with the assistance of scientists and state department officials. These farms are called new gardens. Another type of farm is old garden. In this traditional varieties are grown. The propagation is done through seedlings. Only minimum cultural operations are carried out by farmers. These gardens are not much taken care of. Though the development efforts are taken the social research is not

matching with the present situation. Hence social research is required for the overall development of cashew farmers. Owing to aforesaid vitalities, there is a mandatory need to adopt hi-tech and relevant practices by the farmers for its momentum to a greater extent. Though there are enormous cashew cultivation practices, farmers are not uniformly adopting due to varied socio-economic strata. So it is essential to assess the extent of adoption for the improved cashew cultivation practices.

METHODOLOGY

Cuddalore district in Tamil Nadu state was selected for the study as it has the maximum area and production under cashew than all other districts of the state. Villages from Panruti block and Vrindhachalam block in Cuddalore district was selected for this study. Proportionate random sampling procedure was employed in selecting 45 respondents each from old garden and new garden. Thus the sample size consisted of 90 respondents.

The extent of adoption of the cashew cultivation practices was measured by means of "adoption index". The adoption of each practice was measured on a three

¹ Ph.D Scholar, Division of Agricultural Extension, IARI, New Delhi-12.

² Head, Krishi Vigyan Kendra, TNAU, Coimbarore-641003.

point continuum. Three scores for full adoption, two scores for partial adoption and one score for non-adoption was assigned. The sum of scores of all the selected practices was taken as the adoption score for each respondent. The index was calculated using the formula adopted by Usharani (1998).

$$\text{Adoption index} = \frac{\text{Adoption score obtained by the respondent}}{\text{Possible maximum score}} \times 100$$

The respondents were categorized into low, medium and high level of adoption by using cumulative frequency.

RESULTS AND DISCUSSION

Extent of adoption

Overall adoption : The distribution of respondents according to their overall extent of adoption of recommended cashew cultivation practices is given in Table 1.

It is observed from Table 1, that 55.55 per cent of new garden respondents had medium level of overall adoption of recommended practices followed by high (26.67%) and low (17.78%) levels of adoption. As far as old garden respondents are concerned, majority of them (44.44%) had low level of adoption, followed by medium (35.56%) and high (20.00%) levels of adoption.

The new garden and old garden respondents had significant association in their adoption level. The chi square value was significant at five per cent level of probability. The new garden respondents' adoption level was significantly more than the old garden respondents.

Among total respondents, majority of them (45.56%) had medium level of adoption, followed by low (31.11%) and high (23.33%) levels of adoption.

Thus, it could be concluded that there existed, medium level of adoption of recommended cashew cultivation practices among respondents. The adoption level of new garden respondents was significantly more than the old garden respondents. This finding is in line with finding of Subhashini (1996) and Murugan (2000) who have reported medium level of adoption of recommended practices.

Practicewise adoption : The practice wise data collected for the extent of adoption of recommended cashew cultivation practices are present in Table 2.

From the analysis of total respondents, it could be seen that half of the respondents fully adopted the practices namely recommended varieties, and propagation through garfts and seedlings. Nearly one-third of the respondents fully adopted the gap filling with seedling (31.11%), grafts (39.89%), stem borer management (36.67%) and irrigation at critical stages (35.56%). Very few respondents fully adopted the tea mosquito bug management (17.78%), time of manure and fertilizers application (10.00%), pruning month and method of pruning (4.44% each) and NAA aspray (1.11%).

All respondents harvested at the recommended stage and month. Majority raised intercrop (62.22%). Majority of them partially adopted the time of manure and fertilizers application (68.89%), stem borer management (62.22%) and pruning month (44.45%) and method of pruning (46.67%). Very few respondents partially adopted the irrigation at critical stages (18.89%), NAA spray (4.44%) and intercropping (3.33%).

Table 1. Distribution of respondents according to their overall extent of adoption of recommended cashew cultivation practices

Category	New garden respondents (n=45)		Old garden respondents n=45		Total N=90		'Chi square (χ^2) value
	No	%	No	%	No	%	
Low	8	17.78	20	44.44	28	31.11	7.544*
Medium	25	55.55	16	35.56	41	45.56	
High	12	26.67	9	20.00	21	23.33	

* Significant at 0.05 level

Table 2. Distribution of respondents according to their practice-wise extent of adoption

S. No.	Recommended practices	New garden respondents n=45						Old garden respondents n=45						Total N=90						
		FA		PA		NA		FA		PA		NA		FA		PA		NA		
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
1.	Varieties	45	100.00	-	-	-	-	6	13.33	39	86.67	45	50.00	6	6.67	39	43.33	-	-	
2a.	Propagation through seedlings	-	-	-	45	100.00	45	100.00	-	-	-	-	45	50.00	-	-	45	50.00	-	-
2b.	Propagation through grafts	45	100.00	-	-	-	-	-	-	45	100.00	45	50.00	-	-	45	50.00	-	-	
3a.	Gap filling with seedling	3	6.67	-	42	93.33	25	55.56	-	-	20	44.44	28	31.11	-	-	62	68.89	-	-
3b.	Gap filling with grafts	29	64.44	-	16	35.56	6	13.33	-	-	39	86.67	35	38.89	-	-	55	61.11	-	-
4.	Manuring	24	53.33	21	46.67	-	-	-	-	27	60.00	18	40.00	24	26.67	48	53.33	18	20.00	
5.	Time of manure and fertilizers application	9	20.00	36	80.00	-	-	-	-	26	57.78	19	42.22	9	10.00	62	68.89	18	21.11	
6.	Intercropping	29	64.44	3	6.67	13	28.89	27	60.00	-	-	18	40.00	56	62.22	3	3.33	31	34.45	
7a.	Pruning month	4	8.89	20	44.44	21	46.67	-	-	20	44.44	25	55.56	4	4.44	40	4.45	46	51.11	
7b.	Pruning method	4	8.89	24	53.33	17	37.78	-	-	18	40.00	27	60.00	4	4.44	42	46.67	44	48.89	
8.	NAA spray	1	2.22	4	8.89	40	88.89	-	-	-	-	45	100.00	1	1.11	4	4.44	85	94.45	
9.	Stem borer management	26	57.78	19	42.22	-	-	7	15.56	37	82.22	1	2.22	33	36.67	56	62.22	1	1.11	
10.	Tea mosquito bug management	16	35.55	17	37.78	12	26.67	-	-	10	22.22	35	77.78	16	17.78	27	30.00	47	52.22	
11.	Irrigation	31	68.89	14	31.11	-	-	1	2.22	3	6.67	41	91.11	32	35.56	17	18.89	41	45.55	
12.	Harvesting	45	100.00	-	-	-	-	45	100.00	-	-	-	-	90	10.00	-	-	-	-	

'U' value = 1.916^{NS}, 'Z' value = 1.873^{NS}
 FA - Full adoption; PA - Partial adoption; NA - Non adoption; NS - non-significant

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The practice-wise analysis revealed the following findings.

Varieties

All new garden respondents adopted the recommended varieties namely VRI-1, VRI-2, VRI-3 and VRI-4 whereas, majority of the old garden respondents (86.67%) did not adopt the recommended varieties. Only 13.33 per cent of old garden respondents partially adopted the recommended varieties. The old garden respondents used the recommended varieties only for gap filling and not for planting in the entire area. Because of this reason partial adoption was observed with the old garden adopters.

Propagation

All new garden respondents propagated through grafts. Whereas all old garden respondents propagated through seedling.

Gap filling

Nearly half of the old garden respondents (55.56%) fully adopted the seedling for gap filling, whereas only 6.67 per cent of new garden respondents fully adopted this practice. Majority of the new garden respondents (64.44%) fully adopted grafts for gap filling. Whereas only 13.33 per cent of old garden respondents fully adopted this practice.

Manuring

Little more than half of the new garden respondents (53.33%) fully adopted the recommended dose of farm yard manure for first, second, third and fourth year was 10kg, 20kg, 30 kg and 40 kg respectively. The recommended dose of fertilizers per tree for first year was 70 gms nitrogen, 40 gms phosphorus and 60 gms potassium. Similarly for second, third and fourth year the recommended dose was two, three and four times respectively than that of first year recommendation. From fifth year onwards the recommended dose of 50kg farm yard manure, 500 gms nitrogen, 200 gms of phosphorus and 300 gms of potassium has to be applied per tree every year, while the rest of 46.67 per cent of them partially adopted the recommended dose. Majority of the old garden respondents (60.00%) partially adopted the recommended dose of manures and fertilizers.

The partial adoption was observed because majority of the respondents applied more of nitrogenous fertilizer and less of phosphorous fertilizer than the recommended dose.

Time of manure and fertilizers application

One-fifth of the new garden respondents (20.00%) fully adopted the time of manuring and fertilizers application. Majority of them (80.00%) partially adopted this practice. Majority of the old garden respondents (57.78%) also partially adopted this practice.

The manure and fertilizer application is recommended for two splits. One during June-July and the other during October-November. Majority of the respondents applied fertilizers during October-November only and did not apply fertilizers during June-July. This might be the reason for partial adoption.

Intercropping

Almost equal proportion of new garden (64.44%) and old garden respondents (60.00%) fully adopted intercropping in cashew cultivation. Very few new garden respondents (6.67%) partially adopted this practice. The popular inter crop was black gram.

As cashew is harvested once in a year, during remaining months cashew farmers will not get any returns. In order to overcome this, majority of them go for intercropping to get additional income. This might be the reason for majority to fully adopt this practice. However, the entire cashew garden was not intercropped. Some areas are left free without any intercrop. This might be the reason for partial adoption.

Pruning

Equal proportion of new garden and old garden respondents (44.44%) partially pruned the cashew during the recommended month. Nearly half of the new garden (53.33%) and 40.00 per cent of old garden respondents partially adopted the recommended method for pruning. Very few new garden respondents (8.89%) fully adopted the recommended month and method of pruning. None of the old garden respondents fully adopted this practice.

The partial adoption was found because majority of the respondents adopted the pruning at their convenient time. Most of them preferred July to August for pruning, while the recommended month for pruning is October-November.

NAA spray

Majority of the new garden respondents (88.89%) and all old garden respondents not adopted the NAA spray which can enhance the flowering. Only very few new garden respondents (2.22%) fully adopted this

practice, whereas 8.89 per cent of them partially adopted this practice. Lack of awareness about the practice was the main reason for non adoption of the practice by majority of the respondents.

Stem borer management

The following methods are recommended to manage stem borer attack.

- Root feeding of monocrotophos 10 ml mixed with water for moderate incidence of stem borer.
- Painting of coal tar and kerosene mixture (1:2) or swabbing with a suspension of 0.2 per cent carbaryl upto one metre length on the exposed trunk region twice a year i.e. before the onset of monsoon and after cessation of monsoon.

Little more than half of the new garden respondents (57.78%) and few old garden respondents (15.56%) fully adopted the practices recommend for stem borer management. Majority of the old garden respondents (82.22%) and 42.22 per cent of new garden respondents partially adopted this practice.

The partial adoption was found because majority of them not adopted the recommend practice of root feeding with monocrotophos.

Tea mosquito bug management

Spraying of monocrotophos at the rate of 2 ml per litre at young leaf development stage, spraying of endosulfan at the rate of 2.5 ml per litre at flowering stage and spraying of monocrotophos or endosulfan (2.5 ml) or carbaryl 2 gm per litre at fruit setting stage are recommended to manage the tea mosquito bug. Little more than one-third of the new garden respondents (35.55%) followed the recommended control measures at three stages to manage tea mosquito bug. Little more than one-fifth of the old garden respondents (22.22%) and 37.78 per cent of new garden respondents partially adopted this control measure. The partial adoption was found because they skipped any one or two stages without spraying the pesticide.

Irrigation

Majority of the new garden respondents (68.89%) irrigated at critical stages namely establishment and flowering stages. Nearly one-third of the new garden respondents (31.11%) and very few old garden respondents (6.67%) partially adopted this practice.

Partial adoption was found because the irrigation was not done to entire field. Only the area adjacent to well was irrigated, most by due to water scarcity. Some times respondents did not give irrigation at critical stages because they were not giving much care to the crop.

Harvesting

All new garden and old garden respondents harvested at the appropriate time (March-May) and the stage of harvesting (colour of the nut is grey green and cashew apple colour changes from yellow to red).

The 't' test and Mann-Whitney 'U' test were applied to study the relationship between the two categories of farmers with respect to the adoption of recommended cashew cultivation practices. The 't' value was well as the 'Z' value were non-significant. Though there exist some difference in adoption between two categories of respondents, the difference is not statistically significant.

The association and contribution of independent variables on extent of adoption.

The contribution of same set of independent variables was studied with the dependent variable, extent of adoption. To find out the relationship between the dependent variable, extent of adoption and 14 independent variables, simple correlation, multiple regression and path analysis were worked out. The results are presented in Table 3.

Correlation

As seen from Table 3, educational status (X_2), farm status (X_3), social participation (X_6), extension agency contact (X_7), mass media exposure (X_8), annual income (X_9), scientific orientation (X_{11}), and progressiveness (X_{14}) had positive and significant association with extent of adoption at one per cent level of probability. The variable economic motivation (X_{10}) had positive and significant association with extent of adoption at five per cent level of probability.

Table 3 also revealed that age (X_1), farming experience (X_4) and experience in cashew cultivation (X_5), had shown negative and significant association with extent of adoption at one per cent level of probability.

Two variables viz. decision making behaviour (X_{12}) and credit orientation (X_{13}) showed a non-significant association with extent of adoption.

