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EDITORIAL

Research and Extension Scholarship

The issue of improving the scholarship in research and extension is more important in the changing context of extension. The extension professionals of our country have to improve their scholarship and scholarly practices so that the discipline and practice of extension education will continue to be more relevant and effective in making impacts in agricultural and rural development. Majority of the present day extension professionals lack scholarly mentality and as a result, their professional outputs are far below the required standards. There is need for stronger drive to improve the quality of teaching, research and extension activities. As you know that, the idea of scholarship should not be interpreted too narrowly. Often people identify scholarship only with original research. In Scholarship Reconsidered, Boyer wrote: "Here, then, is our conclusion. What we urgently need today is a more inclusive view of what it means to be a scholar — a recognition that knowledge is acquired through research, through synthesis, through practice, and through teaching. We acknowledge that these four categories — the scholarship of discovery, of integration, of application, and of teaching — divide intellectual functions that are tied inseparably to each other. Still, there is value, we believe, in analyzing the various kinds of academic work, while also acknowledging that they dynamically interact, forming an interdependent whole. Such a vision of scholarship, one that recognizes the great diversity of talent within the professoriate, also may prove especially useful to faculty as they reflect on the meaning and direction of their professional lives" (pp. 24-25).Theodore R. Alterm (2003) has identified six key challenges for extension or outreach scholarship, which reflect where current scholarship is falling short. These challenges include: (1) achieving a scholarly mentality; (2) broadening our view of scholarship as philosophy and concept; (3) understanding the scholarship of engagement; (4) conducting research on the scholarship of engagement; (5) developing and implementing action proposals for change, and (6) developing tools to assess and document outreach scholarship.

The future of extension discipline and practices depends upon improvement of research and extension scholarship. Let us resolve to make necessary changes to achieve it.

Many of the articles in this issue are notable for their usefulness to or implications for extension. You will find a total of eleven research articles and eighteen research notes dealing with various issues such as adopter categorization, organics farming, leadership styles, development orientation, traditional media and impact of mechanization. I hope that you will have time to read and learn from them.

I sincerely extend my thanks to Dr.Premlata Singh, Dr.Rashami Singh, and Dr.R.N.Padaria for their untiring help in bring out this issue.

K.Vijayaragavan
Chief Editor

CONTENTS

Indian Journal of Extension Education

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A New Method of Adopter Categorization — PRIM (E) Model

B. S. Siddaramaiah[1] and D. A. Nithya Shree[2]

ABSTRACT

There is no consensus and uniformity in adopter categorization, although Rogers' model of five groups viz., innovators, early adopters, early majority, late majority and laggards is most commonly accepted one. As Rogers' model too had some limitations, the present study was taken up to validate and standardize this model to Indian conditions. The data were collected from three villages, where there was complete adoption of five selected innovations. All the innovations followed normality in their adopters distribution over time. Based on the statistical analysis of data, the adopters were classified into four groups viz., Pioneers, rationalists, imitators and murmurers and their typical characteristics described.

Adopter categorization has remained a potential area of diffusion research even after nearly six decades of research, beginning with Ryan and Gross (1943) study on hybrid seed corn. This is mainly because of the absence of a sound theoretical orientation and rational basis for discriminating adopters into various categories.

Danhof (1949), in an industrial sociology case study, categorised industries on the basis of earliness in adopting innovations into four groups viz., innovators, imitators, fabians and drones. Chaparro (1955) classified 96 plantation owners into four categories, viz., innovators, progresists, conservatives and traditionals, based on judgement given by experts. Barnett (1953) and Fligel (1957) used different approaches to classify adopters of new ideas in their study.

The inability of the researchers to agree on common semantic ground in assigning terminology led to a plethora of adopter descriptions. This motivated Rogers (1958) to work out adopters categories, based on rate of adoption. This model is mainly based on the assumption that adoption distributions are normal. Using two parameters of normal distribution namely mean and standard deviation, Rogers (1958) classified the adopters and five groups viz., innovators, early adopters, early majority, late majority and laggards.

Subsequent studies conducted in India and elsewhere have followed Rogers method of classification of adopters. Many studies have revealed that adopter categorization done by Rogers does not remain the same for Indian conditions (Motilalkar, 1967; Misra, 1968; Ramegowda, 1983; Singh, 1994), while others are in partially consistent with him (Vijay Mahajan, 1990; Ramakrishna Rao, 1994).

The present investigation was conducted with the following objectives:

(i) To develop and standardise an adopter categories model suitable for Indian conditions, and

(ii) To investigate the characteristics of different adopter categories.

METHODOLOGY

Selection of innovations

Ever since independence, a large number of improved

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varieties have been released in various crops and they have played a dominant role in Indian Agriculture. Hence, it was decided to select improved varieties as innovations in the present study. The following criteria were laid out for selection of the improved varieties.

(a) The variety should have been released about 8-10 years prior to the conduct of the study by any Agricultural University or Government/quasi government research organisation.

(b) Majority of the farmers in the social system should have adopted the varieties under consideration.

Based on these criteria, the improved varieties selected as innovations were: (i) Indaf-9 ragi, (ii) Mandya Vijaya Paddy, (iii) TTB-7 Redgram, (iv) Mudigere-1 cardamom and (v) Kaveri Coffee.

Selection of Respondents

The study was conducted in three purposively selected villages in Kolar, Mandya and Chikkamagalore districts, where these crops were extensively grown. The villages thus selected were Hosur (Kolar) for Ragi and Redgram; Panakanahally (Mandya) for Paddy and Banakal (Chikkamagalore) for Coffee and Cardamom. All the farmers in these selected villages were interviewed to investigate their adoption behaviour. The total number of adopters came to 80 for ragi, 59 for red gram, 72 for paddy, 52 for cardamom and 69 for coffee.

Measurement techniques and Statistical tests used

The rate of adoption was measured in terms of number of farmers adopting the innovations over a period of time. For this purpose, the respondents were asked to indicate the calendar year in which they adopted the innovation for the first time. The number of farmers who adopted the innovation in the same year was summed up to constitute frequency (f). This procedure was continued for all the years and cumulative frequency (cf) was worked out.

A standard score was computed by subtracting the mean ($\bar{x}$) from an observation (x) and dividing by the standard deviation (S) of the distribution. Whereas, U represents a standard score, the formula may be expressed as:

$$U = \frac{(x - \bar{x})}{S}$$

An advantage of standard score is that it is possible to add, subtract or place weightages on each adoption item, even though the interval of time in which adoption takes place may vary. A standard score is a relative type of score, which expresses the individuals position in relation to other members of the social system and is pure or free from the original unit of measure.

Based on the frequency and cumulative frequency, adoption curves were drawn and tested for normality using chi-square as goodness of fit. Analysis of variance test was employed, wherever necessary, to know the significant difference between two or more mean values.

RESULTS AND DISCUSSION

Normality of the Distribution: The normality of adopter curves was investigated for each innovation studied separately.

The distribution of 80 adopters of Indaf-9 Ragi over time was found to be normal, as indicated by the chi-square test for goodness of fit, since the calculated chi-square value of 12.05 was less than the table value at 0.01 level (18.84). The chi-square value in case of Mandya Vijaya Paddy (15.24), TTB-7 Redgram (5.60), Kaveri Coffee (13.28) and mudigere-1 Cardamom (14.98) also indicated the normality of adopters distribution curves. Hence, all these five innovations were considered for categorization of adopters into groups.

Categorization of Adopters into Groups Adopters of an innovation can be classified into different groups based on certain criteria. Rogers (1958) classified the adopters into five groups, using mean and standard deviation. The present study had an objective of verifying Rogers' model empirically and hence the following methodology was employed.

At the first instance, the adopters were classified into the five categories, following Rogers (1958) methodology. The distribution of adopters in to five categories is shown in Table 1.