Table 3. Correlation co-efficient and multiple regression of profile characteristics with extent of adoption

Variable number	Characteristics	Correlation co-efficient 'r' value	Regression co-efficient 'b'	Standard error of 'b'	't' value
X ₁	Age	-0.432**	-0.005	0.053	-0.101 ^{NS}
X ₂	Educational status	0.393**	-0.081	0.283	-0.288 ^{NS}
X ₃	Farm status	0.387**	0.079	0.403	0.198 ^{NS}
X ₄	Farming experience	-0.444**	0.026	0.073	0.362 ^{NS}
X ₅	Experience in cashew cultivation	-0.444**	0.026	0.073	0.362 ^{NS}
X ₆	Social participation	0.313**	-0.038	0.625	-0.062 ^{NS}
X ₇	Extension agency contact	0.823**	0.032	0.070	0.461 ^{NS}
X ₈	Mass media exposure	0.732**	0.179	0.195	0.917 ^{NS}
X ₉	Annual income	0.294**	0.007	0.014	0.480 ^{NS}
X ₁₀	Economic motivation	0.247**	-0.037	0.108	-0.344 ^{NS}
X ₁₁	Scientific orientation	0.782**	0.049	0.083	0.600 ^{NS}
X ₁₂	Decision making behaviour	0.125 ^{NS}	0.005	0.052	0.098 ^{NS}
X ₁₃	Credit orientation	0.083 ^{NS}	0.501	0.231	2.167*
X ₁₄	Progressiveness	0.865**	0.799	0.220	3.369**

** - significant at 0.01 level; * - significant at 0.05 level; NS - non-significant
R² = 0.774; F = 20.001**

Table 4. Path analysis showing direct, indirect and substantial indirect effects of independent variables on extent of adoption (n=90)

Variables	Direct effect	Indirect effect	Substantial indirect effects		
			I	II	III
Age (X ₁)	-0.0081	-0.4119	-0.3110X ₁₄	-0.0536X ₁₁	-0.0487X ₇
Education status (X ₂)	-0.0222	-0.4090	0.2997X ₁₄	0.0518X ₁₁	0.0417X ₇
Farm status (X ₃)	0.0166	0.3689	0.2753X ₁₄	0.0314X ₇	0.0282X ₈
Farming experience (X ₄)	0.0259	-0.4437	-0.3581X ₁₄	-0.0508X ₁₁	-0.0475X ₇
Experience in cashew cultivation (X ₅)	0.0259	-0.4437	-0.3581X ₁₄	-0.0508X ₁₁	-0.0475X ₇
Social participation (X ₆)	-0.0039	0.3129	0.2331X ₁₄	0.0406X ₈	0.0313X ₁₁
Extension agency contact (X ₇)	0.0867	0.7216	0.6242X ₁₄	-0.0841X ₁₁	0.0682X ₈
Mass media exposure (X ₈)	0.0919	0.6289	0.5378X ₁₄	0.0693X ₁₁	0.0643X ₇
Annual income (X ₉)	0.0354	0.2565	0.1928X ₁₄	0.0287X ₈	0.0201X ₁₁
Economic motivation (X ₁₀)	-0.0224	0.2683	0.2184X ₁₄	0.0346X ₁₁	-0.0289X ₁₃
Scientific orientation (X ₁₁)	0.0925	0.7678	0.5901X ₁₄	0.0788X ₇	0.0689X ₈
Decision making behaviour (X ₁₂)	0.0070	0.1192	0.0875X ₁₄	0.0131X ₈	0.0118X ₉
Credit orientation (X ₁₃)	-0.0298	-0.2031	-0.1588X ₁₄	-0.0211X ₁₁	-0.0180X ₇
Progressiveness (X ₁₄)	0.6693	0.1823	0.0816X ₁₁	0.0809X ₇	0.0739X ₈

Residual effect = 0.2262

Regression

The results of multiple regression analysis are given in Table 3. Results indicated that co-efficient of determination (R^2) was 0.774 and it revealed that 77.40 per cent variation in the extent of adoption was explained by the 14 independent variables.

The 'F' value showed that the analysis was significant at one per cent level of probability.

The variable progressiveness (X_{14}) had shown a positive and significant contribution at one per cent of probability whereas variable credit orientation (X_{13}) had shown a positive significant contribution at five per cent level of probability.

The strength and contribution of two variables could be explained as one unit increase *ceteris paribus* in credit orientation and progressiveness would bring an increase of 0.501 and 0.799 units in extent of adoption respectively.

Path analysis

Path analysis was attempted to separate the direct and indirect effects through other related variables apportioning the correlation co-efficients. The results of path analysis are presented in Table 4.

The results from Table 4 explained that progressiveness (0.6693), scientific orientation (0.0925), mass media exposure (0.0919) and extension agency contact (0.0867) had more positive direct effects on extent of adoption.

The variables viz., scientific orientation (0.7678), extension agency contact (0.7216), mass media exposure (0.6289) had more positive indirect effects on extent of adoption.

With respect to 42 substantial indirect effects of independent variables, 13 variables passed through progressiveness (X_{14}), 11 variables passed through scientific orientation (X_{11}), nine variables passed through

extension agency contact (X_7), seven variables passed through mass media exposure (X_8) and one each passed through annual income (X_9) and credit orientation (X_{13}).

It could be concluded from correlation, regression and the path values the progressiveness, extension agency contact, scientific orientation, mass media exposure, education status and age were the variables considered as influential and crucial for adoption of recommended cashew cultivation practices.

Scientific orientation will indirectly increase the innovativeness. Farmers with high scientific orientation will adopt the technology as soon as they are aware of it. Naturally increased scientific orientation leads to increased adoption of new technologies. Education and mass media exposure will indirectly increase their outside contact. This in turn will increase their risk taking ability. This might be the reason for increased adoption.

CONCLUSION

Adoption of improved practices like varieties, propagation and gap filling with grafts, NAA spray and irrigation were practically nil with the old garden respondents. So the adoption constraints may be removed by supplying adequate inputs to the farmers in time. Technical guidance may also be given to the farmers. While selecting the beneficiaries for various development programmes high farming experience and experience in cashew cultivation and extension agency contact, mass media exposure, economic motivation, scientific orientation, decision making behaviour, credit orientation and low level of progressiveness may be considered by the extension functionaries.

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Involvement of Women in Natural Resource Conservation

Neeta Khandelwal¹, V.P.Sharma² and Chittaranjan Sharma³

ABSTRACT

Women are important stakeholders in natural resource management and conservation. They are much closer to nature and have a far greater role in preserving soil, forest and other natural resources than men. In spite of their consistent struggle for the protection and promotion of natural resources for human survival, it is noticed that they are still marginalized at all level of policy making, planning and decision making in natural resource conservation, environment management, protection and rehabilitation. Results show that involvement of women especially tribal women in planning stage was found to be very low as compared to execution stage of natural resource conservation. To promote the involvement of women in conservation activities, quota of women's representative in user committee be made essential and need based training on women entrepreneurship development programmes are to be incorporated in the programmes. The paper discusses the involvement of women in planning and execution stages of natural resources conservation.

The linkage between women, natural resources and the domestic economies of poor rural households in India are interrelated. Women play pivotal role not only in conservation of natural resources but also in management of domestic economy. They are considered primarily as managers and often preserver of natural resources. The interaction of women with the environment as farmers, food producers and household managers has a direct impact on the well being of the nature. They gather firewood, collect medicinal herbs, and look after the biomass. This gives them a special knowledge of nature, which the men do lack. However, in spite of their consistent struggle for the protection and promotion of natural resources for human survival, it is noticed that most conservation projects tend to overlook the priorities and areas where women play crucial role in conservation of natural resources. As a result they become victim of environmental degradation. Therefore, it is crucial time to focus and provide guidelines through research study about those areas where women are involved for conservation and management of natural resources. Under this background, the present work was

conceptualized and undertaken to examine extent of involvement of women in planning and execution stages with respect to conservation of natural resources.

METHODOLOGY

Study was conducted in purposively selected Udaipur district of southern Rajasthan as large number of non-government organizations and other environmental agencies are working for the conservation of natural resources. Udaipur district consists of eleven panchayat samities; out of them two panchayat samities viz., Girwa (tribal) and Badgaon (non-tribal) were selected purposively based on plenteous natural resources. Thus in all, eight villages; four villages from one tribal and four villages from one non-tribal panchayat samiti were selected for the study. A proportionate random sample of 200 respondents was drawn from eight villages of two-selected panchayat samities. That way, 100 tribal and 100 non-tribal women were the respondents. Data were collected with the help of pre-tested interview schedule. Women's involvement was quantified through three point continuum scale: often, seldom and never with relative

¹ Ph.D. Research scholar, Department of Agricultural Extension, Rajasthan College of Agriculture,

² Head, Department of Agricultural Extension, Rajasthan College of Agriculture.

³ Associate Professor, Directorate of Extension, MPUAT, Udaipur.

score 2, 1 and 0 respectively on the basis of response given by the respondents during interview. Collected data were analyzed and are presented in the form of frequency, percentage, ranks and MPS. 'Z' test was applied to see the difference between tribal and non-tribal women with regard to their involvement in conservation of natural resources.

RESULTS AND DISCUSSION

To get an overview of the respondents with respect to involvement, they were grouped into three strata viz., (i) low (ii) medium (iii) high involvement levels on the basis of calculated mean and standard deviation of the involvement performance score obtained by the respondents. Majority of respondents (59 per cent) had medium level of involvement, whereas, 26 per cent had high level of involvement and remaining (15 per cent) respondents observed low level of involvement in planning and execution of natural resources conservation activities (Table 1).

A glance at the data unfolds that only 22 per cent tribal and comparatively good number of non-tribal respondents i.e. 30 per cent had a high level of participation in conservation of natural resources. It was followed by 57 per cent respondents from tribal group and 61 per cent respondents from non-tribal group having medium level of participation. Besides, respondents who fell in category of low level of involvement were 21 per cent tribal and 9 per cent non-tribal, respectively. It is concluded that most of the women had medium level of involvement. In addition, non-tribal women comparatively exerted more towards the conservation practices than their tribal counterparts. This may be due to the fact that they were more aware and conscious of the advantages of

Table 1. Distribution of the respondents on the basis of their level of involvement (N=200)

Involvement level	Tribal	Non-tribal	Total	
	(n ₁ =100) %	(n ₂ =100) %	f	%
Low (Below 14.60)	21	9	30	15
Medium (14.61 to 25.50)	57	61	118	59
High (above 25.51)	22	30	52	26
Total	100	100	200	100

f = Frequency; % = Percentage; n = Size of sample

natural resources conservation due to educational programme being run by different agencies.

Involvement of women at planning stage

It was found from Table 2 that majority of respondents agreed to encourage others to join the consultation programme (mean per cent score (MPS) 82.5) and rated at top rank order. The participation of women were further observed in preliminary meetings before initiating work in the area (MPS 64) and the formulation of plans for conservation of natural resources (MPS 60), which were accorded second and third ranks respectively. Identification of site for plantation in consultation with committee member (MPS 46.5) and frequent interaction on techno-economic aspects (MPS 41.5) were accorded fourth and fifth ranks respectively by the respondents. Likewise in estimation of tentative cost the participation of women was the least i.e. 37 MPS.

Further analysis of data in Table 2 indicates that both the tribal and the non-tribal women had followed almost the same pattern of ranking with regard to the involvement of women at the planning stage except in few practices. Extent of involvement in frequent interaction on techno-economic aspects stood at fifth place in case of tribal (MPS 26) and sixth place in case of non-tribal women (MPS 57). Similarly estimation of tentative cost assigned fifth rank by non-tribal women (MPS 58.1) was in accordance with their fair participation, while sixth rank by tribal women (MPS 16) reflected their least participation. This was because of lack of organized platform for women to express their needs and view, lack of interest towards government programme and natural resource groups and lack of training among women with their policy making capacities.

Thus, it is concluded that involvement of non-tribal women were higher in all activities of planning stage. The reason of low involvement of tribal women may be due to illiteracy, poor socio economic condition, legal and cultural barriers, lack of training and traditional societal constraints. Moreover they were frequently ignored during the planning phase because of commonly held myths about their participation.

Involvement of women in execution stage

The data in Table 3 depict that involvement of the selected respondents was found very high in animal husbandry activities (MPS 87). Growing plants and inter culture operations (MPS 84.5) and forestland preparation for planting (MPS 81.5) were accorded second and third rank respectively by the respondents as per their extent of involvement. A fair proportion of respondents (MPS

Table 2. Involvement of the women in planning stage of natural resources conservation

		(N=200)					
S.No.	Aspect	Tribal (n ₁ =100)		Non-tribal (n ₂ =100)		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Encourage others to join the consultation programme	84.0	1	81.0	1	82.5	1
2.	Preliminary meetings organized before initiating work in the area	57.5	2	70.5	2	64.0	2
3.	Formulation of plans for conservation of natural resources	50.5	3	69.5	3	60.0	3
4.	Identification of site for plantation in consultation with the committee members	31.5	4	62.0	4	46.5	4
5.	Frequent interaction on techno economic aspects	26.0	5	57.0	6	41.5	5
6.	Estimation of tentative cost	16.0	6	58.1	5	37.0	6

MPS = Mean per cent score; n₁, n₂ = Sample size

77) were found to be involved in nursery preparation for seedlings followed by the selecting ram and buck for breeding purpose (MPS 74.5) with fourth and fifth ranks. Sowing of improved vegetable seeds (MPS 68.5) was accorded sixth rank by the respondents followed by replacing of adult female (cow)(MPS 67), growing windbreaks in rows for afforestation (MPS 58) and maintenance of soil and water conservation structures (MPS 54.5), which were awarded seventh, eighth, and ninth ranks respectively by the respondents. However in case of construction of bunds and dams, involvement of respondents was very low (MPS 42.5) with last rank.

Analysis of Table 3 further divulges that involvement of tribal women in growing plants and inter culture operations was very high (MPS 93) in comparison to non-tribal women (MPS 76) which was placed at first rank in case of tribal women while at sixth rank in case of non-tribal women. The tribal women (MPS 89) and non-tribal women (MPS 85.5) were engaged in animal husbandry activities, as they were solely responsible for feeding, watching, watering and milking of livestock. This aspect was ranked second by tribal women whereas, first by non-tribal women. The extent of involvement in forestland preparation for planting was high (85 and 78 MPS) among tribal and non-tribal women and they have ranked it third and fourth, respectively. The tribal women were also found fairly acquainted with nursery preparation for seedlings (MPS 79) in comparison to at non-tribal women (75.5 MPS). Thus it was observed that the tribal women considerably played more active role in above practices than non-tribal women.

Role in replacing of adult female (cow) obtained rank seventh in case of tribal while third in case of non-tribal with MPS 55 and MPS 79, respectively. The extent of participation in maintenance of soil and water conservation structures was observed (52.5 MPS) in tribal women and at 57 MPS among non-tribal women. Further

it was noted that tribal women hardly participated in growing windbreaks in rows for afforestation (MPS 39.5) while fair involvement of non-tribal women was observed in same item with MPS 76.5. Regarding constructing bunds and dams, involvement of non-tribal women was average (MPS 56) as against the MPS 29 of tribal women.

Overall involvement in planning and execution stages

The data in Table 4 reveal maximum involvement in the execution stage (69.6 per cent) followed by planning stage (55.3 per cent), which were accorded first and second ranks, respectively. Involvement in planning stage obtained 66.4 MPS in case of non-tribal women followed by tribal women (44.3 MPS). However, average participation was found at the execution stage in case of tribal women (65.8 MPS). Likewise three fourth non-tribal women were found to be involved in execution stage with 73.4 MPS respectively. It can be observed that calculated 'Z' value was greater than tabulated value (2.58) at 1 per cent level of significance indicating clear difference between tribal and non-tribal women with respect to their involvement in both stages of conservation. It may be due to the fact that the non-tribal women had good socio-economic status and higher literacy and were linked with conservation project. Yet another cause might be that non-tribal women were not so much bound with societal constraints that provided an opportunity to express their view and opinion.

CONCLUSION

Involvement of tribal women was found to be comparatively low in conservation of natural resources than non-tribal women. The study showed that tribal women were poorly involved in practices related to techno-economic aspects during planning stage. Further the participation of tribal women in execution stage was found to be average whereas, involvement of non-tribal women was more than average. Therefore, in order to

Table 3. Extent of involvement of women in execution and post execution stage of conservation of natural resources (N=200)

S.No.	Aspects	Tribal (n ₁ =100)		Non-tribal (n ₂ =100)		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Animal husbandry activities	89.0	2	85.5	1	87.0	1
2.	Growing plants and inter culture operations.	93.0	1	76.0	6	84.5	2
3.	Forestland preparation for planting	85.0	3	78.0	4	81.5	3
4.	Nursery preparation for seedling	79.0	4	75.5	7	77.0	4
5.	Selection of ram and buck for breeding purpose	68.5	5	80.5	2	74.5	5
6.	Sowing improved vegetable seeds	67.5	6	69.5	8	68.5	6
7.	Replacing of adult female	55.0	7	79.0	3	67.0	7
8.	Growing windbreaks in rows for afforestation	39.5	9	76.5	5	58.0	8
9.	Maintenance of soil and water conservation structures	52.5	8	57.0	9	54.5	9
10.	Constructing bunds and dams	29.0	10	56.0	10	42.5	10

MPS = Mean per cent score; n₁, n₂ = Sample size

Table 4. Differences in levels of involvement between tribal and non-tribal women with regard to conservation of natural resources in planning and execution stage (N=200)

S.No.	Involvement stage	Tribal (n ₁ =100)		Non-Tribal (n ₂ =100)		Total		'Z' value
		MPS	Rank	MPS	Rank	MPS	Rank	
1.	Planning stage	44.3	2	66.4	2	55.3	2	5.86**
2.	Execution stage	65.8	1	73.4	1	69.6	1	3.08**
	Overall	55.3		69.6		64.2		5.27**

MPS = Mean per cent score; n₁, n₂ = Sample size; ** = Significant at 1 level

promote involvement of tribal women in planning and execution stages, quota of women's representative in user committee be made mandatory so that they got opportunity to take part in decision making process and might feel concerned with various activities regarding conservation of natural resources. Further it is

recommended that skill oriented trainings and women entrepreneurship development programmes should be organised. Sustained efforts must be made to convince them personally about the benefits of conservation of these resources in their daily life.

Effectiveness of Privatised Agricultural Extension services – A case of Tata Kisan Sansar

Arun Kumar¹ and K. Vijayaragavan²

ABSTRACT

The effectiveness of agrimetural extension services rendered by Tata Kisan Sansar (TKS) at Chitradurga distric of Karnataka was investigated. A sample of eighty member farmers of TKS was drawn through random sampling technique. The overall effectiveness of extension service was calculated based on the four components such as client satisfaction index, adoption index, percentage increase in yield and percentage increase in profit. The study revealed that the extension services rendered by TKS were found to be high in effectiveness by a majority (86.25%) of farmers. About 14 per cent of the farmers found the extension services to be at medium level of effectiveness. None of the farmers found the extension services either at 'low' or very low level of effectiveness.

Growing commercialization of agriculture and increased competition in the markets has strengthened economic incentives of farmers and the rural entrepreneurs to treat extension as another "purchased input" to agricultural production and marketing. Thus private sector extension service is emerging as one of the strong complimentary services to the public services in many parts of the world (Byra Reddy, 2000).

In the current scenario of agricultural sector, the trend shows a rapid move towards privatization of agricultural extension services and increased interest of beneficiaries towards the same. Especially, because of the globalization and liberalization era, rethinking of the prevailing systems in the agricultural extension has become the first step towards future. Looking at the existing climate of extension system, most extension expertise and scientists of related fields have proposed privatization of public extension services based on the condition of the specific areas. (Umali and Schwartz, 1994).

The experiences in privatization of agricultural extension services from last two decades around the world

indicate the broad scope of agricultural extension services that the private sector could deliver efficiently and profitably. Some experts also state some disadvantages of privatization, which include, reduction in food grain production, regional imbalance, reduction in contact between extension personnel and farmers, sidelining of education role of the present public extension system.

Several initiatives in privatized extension services in India have already been initiated in different states. Though several initiatives have been undertaken, there are no studies to find out the effectiveness of their services. The present study makes an attempt to study the effectiveness of agricultural extension rendered by Tata Kisan Sansar (TKS) at Chitradurga district of Karnataka

METHODOLOGY

The study was conducted among he farmers of Chitradurga distric of Karnataka who were covered under the extension services of Tata Kisan Sansar (TKS). A sample of eighty pamegranate farmers who were covered under the extension services of TKS were selected based on random sampling technique.

¹Post graduate student at the Division of Agricultural Extension, IARI, New Delhi- 110 012.

²Professor, Division of Agricultural Extension, IARI, New Delhi - 110 012.

Tata Kisan Sansar

The head office of the TKS is situated at Noida, Uttar Pradesh. It has two regional offices, one at Bangalore working on fruits and vegetables and another at Noida, (UP) working on cereals and pulses. The southern states of India namely Andhra Pradesh, Karnataka and Maharashtra are covered by the operations of Bangalore office. The states covered by the 'cereals and pulses division' of Noida are Punjab, Haryana and Uttar Pradesh with major concentration on basmati rice. The fruit and vegetable division of Bangalore is having field offices at Chitradurga district of Karnataka, Kanaikal in Andhra Pradesh, Dindori in Nasik district of Maharashtra and Nampur in Maharashtra. The major crops concentrated by this Division are pomegranate, grapes, sweet orange, sapota, fig and papaya.

At present the TKS is providing integrated extension services starting from advisory services including field visits to marketing and export for pomegranate. In the near future it is planning to expand their services to other dry land horticultural crops.

Measurement of extension effectiveness

Organizational effectiveness is one of the controversial and interactive constructs in the social and behavioural sciences. The literature on organizational effectiveness is quite large but there is little consensus on how to conceptualize, measure it and explain it. There seems to be no agreement on what constitutes an organizational effectiveness and how to determine the effectiveness for a given organization. A multitude of criteria have been used for measurement of extension effectiveness like effective dissemination of information; appropriateness of method and relevance of extension programmes to the clients' need; frequency of visits and time spent; solving field problems with efficiency and quality of field staff. For the present study the effectiveness of the extension service refers to farmers' satisfaction with extension services, adoption of the recommended pomegranate to extension intervention of TKS. The effectiveness of the agricultural extension services was measured by an 'effectiveness index' developed for the study, which consisted of the above four components.

Measurement of extent of adoption

The extent of adoption was measured for the recommended cultivation practices of pomegranate in

which the TKS was rendering integrated extension services. The extent of adoption was measured as percentage of adoption of recommended practices as given below:

$$\text{Extent of adoption} = \frac{\text{Actual practice}}{\text{Recommended practice}} \times 100$$

All 27 items of recommended practice of pomegranate cultivation by the Tata Kisan Sansar was taken for calculating the adoption percentage of each farmer. These 27 items came under following four categories (i) variety, spacing and major cultural practices, (ii) irrigation management practice, (iii) nutrient management practices and (iv) plant protection measures. The overall extent in level of adoption was calculated by taking the average of adoption level of these 27 items:

Measurement of increase in yield and profit

Increase in yield was calculated by subtracting the earlier yield per acre per year (i.e. is before the intervention of TKS) from the present yield per acre per year of pomegranate (i.e. after the intervention of TKS). The increase in yield was converted into percentage increase in yield, using the following formula.

$$\text{Percentage increase in yield} = \frac{\text{Increase in yield per acre per year}}{\text{Earlier yield per acre per year}} \times 100$$

Increase in profit was calculated by subtracting the earlier profit per acre per year (i.e. before the intervention of TKS) and the present profit per acre per year of pomegranate (i.e. after the intervention of TKS). The increase in profit was converted into percentage increase in profit, using the following formula:

$$\text{Percentage increase in profit} = \frac{\text{Increase in profit per acre per year}}{\text{Earlier profit per acre per year}} \times 100$$

Measurement of farmers' satisfaction

The farmer's satisfaction of extension services based on the selected dimensions was measured by an index developed for that purpose following the procedure given by Edwards (1957). This index consisted of 38 statements which the respondents were asked to give their responses. The responses were added to get a respondent's satisfaction. The satisfaction index was calculated as below.

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$$\text{Client satisfaction index (CSI)} = \frac{\text{The individual's obtained score}}{\text{Maximum score i.e. 190}} \times 100$$

Calculation of extension effectiveness index

After finding out the score of the four components of extension effectiveness the extension effectiveness index was calculated. for every respondent based on the following formula:

$$\text{Effectiveness Index (EI)} = \frac{\text{CSI} + \text{AI} + \text{PIY} + \text{PIP}}{4}$$

Where,

- CSI = Client satisfaction index score of an individual
 AI = Adoption index of an individual farmer
 PIY = Percentage increase in yield for individual farmer
 PIP = Percentage increase in profit for each farmer

RESULTS AND DISCUSSION

Extent of adoption of recommended practices

The data in the Table 1 show a very high level of adoption of pomegranate technologies by the member farmers of TKS. The highest level of adoption was found with respect to variety and cultural practices (98.9%) followed by plant protection practices (91.5%), irrigation practice (86.8%) and nutrient management practices (85.0%). The overall level of adoption was found to be 90.5 per cent.

The results of adoption of modern pomegranate technology show that client farmers of TKS have a very high of adoption of recommended practices. Thus, it can be easily concluded that the extension services of TKS has succeeded in transfer of pomegranate technology.

Table 1. Overall adoption of different practices in pomegranate cultivation

Sl. No.	Different practices	Average extent of adoption
1.	Variety, spacing and cultural practices	98.9
2.	Irrigation practices	86.8
3.	Nutrient management practices	85.0
4.	Plant protection practices	91.5
	Overall extent of adoption of all practices	90.5

The reasons for high level of adoption of pomegranate cultivation practices are Regular field visits by field officers to solve the technical problems and proper monitoring of the adopted practices by the farmers, provision of arrangements for proper and timely supply of all the needed inputs and credit facilities, selection of appropriate technologies suiting to the local areas, provision of grading and marketing facilities and assurance of buying the produce at a profitable level by TKS.

Percentage increase in yield and profit

The investigation revealed that 37.5 per cent of respondents had yield increase of 30 to 40 per cent level (Table 2). Thirty-five per cent of the farmers reported 20 to 30 percentage of yield increase. All the farmers reported an increase in yield of more than 10 per cent level and 97.5 per cent of farmers were having yield increase of more than 20 per cent level.

Based upon the above data, we can conclude that all the farmers had an increased yield of pomegranate due to the extension activities of TKS. The increased yield of pomegranate is a clear reflection of the higher adoption of the modern pomegranate cultivation practices promoted by TKS. The increase in yield was also contributed due to regular field visits by the field officers who helped in checking the diseases and pest attack before it affected the yield of the crop and proper and timely supply all the needed inputs.

The data in Table 2 show that, all the farmers were getting an increase in profit of more than 30 per cent due to the extension intervention of TKS. The percentage increase in profit ranged from 30-40 per cent to 80-90 per

Table 2. Percentage increase in profit of pomegranate

Sl No.	Percentage increase	Respondents	
		f	%
1.	30-40	5	6.25
2.	40-50	12	15.0
3.	50-60	34	42.5
4.	60-70	16	20.0
5.	70-80	12	15.0
6.	80-90	1	1.25

cent. As much as 42.5 per cent of the farmers reported a profit increase of 50-60 per cent.

By comparing the percentage increase in yield and percentage increase in profit we can see that profit has increased much more than the increase in yield. This can be attributed to the proper marketing facilities and post harvest operations like proper grading and packing. The above facilities have resulted in adding value to the pomegranate crop and improving their quality.

Satisfaction of farmers towards extension services provided by TKS

The satisfaction of member farmers towards extension services provided by TKS is one of the components of the effectiveness of extension services. The data in Table 3 reveal a 'high level' of satisfaction by 97.5 per cent of the farmers. No farmer was found in the category of low or very low level of satisfaction. The percentage of farmer who had a medium level of satisfaction was only 1.3. About one per cent of farmers had a very high level of satisfaction with regard to different dimensions of extension services. The investigation also revealed that a majority of the farmers had a very high level of satisfaction with regard to provision of appropriate technological information, solving field problems, timeliness of the services and fairness and competency of the extension personnel. Provision of advisory services was rated highly 90 per cent

of the farmers. A majority of farmers (62.5 per cent) had a low level of satisfaction with regard to training and demonstration of technologies.

The overall picture which emerges from the data related to satisfaction of farmers towards extension services show that the majority of the member farmers of TKS are highly satisfied with the extension services in all dimensions except in the case of training and demonstrations. Thus, it can be concluded that member farmers are highly satisfied with the extension services of TKS. But there is a need for improvement with regard to conduct of demonstration and training.

The satisfaction of member farmers towards the extension services of TKS is also reflected in their high level of adoption of recommended technologies as well as increased yield and income. Field observations and discussion with the farmers revealed various reasons for high level of satisfaction. Perhaps the most important reason is that the TKS has chosen a technology, which is very highly relevant to the local farming system. Even though the technology has been borrowed from state universities and research institutes, the TKS has fine-tuned the technologies along with timely provision of credit and other physical inputs.

Secondly, a high level of satisfaction of farmers was due to competent and committed field officers of the TKS. These officers made regular weekly field visits to

Table 3. Level of satisfaction of farmers towards the extension services of TKS (N= 80)

Sl. No.	Dimensions	Levels of satisfaction of farmers (%)				
		Very low	Low	Medium	High	Very High
1.	Provision of appropriate technological information	-	-	7.5	21.3	71.2
2.	Supply of proper inputs	-	-	10	90	-
3.	Provision of advisory services	-	-	8.8	90	1.2
4.	Solving field problems of the farmers	-	-	-	8.8	91.2
5.	Timeliness of services	-	-	-	12.5	87.5
6.	Fairness and competency of the extension personnel	-	-	-	17.5	82.5
7.	Training and demonstration	-	62.5	31.2	6.3	-
8.	Total satisfaction level	-	-	1.3	97.5	1.2

the farmers' farm to provide advisory services as well as to solve field problems. The weekly field visits by the officer was the most important medium for transfer of pomegranate technologies. The farmers also found the field officers to be highly competent in solving problems related to all the aspects of pomegranate cultivation including cultural practices, nutrient management, plant protection, irrigation management and post harvest measures. The field officers had a minimum qualification of Bachelor's degree in agriculture along with sufficient training and expertise in pomegranate cultivation. There was one field officer for 300-400 acres of pomegranate. Apart from these field officers who were also called as agronomists, the TKS also had specialists in plant protection area.

The next important factor for satisfaction was provision of all needed inputs in time. The inputs were supplied by subsidiary centers of TKS. The subsidiary centers were also run by agricultural graduates the inputs supplied by TKS were of high quality

Overall effectiveness of extension services provided by TKS

The overall effectiveness index was calculated based upon the following components which have been discussed above: (i) extent of adoption, (ii) percentage increase in profit due to the extension services of TKS, (iii) percentage increase in yield due to the intervention of TKS and (iv) farmers' level of satisfaction with the extension services of TKS. Based upon the overall effectiveness score, farmers were classified into the following five categories of effectiveness: very low, low, medium, high and very high. The data in Table 4 shows that the extension services rendered by TKS were found to be high in effectiveness by majority (86.25%) of the

Table 4. Effectiveness of extension services as perceived by farmers (N=80)

Sl. No.	Category of effectiveness	Percentage of respondents
1.	Very low	-
2.	Low	-
3.	Medium	13.75
4.	High	86.25
5.	Very high	-

Table 5. Over all effectiveness score for extension services of Tata Kisan Sansar (N=80)

Sl. No.	Score level	Percentage of respondents	Average effectiveness score
1.	40-50	1.25	65.1 SD=563
2.	50-60	12.50	
3.	60-70	58.75	
4.	70-80	27.50	

Minimum possible score = 0

Maximum possible score = 100

farmers. About 14 per cent of the farmers found the extension service to have medium level of effectiveness. None of the farmers found the extension services either at 'low' or 'very low' or 'very high' level of effectiveness.

The data in Table 5 shows that the average effectiveness score for the extension services rendered by TKS was 65.1. From the results related to overall effectiveness, it can be concluded that extension services of TKS are having a 'high' level of effectiveness. As much as 86 per cent of farmers found the extension services by TKS as 'high' in effectiveness. However, TKS received an average overall effectiveness score 65.1 out of a maximum possible score of 100. The gap (34.9%) in effectiveness was mainly due to the relatively poor performance on yield and net-profit increase. Thus there is a vast scope to improve the effectiveness of extension service by TKS.