As it could be observed from the data in the table, the percentage of adopters falling into the category of innovators in the present study is 3.0, while the percentage of early adopters, early majority and late majority observed were 12.0, 35.0 and 32.0, respectively. The strength of laggards in the present study was 18 per cent.

Table 1: Distribution of adopters into five categories - Innovation-wise and overall

Name of the adapter categories	Criteria used	Indaf-9 ragi	Mandya Vijaya	TTB-7 redgram paddy	Kaveri coffee	Mudigere-1 cardamom	Total adopters	%
Innovators	< (x-2S)	0	0	0	5	4 (7)	9 (7.7)	3.0
Early adopters	(x-2S) to (x-1S)	7	19 (9)	4 (26)	5 (8)	4 (7)	39 (7.7)	12.0
Early majority	(x-1S) to x	42	15 (52)	22 (21)	18 (44)	16 (26)	113 (30.8)	35.0
Late majority	(x) to (x+1S)	16	25 (20)	12 (35)	35 (24)	16 (51)	104 (30.8)	32.0
Laggards	> (x+1S)	15	13 (19)	12 (18)	6 (24)	12 (9)	58 (23.0)	18.0
Total		**80**	**72**	**50**	**69**	**52**	**323**	**100.0**

Note: Percentages of adopters are presented in the paranthesis

Steps Involved in Testing Rogers' Model of Adopter Categories

(a) Testing of Model-1 (Rogers Model): A comparative picture of percentage of adopters observed in Rogers' study and the present study is given in Table 2.

Table 2: Percentage of adopters observed in the five groups according to Rogers and the present authors

Group	Category	% of adopters in Rogers study	% of adopters in the present study
I	Innovators	2.5	3.0
II	Early adopters	13.5	12.0
III	Early majority	34.0	35.0
IV	Late majority	34.0	32.0
V	Laggards	16.0	18.0

There are three major lacunae in the Rogers' method of adopter categorization which are as follows:

1. There is no symmetry in the classification, as there are three groups formulated on one side of the mean and two groups on the other side.

2. The significant difference between various groups is not tested statistically.

3. The classification of the adopter categories is done based on a single innovation.

Among these, the third lacuna cited above has been overcome by selecting multiple innovations in the present study. As a step to examine the relevancy of second criticism, it was decided to test whether there were significant differences in the average time taken for adoption by the five categories of adopters. The average time taken for adoption of innovation was calculated in terms of years, category-wise and the details are given in Table 3.

Table 3: Average number of years taken for adoption by each category of adopters

Adopter category	Average number of years taken for adoption
I	2.4^{a}
II	2.4^{a}
III	4.6^{b}
IV	7.4^{c}
V	9.05^{d}

F = 123.5**, ** = Significant at 1% level of probability; Note : Means with the same superscript are not statistically significant

This data was subjected to one-way analysis of variance. The highly significant 'F' value, implied that the average time taken by the various adopter categories

differed significantly. Further, the values of critical difference calculated indicated that there was no significant difference between the I and II categories, while the means of all other combinations differed significantly. This leads to the conclusion that Rogers' method of classification of adopter categories into five groups is not justifiable under Indian conditions. Hence, it may be desirable to combine groups I and II and bring about a balance in the distribution of adopter categories on both sides of mean.

(b) Testing of the Model 2: One of the major criticisms on the Rogers' method of adopter categorization is that there is no symmetry in the grouping. It is also possible to classify the adopters into six groups, using mean and standard deviation, as detailed in Table 4.

Table 4: Categorization of adopters into six groups based on mean and standard deviation

Adopter category	Criteria	% of adopters observed	Avg. no. of years taken for adoption
I	< (x-2S)	3.0	2.4[a]
II	(x-2S) to (x-1S)	12.0	2.4[a]
III	(x-1S) to x	35.0	4.6[b]
IV	(x) to (x+1S)	32.0	7.44[c]
V	(x+1S) to (x+2S)	16.2	9.0[d]
VI	> (x+2S)	2.0	9.6[d]

Although this method of classification has not been used by Rogers, it was found desirable to extend his analogy of classification and test the six group model. The time taken for adoption of the innovations by different categories was analysed with the help of 'F' test. The results indicated that there was no significant difference in the time taken for adoption in respect of the first two categories as well as the last two categories.

These results suggest that a four group classification would be ideal. Hence, an attempt has been made to develop the third model with four groups of adopters.

(c) Testing of the Model 3: The model consists of four categories by combining the first two categories of the previous model into one and the last two categories into another (Table 5).

Table 5: Categorization of adopters into four grou based on mean and standard deviation

Adopter category	Criteria	% of adopters observed	Avg. no. of year taken for adopti
I	< (x-1S)	15.00	2.4[a]
II	(x-1S) to x	35.00	4.6[b]
III	x to (x+1S)	32.0	7.4[c]
IV	> (x+1S)	18.0	9.05[d]

The average time taken by the first group to ac the innovations was 2.4 years, while it was 4.6 and years for the second and third groups, respectively. last group took nearly 9 years to adopt the innovat studied. The values of critical differences indicate tha the means differ significantly from each other. This imp that the four group categorization of the adopters is fo to be rational and realistic to the conditions prevailing i study area.

Hence, these four groups were considered as star adopter categories and they were named as Pion Rationalists, Imitators and Murmurers. These categ and their percentage are diagrammatically represent Figure 1.

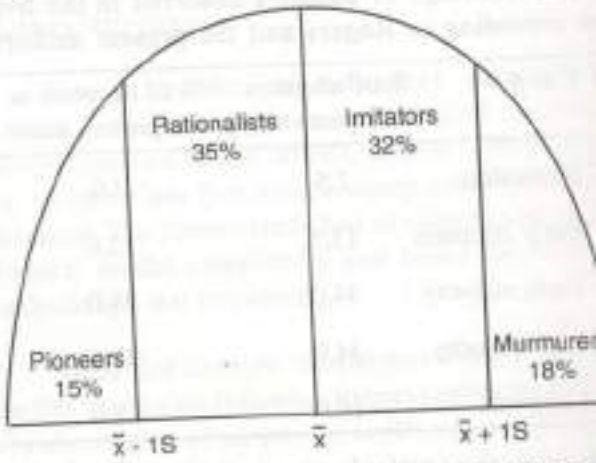

Fig. 1. Distribution of adopter categories in the PRIM(

4. Characteristics of Adopter Categories

Nine typical characteristics of these categories were investigated employing analysis of and the results are summarized in Table 6.

Table 6: Characteristics of adopter categories

Sl.No.	Characteristics	Pioneers	Rationalists	Imitators	Murmurers
1.	Age (in years)	39.0^a	39^a	37^b	33^b
2.	Education (in scores)	5.0^a	3.5^b	3.8^b	3.6^b
3.	Farm size (in acres)	44.0^a	25.0^b	18.0^c	11.0^d
4.	Mass media participation (in scores)	5.3^a	2.8^b	3.3^b	2.8^b
5.	Cosmopolite orientation (in scores)	6.4^a	5.5^b	5.6^b	4.7^c
6.	Risk orientation (in scores)	17.5^a	16.7^b	15.4^c	15.0^c
7.	Economic motivation (in scores)	19.85^a	17.7^b	18.0^b	18.0^b
8.	Scientific orientation (in scores)	9.47^a	8.55^b	8.6^b	8.0^b
9.	Opinion leadership (in scores)	4.7^a	4.0^a	3.75^a	3.3^a

Note: Means with the same superscript are not statistically significant

Description of PRIM(E) Adopter Categories Model

The new adopter categories model developed, based on the findings of the present study, is designated as PRIM(E) model.