CONCLUSION

The investigation revealed a very high level of adoption of improved pomegranate technologies by the member farmers of TKS. The overall adoption level was 90.5 per cent. All the farmers reported an increase in yield of more than 10 per cent level and 97.5 per cent of the farmers had an increased yield at 20 per cent level. The farmers were also getting an increase in profit of more than 30 per cent due to the interventions of TKS. About 98 per cent of the farmers had a 'high level' of satisfaction towards the extension services provided by TKS. The overall effectiveness of extension services calculated based on the components such as extent of adoption, percentage increase in yield and profit and farmers satisfaction level showed that the extension services

provided by TKS were found to be 'high' in effectiveness by about 86 per cent of farmers. The results of the effectiveness of extension service of TKS prove that the extension strategies followed by them i.e. selection of crop and technology suiting to a specific area and providing crop specific integrated services are highly effective. This shows that privatised extension services can be successful even in resource poor areas provided appropriate technologies along with integrated extension services including marketing facilities are made available.

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Impact of Farmer Interest Groups on Adoption and Productivity of Various Enterprises

T.S.Riar¹ and S.S. Gill²

ABSTRACT

Keeping in view the role of farmer-led extension in the economic and social empowerment of the farmers, the Agricultural Technology Management Agencies (ATMAs) in Punjab established 96 Farmer Interest Groups (FIG's) in four districts of the State. The present study was conducted to evaluate the functioning of these groups in terms of their impact on the members. All the 96 FIGs were taken up for the study. The number of FIGs selected for study in Gurdaspur, Jalandhar, Sangrur and Faridkot districts was 29, 19, 37 and 12 respectively. The results of the study revealed that as a result of group formation there was increase in number of entrepreneur farmers in different enterprises viz. bee keeping, dairy farming, mushroom cultivation, etc. There was also a significant increase in yield of various crops. As a result of these changes there was significant increase in overall average income of the farmers.

The traditional approaches of organising farmers and farmer co-operatives needs to be revised to meet the developmental challenges like degradation of natural resources such as soil, water, flora and fauna and for making farming profitable (Chamala and Shingi, 1998). Different extension roles, which can be conceptualized to help rural communities, are empowerment role and community organisation role. The corner stone of extension education must be cardinal principle of self-help empowered farmers groups or organisations which can act as convergent points of solving local problems and mobilizing human and local resources for sustainable development (Manalili, 1990). The idea of Farmer Interest Groups (FIGs) formed under ATMA is a way forward for empowering farmers for meeting their own needs by self-help. These groups have to formulate programmes for co-farmers in their villages or set up enterprises to generate additional income, to develop local leadership, to go for collective production operations and marketing, to reduce the cost of production and increase net returns. The ATMAs are playing an important role

in making a shift in the paradigm by introducing farmer-led extension system in their areas of operation.

In their four districts of operation the ATMAs had implemented the idea of farmer led extension at grass root level through FIGs which were expected to evolve into commodity associations (CAs), marketing cooperatives and other types of farmer organisations at the block level and district level. At village level, FIGs and farmers associations are effectively involved in the preparation of block action plans. These groups are actively involved in organising demonstrations and on farm and adaptive trials and giving feedback to the extension and research (Anonymous, 1998). The present study was undertaken with the objective of assessing the impact of FIGs in terms of adoption of various enterprises.

METHODOLOGY

The study was conducted during 2005-2006 in four districts covered under ATMA namely; Gurdaspur,

¹ Asstt. Professor, Extension Education, Directorate of Extension Education, PAU, Ludhiana.

² Director, Extension Education, PAU, Ludhiana.

Jalandhar, Sangrur and Faridkot in Punjab.

In Punjab, 96 FIGs were established in four selected districts upto the end of 2005. The list of these FIGs was obtained from ATMA offices of selected districts. All the 96 FIGs were taken up for the study. The number of FIGs selected for study in Gurdaspur, Jalandhar, Sangrur and Faridkot districts was 29, 19, 37 and 12, respectively.

The total membership of FIGs in four districts under study was 896. Out of these, 560 members, who could be contacted, formed the study sample. The data were collected by conducting personal interviews with the members of the FIGs with the help of an interview schedule. The data were analysed using descriptive statistics 't' test and 'z' test.

RESULTS AND DISCUSSION

Impact in terms of adoption of various enterprises

The percentage of members of FIGs running different enterprises before and after being part of a group is given in Table 1. The different enterprises being run by farmers before enrolment in a group were: bee keeping (1.25%), mushroom cultivation (1.61%), vermiculture (0.36%), dairy farming (4.11%), floriculture (0.18%), fisheries (0.36%) seed production (0.54%) and fruits and vegetables (1.07%). After enrolment in a group, percentages of farmers running bee keeping enterprise, mushroom cultivation, vermiculture, dairy farming, floriculture, fisheries, seed production and horticulture were 19.29, 11.43, 7.86, 31.61, 1.07, 9.11, 6.61 and 5.71, respectively. The positive changes in terms of adoption of these enterprises were 18.04 per cent (bee keeping), 10.00 per cent (mushroom cultivation), 7.50 per cent (vermiculture), 0.89 per cent (floriculture), 8.75 per cent (fisheries), 6.07 per cent (seed production) and 4.64 per cent (fruits and vegetables). The change was statistically significant in case of bee keeping, mushroom cultivation, vermiculture, dairy farming, fisheries, seed production and horticulture as calculated 'Z' values were greater than the table value at $p < 0.05$. The subsidiary enterprises have great potential of generating additional income of farming families thus ameliorating their economic hardships.

Change in yields of different crops/enterprises

It is apparent from the data presented in Table 2 that there was an increase in yields of all the crops as a result of enrolment in the FIGs. The large farmers were able to bring about statistically significant increase in yield of all the crops except wheat, paddy, fisheries and

chrysanthemum. Similarly, the yield per hectare in case of medium farmers also increased significantly in all the crops/enterprises except fisheries. The findings were also similar in case of semi-medium and small farmers. In case of small farmers, the increase was not statistically significant in case of wheat and fisheries and in case of semi-medium farmers, the increase was not statistically significant in case of wheat, gobhi-sarson, gram and fisheries. Punjab has the highest productivity of wheat in the country and the yield per hectare already obtained by all the categories of farmers was more than 42 quintal per hectare and it was difficult to increase further. The larger farmers were already producing 27.63 quintals of paddy per hectare, therefore, the statistically significant increase could not be achieved. On the whole, the productivity of all the crops registered increase as a result of enrolment in the FIGs. This again proves the potentials of farmer-led extension through FIGs for increasing the productivity of different crops. The exchange of mutual experiences seems to be one of the major contributory factors in this direction.

Table 1. Impact of group membership on adoption of various enterprises

Sr. No.	Enterprises	*Number entrepreneur farmers			Z values
		Before enrolment in group	After enrolment in group	Change	
1.	Bee-keeping	7 (1.25)	108 (19.29)	+101 (18.04)	9.94*
2.	Mushroom cultivation	9 (1.61)	64 (11.43)	+55 (10.00)	6.66*
3.	Vermiculture	2 (0.36)	44 (7.86)	+42 (7.50)	6.32*
4.	Dairy farming	23 (4.11)	177 (31.61)	+154 (7.50)	12.02*
5.	Floriculture	1 (0.18)	6 (1.07)	+5 (0.89)	1.89
6.	Fisheries	2 (0.36)	51 (9.11)	+49 (8.75)	6.80*
7.	Seed production	3 (0.54)	37 (6.61)	+34 (6.07)	5.47*
8.	Fruits and Vegetables	6 (1.07)	32 (5.71)	+26 (4.64)	4.29*

* Multiple responses

*Significant at 5 per cent (Z tv=1.96)

1.	Wheat	42.00	42.30	1.58	42.20	42.53	1.86	42.00	42.58	2.03*	42.30	42.50	1.58
2.	Paddy	27.50	27.73	2.02*	27.53	27.80	2.63*	27.58	27.80	2.86*	27.63	27.88	2.03
3.	Sugarcane	647.50	680.00	4.68*	657.50	680.00	4.23*	662.50	677.50	6.86*	655.00	687.50	6.41*
4.	Cotton	0.00	0.00	-	41.63	50.75	4.35*	40.08	51.25	4.71*	41.70	55.75	5.87*
5.	Gobi sarson	8.58	8.83	12.58*	8.83	9.00	1.88	8.55	8.83	6.43*	8.88	8.95	12.71*
6.	Raya	0.00	0.00	-	8.00	8.58	5.86*	8.00	8.48	4.04*	8.00	8.70	6.15*
7.	Toria	8.38	9.08	17.82*	8.38	9.08	4.71*	8.35	8.95	5.08*	8.80	9.15	4.91*
8.	Moong	8.83	10.30	4.13*	9.15	11.25	10.32*	8.88	10.93	3.32*	9.40	11.30	12.31*
9.	Mash	0.00	0.00	-	8.30	8.85	5.87*	8.28	8.65	9.81*	8.35	8.93	13.50*
10.	Gram	8.60	8.68	3.45*	8.60	8.68	1.90	8.13	8.53	10.57*	8.45	8.75	2.65*
11.	Fodder crops	447.50	482.50	9.63*	509.13	538.88	2.31*	501.40	551.25	2.55*	525.00	545.00	5.49*
12.	Tomato	525.13	574.95	13.86*	528.63	576.38	6.31*	521.40	576.63	4.78*	585.00	600.00	3.86*
13.	Chilies	0.00	0.00	-	239.08	275.80	4.82*	245.58	280.00	5.81*	250.00	297.50	4.85*
14.	Peas	0.00	0.00	-	125.90	139.15	2.41*	137.45	142.50	3.42*	145.00	150.00	6.31*
15.	Cauliflower/cabbage	177.50	245.00	4.08*	178.63	245.63	7.84*	198.58	254.63	8.57*	212.50	245.00	4.62*
16.	Potato	215.00	265.00	3.41*	225.00	275.00	4.84*	237.10	306.25	6.32*	300.00	325.00	6.35*
17.	Citrus fruit	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	150.00	170.00	37.38*
18.	Mango	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	100.00	112.50	3.33*
19.	Guava	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	175.00	200.00	3.65*
20.	Peach	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	150.00	167.50	5.31*
21.	Ber	8.00	0.00	-	0.00	0.00	-	0.00	0.00	-	150.00	160.00	2.87*
22.	Pear	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	200.00	217.50	4.13*
23.	Grapes	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	287.50	325.00	3.87*
24.	Fisheries	42.11	42.12	0.87	42.12	42.13	0.87	42.16	0.90	1.83	42.15	42.16	0.87
25.	Chrysanthemum	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-	141.00	141.53	0.73

*Significant at 5 per cent level

Table 3. Average annual increase in income and total income generation after enrolment in group

S. No.	Farmers' categories	Average annual income (Rs.)			Z values	Total income generation as a result of group enrolment (Rs.)
		Before enrolment in group	After enrolment in group	Increase in income		
1.	Small $n_1=203$	78167	93484	15317	4.78*	31,09,351
2.	Semi-medium $n_2=180$	134186	152147	17961	5.38*	32,32,980
3.	Medium $n_3=143$	334510	352927	18417	2.95*	26,33,631
4.	Large $n_4=34$	483016	499681	16665	2.63*	5,66,610
5.	Overall $n=560$	186212.20	203252.50	17040.31	2.34*	95,42,572

* Significant at 5 per cent

Economic impact

The economic impact in terms of increase in income of group members was significant. The average annual gross income of FIG members before enrolment in a group was Rs.186212, which was increased to Rs. 203252 thereby showing an increase of Rs. 17040 per member which was statistically significant at $P<0.05$. In case of small farmers the average annual gross income before joining ATMA groups was Rs. 78167, which increased to Rs. 93484 thereby showing an increase of Rs. 15317, which was statistically significant. Similarly in case of semi-medium, medium and large farmers the average annual gross income before joining FIG was Rs. 134186, Rs. 334510 and Rs. 483016, respectively, which correspondingly increased to Rs. 152147, Rs. 352927 and Rs. 499681. The increase was Rs. 17961 (semi-medium farmers), Rs. 18417 (medium farmers) and Rs. 16665 (large farmers) which were statistically significant (Table 3).

The total income generation as a result of enrolment in FIGs was Rs. 310935 in case of small farmers, Rs. 3232980 in case of semi-medium farmers, Rs. 2633631 in case of medium farmers and Rs. 566610 in case of large farmers. As a result of their enrolment and participation in group activities all the 560 members in the sample were able to generate total income Rs. 9542572. Income is the key for adoption of any enterprise or crop production system. The groups resulted in economic benefits to the members of FIGs, which in turn ensured sustainability of groups. The above findings have further strengthened the premise that sustainable

economic empowerment can be achieved through self-help and collective action.

CONCLUSION

FIGs have great potential to empower the farmers economically as well as socially. It is evident from the increase in productivity, diversion of area from wheat-paddy rotation to other crops and additional income generated as a result of the group activities. On the whole, the efforts made by ATMAs for the empowerment of farmers through farmer-led extension in the form of FIGs were successful and can be replicated in other districts.

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Functional Characteristics of Rural Women in Self Help Groups

M. Shivamurthy¹, O.Sarada², Shailaja Hittalmani³ and N.R. Gangadharappa¹

ABSTRACT

The study examines the functional characteristics of rural women in self help groups in Prakasam district of Andhra Pradesh by interviewing 120 rural women from 24 self help groups. It revealed that majority of the groups scored low on group processes, high group sustainability, high confirmation to group norms. Maximum number of groups were found to be discussing only issues related to thrift, economic activities and personal problems and most of the self help groups were formed for achieving life security by saving for future. The study suggests qualitative improvement required for the functioning of the SHGs.

Women constitute half of the world's population, contribute about two-thirds of its working hours, receive one-tenth of the world's income and own less than one-hundredth of the world's property (Gupta and Gupta 1987). Rural women in India constitute 77.00 per cent of the female population (Jhamtani, 1995). They share abundant responsibilities and perform a wide spectrum of duties. Even then they suffer from being both economically and socially invisible. Enhancing women's economic productivity is important strategy for improving the welfare of 60 million households living below the poverty line (Dwarakanath, 1999). The existence of women in a state of economic, political, social and knowledge disempowerment is known to be a major hindrance to economic development.

Formation of Self Help Groups (SHGs) has greatly helped rural women to understand their rights, access to information, economic independence, freedom of expression, confidence building, access to credit, improve their personality and respect in the society etc. Self help group is an approach through which efforts are being made by the government and non-government organizations with an intention to pool both human and material resources to empower women in rural areas. The

empowerment of women through SHGs would lead to benefit not only the individual woman and women groups but also the family and community as a whole through collective action and solidarity. Cohesion enables the members of the group to perceive common interests and act collectively (Murugan and Dharmalingam, 2000). In recent years, SHGs are emerging as an important alternative mechanism to meet the urgent credit needs of poor through thrift. Group cohesiveness, group sustainability, cooperation among group members and confirmation to group norms are the factors mostly affecting the functioning of the groups in getting good profits. The present study analyzed the functional characteristics of SHGs in terms of group processes, group sustainability, conformity to group norms, critical issues of group meetings and motivation for forming into SHGs.

METHODOLOGY

The study was conducted in Prakasam district of Andhra Pradesh. Two mandals viz., Cumbum and Bestavaripeta were selected as they were pioneering in the formation of SHGs. From each mandal, three villages were chosen which were having highest number of SHGs.