(a) Pioneers: This first group, resembling innovators category of Rogers' Model, consists of 15 per cent of adopters. They are venturesome and explorers of new ideas. They are originators in testing and adopting any new ideas they come across. They are usually middle aged and attain the highest educational level among all other adopters. They also own larger farms, which enables them to exhibit high risk bearing capacity. They possess greater mass media participation, economic motivation and scientific orientation.

(b) Rationalists: This group, which constitute an highest of 35 per cent is sensible and try to explain everything by reasoning. They adopt new ideas only after ascertaining their merits and utility. They are also middle aged like pioneers but possess slightly lower educational status. They own medium size farms and are less cosmopolites. They exhibit slightly lesser economic motivation, scientific orientation and mass media participation than pioneers.

(c) Imitators: As the name indicates, they imitate the adoption behaviour of the first two categories. They constitute the second largest group i.e., 32 per cent, only next to rationalists. They are younger in age when compared to the other two categories, possess small farms and exhibit low risk orientation.

(d) Murmurers: This group consisting of 18 per cent of adopters, is mainly represented by indifferent farmers with subdued expression of discontent and grieving about one thing or the other. They are younger with small farms and low educational status.

As this model has identified two groups of adopter categories on either side of the mean, the distribution is said to be in equilibrium. Hence, the model is called as PRIM (Equilibrium) model of adopter categories.

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Organic Farming in Punjab — A Case Study

Jaswinder Kaur[1] and Rajinder Kaur Kalra[2]

ABSTRACT

The study was undertaken to know the reasons for opting organic farming as a method and find out the problems faced by organic farmers in selected four districts of Punjab (Ludhiana, Patiala, Bathinda and Muktsar). The data were collected from 60 farmers who were engaged in organic farming under Punjab Agro Foodgrain Cooperation (Punjab Agri. Export Corporation) and Sutlej Power Pvt. Ltd. The findings of the study showed that majority of the respondents were of middle age group followed by the young age group; matriculate; had 8-46 acres of operational landholding, 1-6 acres of area under organic farming and per acre gross income of Rs. 18,959-23,462 per annum from organic farming. The major reasons for opting organic farming reported by the respondents were easy marketing (65%), additional benefits (certification of farm and premium) (43.33%), availability of inputs and technical guidance from firms (48.33%). The major problems such as lack of vermicompost, lack of training, low yield and lack of open market for organic farming were pointed out by all the respondents.

Organic farming relies on natural products and organic resources. "It is a holistic production management system, which promotes and enhances agro-ecosystem health including biodiversity, biological cycles and soil biological activity" (Bajwa 2003).

In Punjab, agriculture has made remarkable progress since mid 1960's but now it has reached a stage beyond which sustaining the growth rate is an uphill task. Considering the adverse effects of the green revolution on the natural resources of Punjab, there is a need to develop strategy for sustainable agriculture (Kolar and Butter 1999). Organic farming is an option to sustain agricultural growth and avoid adverse environmental effects. It can be defined as production system, which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators and livestock feed additives.

There are two firms named Sutlej Power Pvt. Ltd and Punjab Agro Foodgrain Corporation (Punjab Agri. Export Corporation Ltd.) which were encouraging the farmers to practice the organic farming and provide some facilities in cultivating the crops organically. Therefore, it was thought important to know the types of farmers engaged in organic farming, background and functioning of the concerned private firms, reactions of the farmers regarding organic farming and facilities given by the private firms. What are the reasons for opting organic contract farming and to identify the problems faced by the farmers along with reasons for practicing organic farming.

METHODOLOGY

The study was undertaken in four purposively selected districts of Punjab, viz. Ludhiana, Patiala, Bathinda and Muktsar, as. maximum number of the organic farmers were identified in these districts. A list of 115 organic farmers who were engaged in organic farming in selected districts of Punjab was prepared with the help of Punjab Agro Foodgrain Corporation (Punjab Agri Export Corporation

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Ltd.) and Sutlej Power Pvt. Ltd. Out of these 115 organic farmers, a sample of 60 farmers was selected from these four districts by random sampling technique using proportional allocation. The tabulated data were analysed with the help of frequencies, percentages and cumulative cube root method.

RESULTS AND DISCUSSION

It was found that majority of the respondents were of middle age group which were followed by the young age group. Under educational level, nearly half of the respondents were matriculate. Only three respondents were illiterate. Majority of the respondents had 8-46 acres of operational land holding whereas area under organic farming varied between 1-18 acres. A large number of respondents had area under organic farming between 1-6 acres. The range of per acre income from conventional farming was Rs. 22000-38000 per annum. Approximately half of the respondents earned as much as Rs. 22000 - 28400 per annum whereas per acre income from organic farming varied between Rs. 7500 - 27500 per annum. Majority of the respondents earned as much as Rs. 18959-23462 per annum. Nearly half of the respondents had two years experience in organic farming. More than one third of the respondents (38.33%) had one year of organic experience. A large number of respondents (78.34%) did not participate in any social organization whereas only 3.33 per cent of the respondents had membership of two organizations. Majority of the respondents fell under the medium economic motivation (43.33%), risk bearing capacity (53.33%) and innovativeness category (56.67%).

Type of soil used for organic farming: Majority of the organic farmers (53.34%) had loamy soil, followed by sandy loam soil (38.33%) and sandy soil (8.33%) It was noticed that loamy soil is better for organic cultivation.

Source of irrigation and quality of water

More than three-fourth of the respondents (76.67%) had tubewells at their farms for irrigation whereas 21.66 per cent of the respondents were having both tubewell as well as canal water as a source of irrigation. For the quality of irrigation water majority of the respondents (46.67%) had normal quality of irrigation water, followed by 45 per cent of respondents who got both normal and saline quality of irrigation water. This situation takes place because they had land holdings situated at different places. Only 8.33 per cent of the respondents had saline water quality which lowers the yield of organic produce.

Background and functioning of the concerned firm

There are two firms namely Punjab Agri. Expo Corporation and Sutlej Power Pvt. Ltd. Which we promoting organic farming and encouraging the farme for the same. Both the firms were emphasizing the variet diversification. Sutlej Power Pvt. Ltd firm had made th registered contract whereas Punjab Agri Expo Corporation had made the oral contract with the farme for organic farming. Both were supplying the inputs to th farmers in the form of seeds, biofertilizers an biopesticides. Technical guidance and marketing faciliti were also provided by both the firms. Variet diversification, export of organic produce and expectatio of maximum profit from organic produce at state, nation and international level were the major motives of both th firms for starting the organic farming. Main problems face by firms were lack of farmers awareness regarding organi farming, breakdown of agreement by the farmers and advic given by the firms were not followed by the farmers properl

Reactions of the farmers regarding organic farmin and facilities given by the firms

Satisfaction regarding contract organic farming

All the farmers who received the inputs were satisfie with the seeds, biofertilizers, biopesticides, growth regulator technical advice and marketing facilities. Majority of th respondents (71.67%) were dissatisfied with the premiu structure of the firm and standards prescribed by firm fo organic produce. The reason for dissatisfaction may b that the organic farming involved high cost of productio and its yields are low.

Most of the respondents (68.33%) realized tha organic farming is laborious and time consuming. Aroun half of the respondents (53.33%) reported that problem were identified and solved by the firms regarding organi farming, 38.33 per cent of respondents stated that recognitio was given in the form of certificates and thei trustworthiness was increased by the firms. Use o appropriate technical methods by the firms was reporte by 31.66 per cent. Organic farm literature was received a appropriate time in the form of pamphlets, folders, diarie and booklets as pointed out by 35 per cent of th respondents, whereas 30 per cent of the respondents foun the firm consultants to be professional and technically sound

Crop rotation

The study revealed that the majority of the respondent

(71.67%) followed Cotton-Durum wheat rotation while Basmati-Durum wheat rotation was followed by 16.66 per cent of respondents. Only 11.67 per cent of the respondents followed the Basmati-Gram-Pea rotation.