¹ Professor, Department of Agricultural Extension, University of Agricultural Sciences, GKVK, Bangalore-65.

² PG Student, Department of Agricultural Extension, University of Agricultural Sciences, GKVK, Bangalore.

³ Professor, Department of Plant breeding and Genetics, University of Agricultural Sciences, Bangalore.

Totally 24 SHGs were selected by using proportionate random sampling method from 6 selected villages. From each selected SHG, five women were drawn randomly to represent the group. Thus finally, there were 120 rural women respondents for the study. Five functional characteristics viz., group processes in terms of group cohesiveness, group role differentiation, group leadership and group communication; group sustainability; conformity to group norms; critical issues of group meetings and motivation for forming into SHG groups were analysed. Data was collected by personal interview method by using pre-tested schedule developed for the study.

RESULTS AND DISCUSSION

Group processes

Response analysis of group processes viz., group cohesiveness, group role differentiation, group leadership and group communication is presented in Table 1.

Group cohesiveness

A great majority (91.7%) of the groups indicated that members were satisfied with the group functioning and comfortable to work with other members. Further, 87.5 per cent groups expressed that members rely on one another in the group and there is a healthy competition among group members. Majority of 83.3 per cent group members encourage each other, 79.3 per cent groups worked well and 70.9 per cent groups felt that their group manages conflicts/disagreements effectively. Hence this situation need to be maintained by every group leader by motivating their group members to work unitedly for higher benefits through SHGs.

Group role differentiation

Great majority (95.8%) of the groups expressed that members are equally consulted for the development of the group and group members have inclination to take up allotted work and 70.8 per cent groups indicated that

Table 1. Response analysis of statements of group processes of self help groups

(Number of groups=24)

S. No.	Components of group processes	True	Somewhat true	Not true
A.	Group cohesiveness			
1.	I feel this group worked well together	19 (79.2)	5 (20.8)	0 (0.0)
2.	The group manages conflicts/disagreements effectively	17 (70.9)	5 (20.8)	2 (8.3)
3.	There is unhealthy competition and criticism among group members	1 (4.2)	2 (8.3)	21 (87.5)
4.	Member do not encourage/support each other in the group	0 (0.0)	4 (16.7)	20 (83.3)
5.	I feel dissatisfied and would like to quit the group	0 (0.0)	2 (8.3)	22 (91.7)
6.	I do not feel comfortable to work with same group members for other activities	0 (0.0)	2 (8.3)	22 (91.7)
7.	Members do not rely one another in the group	0 (0.0)	3 (12.5)	21 (87.5)
B.	Groups role differentiation			
1.	The work of the group is well divided among all the members	17 (70.8)	7 (29.2)	0 (0.0)
2.	All the members have equal say in the decision making process of the group	17 (70.8)	7 (29.2)	0 (0.0)
3.	All the members actively participate in the activities of the group	15 (62.5)	9 (37.5)	0 (0.0)
4.	Members are not equally consulted for the development of the group	1 (4.2)	0 (0.0)	23 (95.8)
5.	Group leader is solely responsible for majority of tasks	1 (4.2)	14 (58.3)	9 (37.5)
6.	Group members lack inclination to take up allotted work/responsibility	0 (0.0)	1 (4.2)	23 (95.8)
C.	Group leadership			
1.	Group organizer is sympathetic and helpful in solving	15	9	0

	other's problems at work or in their personal life	(62.5)	(37.5)	(0.0)
2.	Group organizer is efficient at group work	11 (45.8)	13 (54.2)	0 (0.0)
3.	Group organizer has control on group and individual members	7 (29.2)	16 (66.7)	1 (4.2)
4.	Group organizers do not have good relationships with other leaders and groups in the community	1 (4.2)	2 (8.3)	21 (87.5)
5.	Group organizer do not work much for group's success	0 (0.0)	2 (8.3)	22 (91.7)
6.	Group organizer is less approachable and undependable	0 (0.0)	4 (16.7)	20 (83.3)
D. Group communication				
1.	Members discuss about their personal problems with other members in the group	19 (79.2)	5 (20.8)	0 (0.0)
2.	Informal and friendly interactions occur in the group	17 (70.8)	6 (25.0)	1 (4.2)
3.	The information flows easily from one clique to another clique in the group	12 (50.0)	10 (41.7)	2 (8.3)
4.	Group members depend on information leader for getting information	4 (16.7)	20 (83.3)	0 (0.0)
5.	The group members are not kept informed about important events or activities	1 (4.2)	1 (4.2)	22 (91.6)

Note: Figures in the parenthesis indicate percentages and multiple responses are possible.

the work of the group is well divided among all the members and all the members have equal say in the decision making process of the group. It is very clear from the above figures that they are following democratic approach and equal importance is being given to all members. It is a good sign for better functioning of the group as a whole.

Group leadership

A great majority of groups indicated that, group organizer works much for group success (91.7%), group organizer have good relations with other leaders and groups (87.5%) and group organizer is approachable and dependable (83.3%). Further, 66.7 per cent group gave response of some what true for the statement group organizer has no control on the group members and 62.5 per cent groups felt that the group organizer is sympathetic and helpful in solving others' problems at work or in their personal life. Hence further to strengthen the leadership abilities they need to be selected by using right methods and trained to work as an effective leader.

Group communication

Almost 92.0 per cent groups expressed that the group members are kept informed about important events, 83.3 per cent groups indicated that the members dependency on informal leader for information was somewhat true. Nearly eighty per cent groups felt that members discuss about their personal problems with others in group and 70.8 per cent groups informed that

friendly and informal interactions occur in the group. It was mainly due to the homogeneity in terms of castes, location and their interests.

Group sustainability of SHGs

Majority (58.3%) groups were having low recoupment of revolving fund and 41.7 per cent groups had high recoupment of revolving fund.

The overall picture of group sustainability clearly indicating that majority of the groups were found with high group sustainability and it was mainly because group members realized that group profits are their own profits.

Confirmation to group norms by SHGs

From Table 3 it is evident that, majority of the groups always confirmed to meet as scheduled at fixed places and group work (95.8%), maintaining books and records (91.6%), and repaying loan promptly (66.7%). Half of the groups sometimes confirmed to promptly remitting the thrift. Further, 66.6 per cent of groups rarely confirmed to levy penalty on members for late payment. These results are indicating the members realization about the confirmation to group norms for smooth functioning of the group.

Critical issues discussed in group meetings of SHGs

It could be noticed from Table 4 that 37.5 per cent of the groups discussed thrift activities, economic activities and personal problems. One third (33.3%) of groups discussed their activities, economic act...

Table 2. Group sustainability of SHGs
(Number of groups=24)

S. No.	Components of group processes	f	%
1.	Active life of the group(mean=3.7)		
	Low active life groups	7	29.2
	High active life groups (Range 2-4)	17	70.8
2.	Level of internal lending (mean=2.79)		
	Low internal lending groups	7	29.2
	High internal lending groups (Range 2-4)	17	70.8
3.	Extent of defaulters in group (mean=3.08)		
	Low defaulters groups	13	54.2
	High defaulters groups (Range 2-4)	11	45.8
4.	Status of group savings (mean=3.29)		
	Low (\leq mean)	13	54.2
	High ($>$ mean) (Range 2-4)	11	45.8
5.	Recoupment of revolving fund (mean=3.33)		
	Low (\leq mean)	14	58.3
	High ($>$ mean) (Range 2-4)	10	41.7

Table 3. Response analysis of statements of confirmation of group norms of SHGs
(Number of groups=24)

S. No.	Components of group processes	All-ways	Some-times	Rarely	Total
1.	The group meets as scheduled at fixed place of meetings and group work	23 (95.8)	1 (4.2)	0 (0.0)	24 (100)
2.	The group maintains required books and records	22 (91.6)	1 (4.2)	1 (4.2)	24 (100)
3.	Group members repay loan promptly	16 (66.7)	8 (33.3)	0 (0.0)	24 (100)
4.	The needs of members are prioritized for utilization of thrift	14 (58.3)	9 (37.5)	1 (4.2)	24 (100)
5.	All the members compulsorily attend the meetings	13 (54.1)	10 (41.7)	1 (4.2)	24 (100)
6.	Group members promptly remit the thrift	12 (50.0)	12 (50.0)	0 (0.0)	24 (100)
7.	Penalty is levied on members for late repayment defaulting	4 (50.0)	4 (50.0)	16 (0.0)	24 (100)

Note: Figures in the parenthesis indicate percentage

Table 4. Distribution of SHGs according to the critical issues discussed in group meetings
(Number of self help groups=24)

S. No.	Critical Issues of group meetings	f	%
1.	Only thrift and other financial aspects	0	0
2.	Thrift activities + economic activities	1	4.2
3.	Thrift activities + economic activities+ personal problems	9	37.5
4.	Thrift activities+economic activities+ personal problems+community problems	6	25.0
5.	All the above+general welfare and solutions for problems of women	8	33.3

personal problems, community problems and general welfare and solutions for problems of women. Whereas, 25.0 per cent of groups discussed thrift activities, economic activities, personal problems and community problems and only a negligible per cent (4.2%) discussed only thrift activities and economic activities. It shows their concern about different related aspects for their welfare.

Perceived motives for forming SHGs

A great majority (95.8%) of the groups were formed with a motive of future savings, 70.8 per cent for getting loans at cheaper interests, 54.2 per cent to become

Table 5. Distribution of SHGs according to the motive to form SHGs.

(Number of groups=24)			
S. No.	Reason	f	%
1.	For future savings	23	95.8
2.	For getting loans at cheaper interests	17	70.8
3.	To become economically independent	13	54.2
4.	To overcome financial problems	12	50.0
5.	To solve the problems collectively	7	29.2
6.	For improving skills	6	25
7.	To avoid the conflicts among neighbors	2	8.3

economically independent and 50 per cent with a motive to overcome financial problems. The least motives for them to form groups were to avoid the conflicts among neighbours (8.3%). It is a clear evidence for the transformation in their attitudes and their concern about the future.

CONCLUSION

The concerned agencies and development workers responsible for forming and promoting SHGs like women and child welfare department and non government organizations has to emphasize and encourage the fruitful discussions of thrift, social and economic activities and different means of savings and investment which benefit not only the personality of women but also the overall development of the society. This kind of inculcating such

factors among the group members may be through training programmes, discussion with successful group members at other villages and awareness camps.

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Content Analysis of Developmental Information Telecast from Delhi Doordarshan

Rukmani¹, Lali Yadav² and Sumitra Yadav³

ABSTRACT

A study was under taken to analyse the content and coverage of developmental information telecast from Delhi Doordarshan (DD-1). The study revealed that out of total items on the selected developmental information telecast, 36.7 per cent of the items was telecast on Independence Day followed by Republic Day (33.3%) and International Literacy Day (6.7%). No developmental item was telecast on International women Day, Nutrition Week, World Food Day and Women in Agriculture Day. Regarding format 30 per cent was in speech format and 26.7 per cent was in recreational format. A majority of the programme was telecast in Hindi language with optimal speed and with clear audio-video quality.

In this age of information technology and information revolution, people are becoming increasingly aware of the world around them through television to a higher extent than any other form of mass media. The role of television is well known in the present era of communication network development and has become part of daily living of shaping their future by having impact on their outlooks and perceptions. Industrialization, globalization and other socio-cultural and techno-economic transformations have affected the entire world but more particularly the rural sectors of the developing world. Numerous channels, formats and styles of the programmes have grown with no exception to India, which have channeled their effects on life of people.

Past experiences of information dissemination systems have established beyond doubt that all forms of information do affect people through its input, process and output mechanism but specific information for specific category audience still affect the most. The programmes related to developmental information thus play a crucial role in changing and moulding attitudes, and creating general awareness among masses.

This is much more true for audience who have limitations of education or access to communication channels. Considering some of the above generalizations drawn on the bases of past experiences, the present study was undertaken to analyze the content and coverage of developmental information telecast from Delhi Doordarshan (DD-1).

METHODOLOGY

Developmental information for the purpose of the present investigation included all the events being focused to create awareness among common masses by governmental, non-governmental or international organizations/ agencies/ departments through Delhi Doordarshan (DD-1).

The developmental information was gathered and compiled. The judges's judgment was obtained for relevancy and importance of the events to the end users. On the basis of the judge's judgement, events were listed score wise in ascending order. Fifteen events with higher scores were selected finally for the purpose of the study.

¹ Ph.D Student, Dept. Home Science Extension Education, CCS HAU, Hisar (Haryana).

² Professor, Dept. Home Science Extension Education, CCS HAU, Hisar (Haryana).

³ DES (H.Sc.), Dept. Home Science Extension Education, CCS HAU, Hisar (Haryana).

Sample Selection

Pre event, event and post event day's programmes of DD-1 were recorded for content analysis by covering and ensure the fair representation of the contents in programme for three days on selected developmental information.

Selection of parameters

The various parameters used for content analysis of television programmes were theme, speaker, and status of programme, language, duration, audio quality, timeliness and relevancy of the programmes. The data were analyzed by the researcher by carefully watching all the recorded programmes and made self-judgement on various parameters of content analysis. These programmes were recorded in complete by viewing complete details of the programmes pertaining to the developmental information a day before the telecast.

RESULTS AND DISCUSSION

The results regarding content analysis of developmental information telecasted by DD-1 are presented underneath.

Items and time spent on developmental information on DD-1

Table 1 shows the results pertaining to items presented and time spent on developmental information on DD-1. Data revealed that out of total items on the selected developmental information telecast by DD-1, 36.7 per cent of the items was on Independence Day followed by Republic Day (33.3%), and International Literacy Day (6.7%). Only 3.3 per cent items in each case telecasted on DD-1 was on National Science Day, World Consumer Rights Day, World Water Day, World Health Day, World Environment Day, Breast Feeding Week and World Disabled Day. No item was telecasted by DD-1 on International Women Day, Nutrition Week, World Food Day, and Women in Agriculture Day and National Energy Conservation Day.

Results in context of time spent for delivery of items by DD-1 are also presented in Table 1. It is clear from the data that 53.6 per cent of the total time was devoted on Republic Day followed by Independence Day (26.3%), International Literacy Day (14.6%). Only 2.3 per cent of the total time was spent on National Science Day and World Health Day. The percentage of time devoted on World Consumer Right Day, World Environment Day, Breast Feeding Week and World

Disabled Day was only 0.2 per cent in each case, while it was only 0.1 per cent for World Water Day.