Crops and area under organic farming

It was found that during *kharif* season Basmati covered 93.50 acre of area under organic cultivation and 273.50 acre area covered by organic cotton of the selected farmers. In *rabi* season, Durum wheat covered 317 acres of land whereas 43 and 6 acres of land was covered by gram and pea cultivation respectively.

Acreage dynamicity and acreage shift in organic farming

The study revealed that for acreage dynamicity and acreage shift in organic farming, 70 per cent of respondents exhibited consistency under acreage shift and 18.33 per cent of respondents wanted to increase the area under organic farming in next year about 11.67 per cent of respondents wanted to discontinue.

Reasons for discontinuing organic farming in the next year

It is clear from Table 1 that main reasons for discontinuing were lack of financial aid, low yield and weeding problem which was followed by lack of open marketing for sale (85.71%), unfit soil (57.14%), more attack of insects and diseases (57.14%) and unfavourable weather conditions (42.85%) for organic farming.

Reasons for practicing organic farming

Majority of the respondents (65%) opted the organic farming for easy marketing, followed by the respondents (61.67%) who opted it only due to contract made by the firms and 56.67 per cent of the respondents adopted due to demand of organic produce, while 55 per cent of the respondents wanted to increase their status by adopting organic farming. This was followed by income security (53.33%), soil health improvement (51.67%), timely availability of inputs and technical advice from firms (48.33%), additional benefits (premium or certification) (43.33%), human health consciousness (23.33%) and environmental consciousness (36.67%). Nearly one third of the respondents (21.67%) opted organic farming because they thought that they can save the ground water by adopting organic farming (Table 2).

Table 1 : Distribution of the respondents according to the reasons for discontinuing organic farming in the next year

(n = 7)

S.No.	Reasons	Frequency*	%
1.	Lack of financial aid	7	100.00
2.	Low yield	7	100.00
3.	Weeding problem	7	100.00
4.	Lack of open marketing for sale	6	85.71
5.	Laborious in nature	5	71.42
6.	Unfit soil	4	57.14
7.	Attack of insects and diseases	4	57.14
8.	Unfavourable weather	3	42.85

*Multiple response

Table 2: Distribution of the respondents according to the reasons for practicing organic farming

(n = 60)

S.No.	Reasons	Frequency*	%
1.	Want more income	26	43.33
2.	Increased status	33	55.00
3.	Certification of farm	26	43.33
4.	Human health consciousness	14	23.33
5.	Soil health improvement	31	51.67
6.	Environmental consciousness	22	36.67
7.	Additional benefit (premium or certification)	26	43.33
8.	Ground water saving	13	21.67
9.	Easy marketing	39	65.00
10.	Only because of contract	37	61.67
11.	Availability of technical advice timely	29	48.33
12.	Income security	32	53.33
13.	Timely availability of inputs	29	48.33
14.	Demand of organic produce	34	56.67

*Multiple response

Problems faced by the farmers in practicing organic farming

It is clear from Table 3 that problems were classified into four categories viz. input problems, information seeking and sharing problems, socio-cultural problems and miscellaneous problems.

Major problems in organic farming reported by all the respondents were lack of vermi compost, lack of training, low yield and lack of open local market, followed by lack of specific biofertilizers for specific crops (95%), more insect-pest and diseases attack (90%), high cost of cultivation (80%), lack of resistant varieties (71.67%), nonavailability of biofertilizers and biopesticides (55%). The problems such as lack of relevant literature (65%), less contact by firm consultants (71.67%), small size of land holdings (61.67%), non-remunerative prices (53.33%), late payment (46.66%), unfavourable weather (15%) and risky venture (10%) were also reported by the respondents. These problems are in line with Pal *et al.* (2003) who reported the biophysical and biological constraints in organic farming.