Format used and time devoted

The perception of the message depends to a great extent on the mode of presentation/format used besides other elements. It is evident from the Table 2 that 30.0 per cent of the items were in speech format followed by more than one-fourth (26.70%) of the items, which were in recreational format. It was also seen that one-fifth of

Table 1. Items and time spent on developmental information by DD-1

S. No.	Events	Items	% age of items	Duration Min: Sec.	% age Time devoted
1.	Republic Day (26 Jan.)	10	33.3	702:36	53.6
2.	National Science Day (28 Feb.)	1	3.3	30:15	2.3
3.	International Women Day (8 March)	0	0.0	0:00	0.0
4.	World Consumer Right Day (15 March)	1	3.3	2:05	0.2
5.	World Water Day (22 March)	1	3.3	1:27	0.1
6.	World Health Day (7 April)	1	3.3	30:12	2.3
7.	World Environment Day (5 June)	1	3.3	3:10	0.2
8.	Breast Feeding Week (1-7 Aug.)	1	3.3	2:27	0.2
9.	Independence Day (15 Aug.)	11	36.7	344:01	26.3
10.	Nutrition Week (1-7 Sept.)	0	0.0	0:00	0.0
11.	International Literacy Day (8 Sept.)	2	6.7	191:06	14.6
12.	World Food Day (16 Oct.)	0	0.0	0:00	0.0
13.	World Disabled Day (3 Dec.)	1	3.3	2:15	0.2
14.	Women in Agriculture Day (4 Dec.)	0	0.0	0:00	0.0
15.	National Energy Conservation Day (14 Dec.)	0	0.0	0:00	0.0
Total		30	100.0	1309:234	100.0

Table 2. Format used and time devoted to developmental information telecasted on DD-1

S No.	Format	Freq.	Duration Min:Sec	Duration Min:Sec-	Average Min:Sec.
1.	Talk	1 (3.3)	15:16 (1.2)	0:00-15:16	15:16
2.	Speech	9 (30.0)	181:53 (13.9)	10:09-30:23	20:17
3.	Serial	1 (3.3)	30:17 (2.3)	0.00-30:17	30:17
4.	Discussion	2 (6.7)	60:27 (4.6)	30:12-30:15	30:13
5.	Report	3 (10.0)	65:55 (5.0)	15:21-25:19	21:81
6.	Recreational'	8 (26.7)	924:12 (70.6)	12:05-210:09	115:52
7.	News	6 (20.0)	31:34 (2.1)	1:27-20:10	5.22
Total		30 (100.0)	1309:34 (100.0)	1:27-20:10	5.22

Figures in parentheses indicate percentages

the items were presented in news format (20.0%) while the other formats were report (10.0%), discussion (6.7%), serials (3.3%), and talk (3.3%).

Further it was seen that 70.6 per cent time was devoted to present items on selected developmental information in recreational format. It was followed by presentation of items in format of speech (13.9%), report (5.0%) and serial (2.3%). The average time devoted for presentation of items on selected developmental information was found to be 43:64 min.

Analysis of Developmental Information according to Different Parameters Telecasted by DD-1

Parametric analysis of all the recorded programmes was done and results are presented in Table 3.

Language used

It is the language, through which the ideas, feelings, knowledge are shared with other people. Table 3 gives a clear picture of language used in programmes of selected developmental issues. Majority of the programmes (76.7%) were telecasted in Hindi language followed by combination of English, Hindi and other languages (16.6%) and only 6.7 per cent of the programmes made use of English language exclusively.

Table 3. Analysis of developmental information according to different parameters telecasted by DD-1

S. No.	Parameters	Categories	Freq- uency	%age
1.	Language used	English	2	6.7
		Hindi	23	76.7
		Combination	5	16.7
2.	Speed of presentation	Slow (below 125)	7	23.3
		Medium (125-150)	21	70.0
		High (above 150)	2	6.7
3.	Audio quality	V. Clear	24	80.0
		Clear	6	20.0
		Not clear	-	-
4.	Video quality	V. Good	22	73.3
		Good	8	26.7
		Not good	-	-
5.	Timeliness	Timely	30	100.0
		Not timely	-	-
6.	Relevancy	Relevant	30	100.0
		Not relevant	-	-
7.	Status of item	Informational	17	56.7
		Educational	1	3.3
		Infoinstructional	1	3.3
		Entertainment	5	16.7
		Infotainment	4	13.3
		Edutainment	2	6.7

Speed of presentation

The speed of speech which was measured in number of words per minute was taken item wise and maximum and minimum was worked out and divided into three categories.

Data in Table 3 revealed that speakers in 70.0 per cent of the items delivered messages with normal speed (125-150 words/minute) while 23.3 per cent delivered the message with slow speed (below 125 words/minute) and the speed of 6.7 per cent of items was fast/high (above 150 words/minute).

Audio quality

The presentation of the telecast for the audience is also a very important aspect of the programme, as perception of viewers about the audio quality of message also plays a major role beside other elements. Understandability and comprehensiveness of the telecast message is affected by the audibility of the content. Hence, the language, clarity of voice, tone and pitch, pronunciation and emphasis on important words of the

speakers was also judged to judge its audio quality. The audio quality was classified into three categories, namely good, (very clear), fair (just clear) and poor (not clear). The data regarding audio quality of various programmes has been presented in Table 3. It is clear from data that 80.0 per cent of items had very clear understandability and comprehensibility followed by clear (20.0%) audio quality.

Video quality

The results regarding visual quality of the programmes telecasted pertaining to the developmental information revealed that 73.3 per cent programmes had very good visual quality followed by good (26.7%).

Timeliness and relevance of message

Timeliness and relevance of the message related to developmental information were classified into 'Timely' and 'Not Timely' and 'Relevant' and 'Not Relevant' categories. It is clear from the Table 3 that cent percent items telecasted were timely and relevant in nature.

Status of item

Status of item refers whether the items were informational, educational, info instructional, entertainment, infotainment and edutainment. Data in same Table 3 further depicted that 56.7 per cent of the items were informational in nature followed by entertainment (16.7%), infotainment (13.3%) and edutainment (6.7%) in nature.

CONCLUSION

It may be concluded that out of total items on the selected developmental information telecast by DD-1,

36.7 per cent of the items was on Independence Day followed by Republic Day (33.3%), and International Literacy Day (6.7%). Only 3.3 per cent items in each case telecasted on DD-1 were on National Science Day, World Consumer Right Day, World Water Day, World Health Day, World Environment Day, Breast Feeding Week and World Disabled Day. No item was telecast by DD-1 on International Women Day, Nurtition Week, World Food Day, and Women in Agriculture Day and National Energy Conservation Day. Therefore it is suggested that these issues may also be covered in future as it helps masses to know the developmental information.

Regarding format, out of total items, 30.0 percent was in speech format followed by more than one-fourth (26.7%) of the items, which were in recreational format while more time was devoted on recreational format. It is suggested that format of items may be considered in reference with the type of specific audience for whom it serves the most.

A majority of the programmes was telecast in Hindi language with normal speed and very clear audio-video quality. The entire programmes presented were timely and relevant and 56.7 percent items was informational in nature. The findings are very encouraging for the information communicators to present programmes through DD-1 effectively so that they have greater impact on audience.

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e-Readiness of Information Communication Technology Beneficiaries in Kerala

A. Arun Babu¹, M.S. Nataraju², K.N. Ramanna³, M.P. Gokulraj⁴

The global information society is undergoing a fast revolution. Integrating Information Technology with agriculture has increased the opportunities for effective management support. Information and Communication Technology (ICTs) can empower rural communities and give them a voice that permits them to contribute to the development process. A silent revolution is taking place in the communication systems in rural India. It is said that in the years to come digital divide will be one important factor in separating people in a society like caste and income. A huge sum of money is being pumped in to this sector to reduce the so called digital divide. At the same time it raises a number of questions also. Whether our farmers and rural people are capable of facing this revolution? What are the factors hindering ICT dissemination? Are they really ready in terms of various ICT indices to use these technologies? In this regard an attempt is made through a formal study conducted in Kerala State to find out answers to the above mentioned questions with the following objectives:

- i. To study the mean e-readiness and its indicators among beneficiaries,
- ii. To assess the e-readiness levels of Akshaya beneficiaries and
- iii. To assess the e-readiness levels of Kissan Kerala beneficiaries

METHODOLOGY

The study was conducted in three districts of Kerala namely, Malappuram, Thrissur and Palakkad. Two ICT's programmes that have more relevance to agriculture and rural development namely Kissan Kerala and Akshaya were selected. Forty respondents were selected

from each project making to a total of 80. Simple random sampling method was used to select the respondents. Data was collected using a well structured and pretested interview schedule.

e-readiness is operationally defined as the readiness or preparedness of people to use various forms of ICTs in their daily life. The procedure developed by Harvard University Centre for International Development was used to measure the e-readiness with slight modification. The tool prepared for the study was having 6 major categories with subdivisions. The six major categories assessed were, e-access, e-learning, e-society, e-business, e-governance and e-willingness. This tool provided a grid with four stages of developments for each category and their sub dimensions. The respondents were asked, to which stage they fit in according to their perception. They were asked to select only one stage. A score of 1 was given to first stage, 2 for second stage, 3 for third stage and 4 for fourth stage of development. The score obtained by the respondent in each category is the readiness of that category and the total e-readiness is assessed by taking the average of all these 6 major categories. The maximum score of e-readiness that can be attained by a respondent was 4 and the minimum score that can be attained was 1.

RESULTS AND DISCUSSION

Mean e-readiness of ICT beneficiaries

A critical glance of the Table 1 indicates that among the three categories of respondents Kissan Kerala beneficiaries exhibited highest mean e-readiness score followed by Akshaya beneficiaries. The mean e-readiness

¹ PG Scholar, Deptt of Agril. Extension, University of Agricultural Sciences, GKVK, Bangalore - 65.

² Associate Professor, Deptt of Agril. Extension, University of Agricultural Sciences, GKVK, Bangalore - 65.

³ Professor of Extension and Chief Instructor, FTI, University of Agricultural Sciences, Bangalore - 24.

⁴ Associate Professor, FTI, University of Agricultural Sciences, Bangalore - 24.

Table 1. Mean levels of e-readiness indicators and total e-readiness

Respondents	(N=40)						Mean e-readiness
	e-access	e-learning	e-society	e-business	e-governance	e-willingness	
Akshaya Beneficiaries	2.55	2.38	2.34	1.58	2.50	3.35	2.45
Kissan Kerala Beneficiaries	3.35	3.29	2.44	2.83	2.65	3.68	3.04

score of Kissan Kerala beneficiaries is 3.04, which is almost 25 per cent more than Akshaya beneficiaries who scored 2.45.

e-readiness was calculated by assessing six indicators namely e-access, e-learning, e-society, e-business, e-governance and e-willingness to use. Each of these indicators were assessed and scored in such a way that maximum score that an individual can get is 4 and minimum score is 1. The mean score of these indicators obtained by the respondents are presented in Table 2.

It can be seen that Akshaya beneficiaries exhibited mean scores of 2.55, 2.38, 2.34, 1.58, 2.50 and 3.35 for e-access, e-learning, e-society, e-business, e-governance and e-willingness, respectively. Kissan Kerala beneficiaries had mean scores of 3.35, 3.29, 2.44, 2.83, 2.65 and 3.68 for the same indicators in that order.

Further it is observed that, in case of all indicators Kissan Kerala beneficiaries had highest mean score among respondents. While comparing the scores of Akshaya and Kissan Kerala beneficiaries, Kissan Kerala beneficiaries had high scores in the case of e-access, e-learning and e-business. Mean scores of e-society and e-willingness to use are almost equal for all the three groups.

e-readiness levels of Akshaya beneficiaries

Akshaya beneficiaries were categorized into low, medium and high groups using mean and standard deviation of e-readiness scores. The results are presented in Table 2.

The data in Table 2 reveal that majority of the Akshaya beneficiaries belong to high level of e-readiness (40%) followed by medium (32.5%) and low (27.5%) categories.

Exactly half of the respondents (50%) were found in the medium e-access category followed by 37.5 per

Table 2. e-readiness levels of Akshaya beneficiaries (N=40)

Indicators	Category	No.	Percent
e-access	Low < 2.36	15	37.5
	Medium 2.36-3.09	20	50.0
	High \geq 3.09	5	12.5
e-learning	Low < 1.90	0	0
	Medium 1.90-2.84	31	77.5
	High \geq 2.84	9	22.5
e-society	Low < 1.99	0	0
	Medium 1.99-2.53	37	92.5
	High \geq 2.53	3	7.5
e-business	Low = 1	18	45.0
	Medium = 2	21	52.5
	High = 3	1	2.5
e-governance	Low = 1	5	12.5
	Medium = 2	10	25.0
	High = 3	25	62.5
e-willingness	Low = 2	7	17.5
	Medium = 3	12	30.0
	High = 4	21	52.5
e-readiness	Low < 2.06	11	27.5
	Medium 2.06-2.74	13	32.5
	High \geq 2.74	16	40

cent in the low and 12.5 per cent of the beneficiaries in the high e-access category.

In the case of e-learning, it is interesting to quote that none of the beneficiaries were found in low level of e-learning while 77.5 per cent and 22.5 per cent of the beneficiaries were found in medium and high categories, respectively.

It is observed that none of beneficiaries belong to low group of e-society. However, vast majority (92.5%) of beneficiaries belong to high group and remaining 7.5 per cent of them come under medium group for e-society.

As high as 45 per cent of the beneficiaries were observed in low group followed by 52.5 per cent in medium group and only 2.5 per cent in high group of e-business.

With regard to e-governance it is seen that only 12.5 per cent of beneficiaries fall in low group as against 25 per cent of beneficiaries in the medium group and majority (62.5%) of beneficiaries in high group.

The Table further shows that majority of the beneficiaries (52.5%) exhibited high score followed by 30 per cent medium score and 17.5 per cent were found to have low score for e-willingness.

e-readiness levels of Kissan Kerala beneficiaries

The Kissan Kerala beneficiaries were categorized into low, medium and high using mean and standard deviation of e-readiness scores. Per cent distribution of each category is presented in Table 3.

Table 3. e-readiness levels of Kisan beneficiaries (N=40)

Indicators	Category	No.	Percent
e-access	Low < 2.36	0	0
	Medium 2.36-3.09	13	32.5
	High \geq 3.09	27	67.5
e-learning	Low < 1.90	0	0
	Medium 1.90-2.84	8	20.0
	High \geq 2.84	32	80.0
e-society	Low < 1.99	8	20.0
	Medium 1.99-2.53	18	45.0
	High \geq 2.53	14	35.0
e-business	Low = 2	20	50.0
	Medium = 3	7	17.5
	High = 4	13	32.5
e-governance	Low = 2	20	50.0
	Medium = 3	14	35.0
	High = 4	6	15.0
e-willingness	Low = 2	20	50.0
	Medium = 3	13	32.5
	High = 4	27	67.5
e-readiness	Low < 2.06	0	0
	Medium 2.06-2.74	6	15.0
	High \geq 2.74	34	85.0

A vast majority of the Kissan Kerala beneficiaries (85%) showed high level of e-readiness and remaining 15 per cent had medium level of e-readiness.

It can be seen from the Table that none of the Kissan Kerala beneficiaries was found in low e-access category while 32.5 per cent and 67.5 per cent of the beneficiaries were found in medium and high e-access category respectively.

In the case of e-learning none of the Kissan Kerala beneficiaries had low level of e-learning whereas a greater proportion of them (80%) had high level of e-learning followed by medium level (20%).

Twenty per cent of beneficiaries exhibited low score of e-society followed by 35 per cent of beneficiaries in medium category and 45 per cent in high category for e-society.

Exactly half of the beneficiaries (50%) were observed in low group whereas 17.5 per cent of beneficiaries were found in medium group and only 32.5 per cent of beneficiaries were in the group with high score for e-business.

Half of the beneficiaries were in low group, 35 per cent in medium group and 15 per cent in the group with high score for e-governance.

It can be seen that none of the beneficiaries was found in low group based on their e-willingness score whereas 32.5 per cent of beneficiaries were in the medium group and majority (67.5%) of beneficiaries were found in high group.

CONCLUSION

Kissan Kerala beneficiaries were having more score for e-readiness and e-readiness indicators. Both of them were having low scores for e-society, e-business and e-governance.

There is a need to make beneficiaries aware of the ICT enabled services and care should be taken to make them adopt more such technologies. It was also found that irrespective of the respondents all were having high score for e-willingness, which indicates the scope for diffusion of ICTs and ICT enabled services to rural areas. Care should also be taken to concentrate more on technologies like mobile telephony, radio and television, wherein the rural poor have more access. By exploiting the full potential of mobile telephony or land line telephony farmers and rural people can be connected to the wired world. FM radio is a potential medium to reach the rural poor for providing them access to the outside world. The possibility of starting a FM channel for the farmers and rural people in all the states giving more relevance to local information, can be explored and it will certainly help the rural poor in entering the networked world.

Research Note

Measurement of Skills of Farmers in Selected Practices of Wheat Production

Anuranjan¹, R.P. Singh 'Ratan'², B.K. Jha³ and V.P. Chahal⁴

Behavioural changes brought about by the extension agencies through transfer of technology programme are skewed in the favour of knowledge and formation of favourable attitude, which are expected to lead to adoption. However, knowledge and favourable attitude are of no value unless these are translated into actual practice through acquisition of appropriate skills. Lack of mastery over application of knowledge seems to play vital role towards wide technological gap. The extension literature is replete with references for measuring the skills through self-analysis method of verbal test. Perhaps no direct study is available on measurement skills by actual performance test related to agricultural operations (Singh 1983). As skill is the degree of expertise in performing the practices, it cannot be measured precisely until and unless the experts judge practices of respondents.

Keeping this in view, an attempt was made to measure the level of skills of the farmers who participated in front line demonstrations conducted by the scientists of Birsa Agricultural University and general demonstrations conducted by the extension functionaries of Department of Agriculture.

METHODOLOGY

The study was conducted in five purposively selected villages, namely, Okhargarha, Sundil and Sukurhuttu under Kanke block, Lota under Silli block and Nawatoli under Lapung block of Ranchi district, where FLDs and GDs were conducted during 2001-2002.

All the farmers with demonstrations belonging to the selected villages under Front Line Demonstrations (FLD) category (45) and General Demonstrations (GDs) category (67) were selected. Thus the sample consisted of a total number of 112 respondents.

With the help of informal discussion with the scientists and extension personnel of the University, seven practices viz. seed treatment, soil treatment, sowing behind plough, basal application of fertilizers, top dressing, use of sprayer and selection and storage of seeds were selected for skill analysis.

A panel of three judges comprising the scientists, one each from the disciplines of Agronomy, Entomology and Soil Science were selected and requested to rate the skill performance of the respondents. The respondents were requested to assemble at a fixed place in each village on a pre-convened day to perform the selected practices one by one for rating the skills by the panel of judges. The rating was done on a 3-point continuum with their scores given in parentheses as good performance (3), average performance (2) and poor performance (1). The overall scores of the respondents reflected the level of skill, which was calculated by taking the arithmetic mean of scores given to all the seven practices. Finally, the respondents were categorized into three groups on the basis of their overall mean skill scores and standard error ($X = 1.71$ and $SE = 0.49$) i.e. good (> 2.2), average ($1.22 - 2.20$) and poor (< 1.22).

¹ SMS (Agricultural Extension), Krishi Vigyan Kendra, Vikas Bharti, Gumla.

² Director Extension Education, BAU, Ranchi.

³ Assistant Professor-Cum-Junior Scientist, Department of Extn.Edu., Faculty of Agriculture, BAU, Ranchi.

⁴ Sr. Scientist, Division of Agril. Extension, ICAR, KAB-1, New Delhi.

Table 1. Skill scores of the respondents with respect to selected practices of improved wheat production

Sl. No.	Practice	Maximum obtainable score	Average skill score		Value of 't'
			FLD respondents	GD respondents	
1.	Seed treatment	3	1.58 (52.66)	1.26 (42.00)	2.11*
2.	Soil treatment	3	1.56 (52.00)	1.19 (39.67)	2.24*
3.	Sowing behind plough	3	2.11 (70.33)	1.98 (66.00)	1.32 NS
4.	Basal application of fertilizers	3	2.00 (66.67)	1.68 (56.00)	2.03*
5.	Top dressing	3	2.17 (72.33)	2.12 (70.67)	0.88 NS
6.	Use of sprayer	3	1.62 (54.00)	1.21 (40.33)	2.17*
7.	Selection and storage of seed	3	1.91 (63.67)	1.76 (58.67)	1.21 NS

Figures in parentheses indicate percentage; *Significant at 5% level; NS - Non significant

RESULTS AND DISCUSSION

Practice-wise skill scores

It was observed that the FLD respondents obtained above 50 per cent of the maximum obtainable scores in all the seven selected practices of improved wheat production technologies, whereas the GD respondents failed to score that level in three practices, viz., seed treatment, soil treatment and use of sprayer (Table 1).

The FLD respondents had significantly higher average skill scores than the GD respondents in practices like seed treatment, soil treatment, basal application of fertilizers and use of sprayer. Nevertheless, FLD respondents failed to achieve more than 75 per cent of maximum obtainable score in any of the practices. This might perhaps be due to the fact that scientists also did not organize the farmers' training prior to the conduct of the frontline demonstrations, which was a pre-requisite for successfully imparting the skill (Singh and Gill, 1980). No significant differences were observed with respect to the three practices i.e. sowing behind plough, top dressing and selection and storage of seeds.

Frequency distribution of respondents according to skill category

About 50 per cent of both the categories of respondents possessed average level of skill (52.68%). However, the FLD respondents outscored the GD respondents in possessing a fairly good level of skill (Table 2). This might be due to the fact that the scientists under the FLDs followed the interactive approach of demonstration, while the extension functionaries did not

Table 2. Frequency distribution of respondents according to their skill scores on selected practices

Skill score	FLD respondents (N=45)	GD respondents (N=67)	Pooled (n=112)	Value of 't'
Poor (< 1.22)	5 (11.11)	16 (23.89)	21 (18.75)	
Average (1.22-2.20)	23 (51.11)	36 (53.73)	59 (59.68)	2.17*
Good (> 2.20)	17 (37.78)	15 (22.38)	32 (28.57)	
Mean	1.85	1.62	1.71	

Figures in parentheses indicate percentages

* Significant at 5% level

follow the same. Since the extension functionaries were not having the expertise in performing and imparting skills of certain operations like the scientists and also they devoted less time on efforts for skill transfer due to their involvement in conducting demonstrations at large scale in a very limited time to fulfill the targets.

CONCLUSION

The FLD respondents had acquired relatively better skills than those of the GD respondents in all the seven selected practices of improved wheat production technologies. However, the scores of majority of the FLD respondents also ranged between poor to average skill.

Method demonstrations of important operations need to be conducted by the scientists and, if possible, prior training should be imparted to the farmers. Capacity building of extension functionaries seems imperative to improve the quality and standard of demonstrations undertaken by them. Measurement of skill still hovers around self-analysis verbal test method and performance test by panel of scientists. Therefore, more sophisticated method is needed to rate the skills of the farmers.

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Research Note

A Study on Awareness of Integrated Pest Management Among Tomato Growers

Neeraj Singh, K.K. Pandey, S. Satpathy and Mathura Rai¹

As the vegetables are harvested at short intervals, chemical method of plant protection has become risky and hazardous. In this context Integrated Pest Management strategies, which generally rely primarily on biological defenses against pests before chemically altering the environment, are the best alternate option to sustain plant protection in vegetables. It is the integration of all suitable management techniques with natural regulating and limiting elements of the environment. It is a multidisciplinary approach, which includes all pest management tactics co-ordinated in a unified programme, and crop protection is considered as one aspect of agro-ecosystem management that addresses the economic, ecological and social issues. The components for successful Integrated Pest Management consists mainly of insect pests monitoring, integration of tactics, decision-making and implementation. In tomato every year approximately 22-38 per cent of crops is damaged only due to insect pests and diseases and farmers are spending a lot in managing the pests without any formidable outcome.

The success of IPM totally depends on awareness of the approach supported by the authentic source of inputs and knowledge from technical persons. Therefore, it is essential to judge the depth of knowledge of the concerned farmers on pest management of tomato, which is a prerequisite to develop a strategy for successful implementation of IPM programme in a particular farming community. In this context a survey study was conducted to know the awareness of tomato growers regarding IPM and the major sources of information on pest control and IPM strategy for tomato pests.

METHODOLOGY

Varanasi is a major vegetable-growing district of Uttar Pradesh. Tomato is the main vegetable crop in Arazilines block of this area. Therefore, for the present study, Arazilines block was purposively selected and fifty tomato growers were randomly sampled from Jayapur panchayat, adopted by IIVR, Varanasi under NATP mission mode sub project on "Validation and Promotion of IPM Technology in selected crops in different Agro-ecological Regions". Data were collected before the implementation of project from the sample farmers through personal interview with the help of a questionnaire developed for the purpose. The questionnaire was used to measure the awareness of the farmers about the practices, which directly or indirectly are part of IPM. Similarly a list of technical persons and other sources of pest control knowledge was devised to know the status of IPM techniques in tomato. The frequency obtained for various practices and sources were converted into percentage of total sample and ranked accordingly. IPM module for tomato was developed with the help of scientists of the institute based on their researches.

RESULTS AND DISCUSSION

Individual practice-wise data of tomato growers were worked out to get the clear idea about the extent of IPM awareness in tomato growers and source of advice they are getting regarding pest control.

IPM awareness among tomato growers

The data in Table I indicate that all the members of tomato growers sample were aware of

¹Indian Institute of Vegetable Research, P.B. 5002, P.O. BHU, Varanasi-221 005.

Table 1. Ranking of IPM practices in tomato on the basis of farmers' awareness

S.No.	IPM Practices	Frequency	Percentage	Rank
1.	Monitoring of field	50	100	I
2.	Identify insect pest	28	56	II
3.	Use of chemical pesticide	50	100	I
4.	Recommended dose of pesticide	4	8	V
5.	Hand removal of pest	28	56	II
6.	Fallowing of field	14	28	IV
7.	Allow weeds during fallowing	14	28	IV
8.	Chiseling soil solarization	-	-	-
9.	Burn crop stubble	22	44	III
10.	Aware of friendly insects	-	-	-
11.	Aware of IPM strategies	2	4	VI
12.	Biological control of insect pest	-	-	-
13.	Seed treatment	14	28	IV

field monitoring and use of chemical pesticides. On the other hand only 56 per cent of the farmers had complete knowledge of insects and diseases and the symptoms of their infection/infestation in tomato. It is most interesting to analyze two facts of information on chemical pesticides i.e., their use and knowledge of correct dose of pesticides. On one hand all the farmers had knowledge of pesticides while only 8 per cent were aware of recommended dose for use in tomato. This indicates the misuse and overuse of chemical pesticides in such an important vegetable crop which signals not only hazards on human health but, also increases the cost of cultivation where pesticides is a major input. Such things also perpetuate in the form of control failures due to insecticides resistance and secondary pest outbreak consequent to heavy mortality of natural enemies. Further considerable section of farmers were aware of various IPM practices such as hand removal of pests (56%), burning of stubbles (44%) and seed treatment (28%) where as only 4 per cent of them were aware of IPM strategies. It is imperative that

the tomato growers although practice some of the IPM practices separately, their awareness about IPM in total is negligible. Most of them adopt the practices separately but not in the form of a total module.

Surprisingly, despite the farmers good awareness about insect-pests (56%) none of them was aware of friendly insects in the field, which is reducing either as a result of indiscriminant use of chemical pesticides or total lack of knowledge about natural enemies. None of the farmers was aware of two important practices i.e., soil solarization and biological control of insect pest. Hence, it indicates that the farmers are not at all aware of biological control and other important IPM practices. Therefore, farmers need to be trained on adoption of a complete IPM module of tomato.

Sources of pest control information

As discussed in Table 1 very few farmers are using appropriate dosages of pesticides while almost

Table 2. Sources of pest control information to the sampled farmers

(N=50)

S.No.	IPM Practices	Frequency	Percentage	Rank
1.	Research Institute/KVKs/SAUs	4	8	IV
2.	State Agricultural Depts.	6	12	III
3.	Fellow Farmers	14	28	II
4.	Pesticide Dealers	42	84	I
5.	Others	-	-	-

all the farmers are severely using chemical pesticide in their crops. Therefore, it is necessary to see what is the source of their pest control information.

It is clear that majority of tomato growers (84%) are getting pest control information from pesticide dealers and only few farmers are getting such advise from state agricultural department and research institutes/KVKs/SAUs (Table 2). From the above data it is clear that, why our farmer are spending lots of money on chemical pesticides without knowing the appropriate pesticides with recommended doses. Because private pesticides dealers, having profit motives, usually suggest the growers to use new and costly pesticides in high doses for controlling the disease pests of their field.

CONCLUSION

The present study clearly indicates the knowledge and practice of the growers regarding insect pests disease in tomato. Due to indiscriminate use of chemical pesticides today most of the insects/pests have become resistant and irrespective of using good pesticides with recommended dose it is difficult to control them. Therefore, it is necessary that the farmers should adopt the integrated pest management strategies by using the appropriate combination of physical, biological and chemical control methods. At the same time the extension and other agricultural officials of state agricultural departments, SAUs, KVKs and research institutes should come forward to educate the farmers regarding integrated pest management.

Research Note

A Scale to Measure the Performance of Self Help Groups

B. Narayanaswamy¹ and K. Narayana Gowda²

Self Help Groups have emerged as a new paradigm for combating poverty. This is high time that it should be a matter of concern for all those social consciousness driven people who want to banish poverty through new approach like Self Help Groups (SHGs). As we have experience from the past the rural community is always threatened by insecurity and vagaries of nature; individually they are hesitant to initiate for the fear of being ridiculed by peer group. So it is the group that need to be promoted and not individual achievement alone. The administrators, policy makers and planners should look for alternate, effective complimentary approach for rural development. Many countries in Asia have proved that the group concept can yield very good fruits. Group concept is definitely having distinct advantages when compared to individual approaches. Self Help Groups (SHGs) can attain sustainability easily, because its members understand each other and the group was formed only after mutual consultation for their own mutual benefits.

An appropriate and comprehensive device for measuring the performance of Self Help Groups has not been reported so far. In this background, an attempt was made to develop a performance scale for measuring the performance of SHGs.

METHODOLOGY

Collection of items

The various factors contributing for effectiveness or performance have been thoroughly reviewed in the context of Self Help Groups and a list of 148 items were prepared, which encompasses different performance

indicators and activities. The items thus prepared were screened further for their appropriateness, simplicity, clarity and correctness based on procedure advocated by Edwards (1957) and finalised the list. Out of 148 items collected initially, 114 items were retained after editing.

Judges' rating

The judges' rating was primarily used to ascertain the aspects and items under various categories. The selected 114 statements were sent to 146 judges across the country. They were requested to evaluate these aspects on a three point continuum- 'Most Relevant' (MR), 'Relevant' (R) and 'Less Relevant' (LR). A score of three, two and one were given for MR, R and LR respectively. Out of 146 judges, 72 judges responded timely. Thus, the relevancy data furnished by 72 judges were taken into consideration (49% response) for arriving at the selection of items for the scale.

RESULTS AND DISCUSSION

Selection of items for the final scale

The responses obtained from the judges were tabulated for each item and 't' value was calculated. The 't' values under 'performance at individual level' was 0.64, 'performance at group level' was 0.68 and 'performance at community level' was 0.67. To select the most relevant sub-dimension and item, the cut off-point of 't' value was fixed at 0.60. For the total score, the frequency distribution of scores was considered, which was based on the responses to all statements. Then, 25 per cent of the subjects with the highest total score and 25 per cent of the subjects with the lowest total score were taken

¹ SMS (Ag. Extension), KVK, CPCRI (ICAR), Kasaragod.

² Project Co-ordinator, (Rural Bio Resource Complex), University of Agricultural Sciences, GKVK, Bangalore.

which provided the criterion groups to evaluate the individual statement. The relevancy test (RT) was carried out using the formula:

$$RT = \frac{\{[MR \times 3] + [R \times 2] + [LR \times 1]\}}{72 \times 3}$$

where, MR = Most Relevant
 R = Relevant
 LR = Least Relevant

If the value of RT was more than 0.75 per cent for a statement, it was accepted.

The 't' value for each item was worked out using the formula:

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

where,

X_H = the mean score on a given statement for the higher group
 X_L = the mean score on a given statement for the lower group
 n = the number of subjects in each group
 t = sig. (>1.96), t = NS(<1.96)

where,

- $\Sigma(X_H - X_H) = \Sigma X_H^2 - (\Sigma X_H)^2 / n$
- $\Sigma(X_L - X_L) = \Sigma X_L^2 - (\Sigma X_L)^2 / n$

The value of 't' is a measure of the extent to which a given item differentiates between the high and low groups. As an appropriate thumb rule, any 't' value equal to or greater than 1.75 is considered as indicating the average response and which differentiates high and low groups statements significantly. So, the items/ statements with 't' value of equal or greater than 1.75 were selected as the performance of SHG items. The items were arranged in a rank order according to their 't' values. The 't' values of individual statements were also prepared. Finally, on the basis of their 't' values, all the three categories- individual, group and community levels and all sub-dimensions were selected. Also on the basis of their highest 't' values, 27 statements under performance

at 'individual level', 25 statements under performance at 'group level' and 16 statements under performance at 'community (village) level' were selected for the inclusion on the scale of the performance of SHGs. Thus, 68 out of 114 statements were selected for inclusion in the final scale on the basis of their 't' values.

Reliability of the scale

The reliability of performance of SHGs scale was determined by Brown Prophecy Formula, which is otherwise called as split-half method. The scale was administered to 30 respondents in the non-sample area. The scale was divided into two halves based on odd and even numbered statements and the two sets of scores obtained from the same respondents were correlated. This was calculated by the formula:

$$r_{11} = \frac{\Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2][N\Sigma y^2 - (\Sigma y)^2]}}$$

where, x = odd score and y= even score, if $r_{11} > 0.75$, it is reliable

The 'r' values obtained at performance at 'individual level' was 0.9009, performance at 'group level' was 0.9325 and performance at 'community (village) level' was 0.9154 and were found to be significant at 0.01 level of probability, which indicates high reliability of the scale (Table 1).

Table 1. Item Analysis and Reliability Coefficients of the Performance of SHGs at Individual, Group and Community levels (N=200)

Performance	Item analysis value	Statements considered	Statements retained	Reliability coefficient
I. Individual Level				
A. Capacity Building	0.63	9	5	0.9009
B. Economic Activity	0.72	9	7	
C. Social Status	0.62	12	5	
D. Communicability	0.65	7	4	
E. Self-Monitoring	0.69	8	6	
Total	0.64	45	27	
II. Group Level				
A. Economic Activity	0.68	11	6	0.9235
B. Social Status	0.71	6	4	
C. Functional Linkage	0.68	7	5	
D. Conflict Management	0.63	8	4	

E. Transparency in Functioning	0.73	8	6	
Total	0.68	40	25	
III. Community Level				
A. Social Development	0.66	13	6	
B. Economic Development	0.65	9	6	
C. Functional Linkage	0.60	7	4	
Total	0.67	29	16	0.9154
Grand Total	-	114	68	

Validity of the scale

The content validity of the scale was established in two ways. Firstly, the scale items selected for inclusion in the scale was based on extensive discussion with experts and review of literature. Secondly, the opinion

of the judges was obtained to find out whether the components and items suggested were suitable for inclusion in the scale or not.

Administering of the performance scale

The scale for the performance of SHGs was administered based on Likert (1932) procedure. Each item in the scale was provided with a five point continuum and the response categories were " 'Strongly Agree', 'Agree', 'Undecided', 'Disagree' and 'Strongly Disagree'. The considered item was scored in the above said pattern, which received 5, 4, 3, 2, and 1 score respectively. The cumulative score of each respondent for all the statements was considered as performance of SHG score of that individual. The minimum possible score was 68, whereas the maximum possible score was 340. The finalised scale items are depicted in the Table 2.

Table 2. Final statements of the performance scale

I. Performance at Individual Level		3. Helped to solve conflicts in the meetings.
A. Capacity building		4. Provided leadership role in the smooth functioning of SHG
1. SHG enabled me to participate in the training programme which were organised for SHG members.		5. Facilitated smooth recovery of loan/other material support provided by SHG.
2. SHG enabled me to participate in extension activities organised at village level.		6. Enterprise was practiced as per technical recommendations
3. Facilitated in the conduct of educational activities for the benefit of SHG members.		II. Performance at Group Level
4. Improved the decision making ability on the choice of enterprises.		A. Economic activities
5. Facilitated confidence building of members		1. Provided an opportunity to undertake the group enterprise by SHG.
B. Economic activities		2. Reduced cost of production due to collective purchase of inputs.
1. Facilitated capital formation in the SHG.		3. Enhanced labour use efficiency because of group enterprise
2. Realised increased income in the enterprise taken.		4. Encouraged to utilise local resources effectively in all the production process.
3. Profit gained was recycled for expanding the enterprise.		5. Profitable sale of produce of group enterprise was possible because of SHG.
4. Repayment was done as per the norms.		6. Enhanced saving habit among fellow members of SHG.
5. Developed saving habit because of my participation in the SHG.		7. Realised increased net income of group due to participation in group enterprise.
6. Developed economic independence because of my participation in SHG.		B. Social status
C. Communicability		1. Because of the SHG, migration for employment has been decreased.
1. My communication skills have been improved due to my participation in SHG.		2. Provide an opportunity for every member to serve as an Office Bearer of the SHG.
2. Confidence of interacting in group has been improved.		3. Elders of the village have recognised the achievements of our SHG.
3. Improved the communicability with other SHG members.		4. Implementing agencies are recognising the achievements of our SHG.
4. Developed confidence in writing letters, accounts and proceedings		C. Functional linkage
E. Self-Monitoring		1. SHG facilitated in establishing linkage with local institutions
1. Attended SHG meetings regularly		
2. Actively participated in meetings		

2. Enabled linkage with financial institutions
3. Enabled in establishing contact with Development Departments
4. Enabled procurement of inputs at reasonable rates
5. Promoted linkages with marketing agencies.

D. Conflict Management

1. Decisions taken in the SHG meetings was helpful on smooth disbursement of loan to the members
2. Fairness in selection of beneficiaries for awarding loan was helpful in avoiding conflicts.
3. Acceptable guidelines developed were helpful for smooth repayment of loans
4. Amicable settlement of misunderstandings among members was ensured.

E. Transparency in functioning

1. Meeting date, time and venue are made known to all members in advance.
2. Status of budget and expenditure is made known to each member in the meeting.
3. Decision to provide loan to members was discussed and decided in the regular meetings.
4. Purchase of materials and inputs are discussed and decided in the meeting.
5. Procedure of sale of produce is made known to all the SHG members.
6. Guests to be involved in a programme are discussed and decisions are taken in the meeting.

III. Performance at Community (Village) Level

A. Social Development

1. Activities of SHG have minimised the under-employment among villagers.

2. Spare time of villagers is profitably utilised in productive activities.
3. Villagers feel united as a result of SHG activities.
4. Activities of SHG has served as a role model for other villagers.
5. Harmony in village atmosphere is consequent to start of SHG.
6. SHG gave impetus to many members to become elected members in other local bodies.

B. Economic Development

1. Availing money from money lenders has been reduced considerably due to start of SHG.
2. Income level of fellow villagers have also increased due to start of SHG.
3. Provided employment opportunity among fellow villagers due to start of SHG.
4. Infrastructure created by SHG is shared by fellow villagers for undertaking income generating activities.
5. Helped to acquire improved financial management skills among fellow villagers.
6. The standard of living of fellow villagers have improved due to establishment of SHG.

C. Functional Linkages

1. Activities of SHG helped villagers to have more awareness about development programmes.
2. Because of SHG, frequency of visits by development department personnel has increased.
3. Mobilised different agencies for undertaking various village development works.
4. Because of SHG, other agencies jointly organised awareness programmes against social evils.

CONCLUSION

The Self Help Groups are gaining momentum across the country and among the developing countries as an important strategy for the development of rural people in general and weaker section in particular. The necessity of a scale to measure the performance of SHGs is widely felt.

The scale developed for measuring the performance of SHGs is most relevant and valid. Hence, the scale could be used under similar situations for measuring the different types of SHGs with suitable modifications. Further, the scale comprises sub-

dimensions like individual level, group level and community (village) level, which could be used for the specific aspects. The interdependent variables under sub dimensions could be modified suitably according to the situations in which it is administered, while studying the performance of Self Help Groups.

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Research Note

An Index to Measure the Decision Making Behaviour of Farmers Towards Weather Forecasts

K. Ravi Shankar¹ and Pochaiiah Marathy²

Effective use of certain accurate weather forecasts pertaining to farming decisions can lead to better outcomes. Farmers have a variety of goals in mind and they try to use the available information to take decisions and to achieve those goals. Weather forecasts are one type of such information (Qi Hu *et al.*, 2005). Better understanding of weather and its variability on the overall effect of the different processes contributing to agricultural production is necessary to adopt appropriate cropping system, soil and water management practices (Rao, 2003). Understanding decision capacity of farmers helps to achieve effective climate communication. It is important to know the extent of forecast use and their influence on decision capacity of farmers, which can be possible by quantifying through an index. Weather-wise farm management is the optimal use of weather and climate information, including both direct and indirect effects, in agricultural decision processes, primarily for economic benefit (Mefarland and Strand, 1994). Decision making in the present context with respect to agricultural weather forecasting is the process of choosing the best alternative for the purpose of attaining specific goals involving the resources, environment, economic and personal characteristics of a farmer.

METHODOLOGY

Decision process deals with the environment characteristics of a farmer especially those concerned with weather forecasting. Decision involvement was associated with the resources, economic and personal characteristics of a farmer. Both decision process and decision involvement make up for decision making behaviour.

The following steps were followed in constructing an index for measuring the decision making behaviour of farmers towards weather forecasts:

- Decision making behaviour was classified into decision process and decision involvement.
- After scrutinizing the decision areas and checking the relevancy with experts, some items were discarded. In all, 16 items were included in the decision process and a two point continuum was used with categories as 'self decision' and 'joint decision' with a score of 2 and 1 respectively.
- Seven items were included in the decision involvement under a two point continuum with categories 'Always' and 'Sometimes' having a score of 2 and 1 respectively.
- Total decision making behaviour for each respondent was obtained by adding the respective scores on decision process and decision involvement.
- Decision making behaviour index was calculated as follows:

$$\text{Decision making behaviour index} = \frac{\text{The obtained decision making behaviour score of the respondent}}{\text{Maximum possible decision making behaviour score}} \times 100$$

The respondents can be classified into three groups i.e., low, medium and high based on the minimum and maximum obtained scores.

¹Scientist, Central Research Institute for Dryland Agriculture, Saidabad P.O., Santoshnagar, Hyderabad - 500 059.

²Dean, Acharya N. G. Ranga Agricultural University, Rajendranagar, Hyderabad - 500 030.

RESULTS AND DISCUSSION

The finalized items of index of decision making behaviour of farmers towards weather forecasts are given in Table 1 and Table 2. The decision process consists of a total of 16 items dealing with crop production and other

activities. The items related to crop production are as follows: preparation of land, selection of crops, area to be sown, sowing operations, dose of fertilizer application, top dressing of urea, irrigation, intercultural operations, crop monitoring, application of pesticides, harvesting and

Table 1 Statements related to decision process of respondents in relation to agricultural weather forecasting

Sl. No.	Statements	Self-decision *	Joint Decision **
a) Crop Production			
1.	Preparation of land in advance to take advantage of early onset of monsoons		
2.	Selection of crops and cropping systems suitable for normal rainfall and delayed onset conditions, as recommended by Research Stations/Universities / Department of Agriculture		
3.	Area to be sown under each crop following distribution of rainfall		
4.	Sowing operations to be undertaken based on amount of rainfall and time of onset of monsoon		
5.	Deciding the time and dose of fertilizer application depending on stage of crop, rains received		
6.	Top dressing of urea if rains resume during pre-flowering period		
7.	Time and number of irrigation schedules based on rain and temperature		
8.	Intercultural operations like making ridges and furrows to enhance rain water conservation		
9.	Crop monitoring based on crop disease warnings, rain and cloudiness		
10.	Deciding application of pesticides / fungicides based on ETL of pests, relative humidity and wind speed		
11.	Determining the time and stage of harvesting the crop depending on stage of crop / duration and probable dry weather		
12.	Deciding processing and storage of post harvest produce considering humidity and rainfall pattern		
b) Other Activities			
13.	Diversification of farm enterprises under drought situation		
14.	Conservation of water, food and preservation of fodder when rainfall is deficient		
15.	Undertaking disaster mitigation measures to minimize losses		
16.	Working out relative benefits of forecast information in relation to farm operations		

* Self decisions were those taken by the respondent alone.

** Joint decisions were those taken by the respondents in consultation with family members or other farmers or relatives.

Table 2. Statements related to decision involvement of respondents in relation to agricultural weather forecasting.

Sl. No.	Statements	Always	Sometimes
1.	I analyze farming situations like location of farm, diversity of farm production etc., before taking a decision		
2.	I consult all appropriate people and information sources of weather forecasting before reaching a decision		
3.	I consider my income, expenditure and debts before arriving at a decision		
4.	I take decisions on the basis of my needs, values, belief, attitudes, efficiency and personality		
5.	I foresee all the consequences of my decision in advance		
6.	I always try to minimize risks but hold on to the decisions taken with confidence		
7.	I convince myself before taking a decision		

processing. The items included under 'other activities' relate to diversification, conservation, disaster mitigation measures and benefits of forecast information.

The finalized items of decision involvement consists of seven items dealing with analysis of farming situation, consultation with people, consideration of income, decision based on needs, foreseeing consequences, minimising risk and convincing of self.

Reliability of the index

Test-retest method was used to find out the reliability. In this method, the index was administered to 30 respondents with 20 days interval. The scores obtained were correlated and the correlation coefficient was found to be 0.91. Therefore, the index was highly stable and dependable to measure decision making behaviour of farmers towards weather forecasts.

Validity of the index

Validity of an index is a property that ensures that the obtained index measures the variables they are supposed to measure. The validity was examined with the help of content validity determining how well the content of the index represented the subject matter under study. As all possible items covering the universe of content were selected by discussion with experts, resource personnel and available literature on the subject.

CONCLUSION

The effective use of weather forecasts is influenced by the decision capacity of the farmers. Hence, an index to measure the decision making behaviour of farmers towards weather forecasts has been presented in this paper. By knowing the decision making pattern of farmers at different stages of crop management, decision capacities at critical responsive stages can be targeted and improved. Researchers can use this in future while conducting impact and evaluation studies on weather forecasts.

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