CONCLUSION

Organic farming is a holistic production management system. It was found that majority of the respondents were satisfied with contract organic farming. Technical guidance and inputs were provided by firms. The total area under organic farming in selected districts was 14.98 per cent of the total operational land holding of the selected respondents and was likely to be increased marginally to 15.14 per cent in next year by them. The major reasons for opting organic farming reported by the respondents were easy marketing, additional benefits (certification of farm and premium), availability of inputs and technical guidance from firms. As many as 11.67 per cent of the respondents wanted to discontinue organic farming in the next year. The reason

Table 3 : Distribution of the respondents according to the problems faced in organic farming

(n = 60)

S.No.	Problems	Respondents* Frequency	%
1.	Input problems		
	(a) Lack of vermi compost	60	100.00
	(b) Lack of specific biofertilizers for specific crop	57	95.00
	(c) Lack of resistant varieties	43	71.67
	(d) Non-availability of biofertilizers	33	55.00
	(e) Non-availability of biopesticides	33	55.00
	(f) Non-availability of seeds in time	11	18.33
2.	**Information seeking and sharing problems**		
	(a) Lack of training in organic farming	60	100.00
	(b) Lack of relevant literature	39	65.00
	(c) Frequency of contract by firm consultants with farmers is less	43	71.67
3.	**Socio-cultural problems**		
	(a) High cost of cultivation	48	80.00
	(b) Low yield	60	100.00
	(c) Small size of land holdings	37	61.67
	(d) Attack of insect-pest and diseases more	54	90.00
	(e) Lack of open local markets	60	100.00
4.	**Miscellaneous problems**		
	(a) Non-remunerative prices	32	53.33
	(b) Late payment by firms	28	46.67
	(c) Unfavourable weather	9	15.00
	(d) Risky venture	6	10.00

*Multiple response

for their discontinuance were: lack of financial help, low yield and weeding problem. Lack of vermicompost, low yield, lack of training, lack of specific biofertilizes for specific crops were the major problems faced by respondents. Lack of awareness regarding organic farming and breakdown of agreement by the farmers were the problems faced by both the firms. Hence, there is a need to solve these problems by organising organic farming association which can initiate and work out certification of seed and produce and compete the marketing. Government should also take initiative in promoting the organic farming in the state. Research based trials need to be organized by the agricultural institutes and based on the results of trials recommendations should be made.

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Development Orientation of Watershed Project Functionaries

Lakhan Singh[1] and B. P. Sinha[2]

ABSTRACT

The Doon Valley Integrated Watershed Management Project initiated in 1993 was designed to find ways of building on the skills, enthusiasm and knowledge of farmers with participatory approach and institution building. A study to investigate the development orientation of project functionaries revealed that the project staff are favourably disposed to physical targets as against quality performance. People's participation is not valued and project activities are considered as dole for the village people while projecting themselves as 'mai-baap' to the project functionaries. When examined for dimensions of empowerment, project functionaries were found to be low on initiative and self esteem oriented behaviour; in fact, they tend to pursue routinised behaviour. This was creating powerlessness and dependency in people.

The Doon valley integrated watershed management project initiated in June 1993, envisaged to arrest and as far as possible, reverse the ongoing degradation of the Doon valley ecosystem, improve rural living standards and ensure involvement of rural people in the process. This project was launched by the Government of Uttar Pradesh with technical and financial assistance from European Commission, which focussed on participatory and integrated approach to watershed management.

The project was designed to find ways of building on the skills, enthusiasm and knowledge of farmers with participatory approach and institution building. The success of this project therefore depends on the extent to which the people are motivated and mobilized for group action and community participation and also the extent to which project functionaries are sensitive to people's needs are capable to provide an enabling style of leadership empowering local people.

Thus, a study was conducted during 1997-98 with the objective to investigate into the development orientation of the project functionaries. The organizational forces, which are supposed to be facilitating or constraining the project functionaries' performance were specifically explored. The perceived climate of the organization, the development functioning style of the project functionaries, their style of empowerment and their leadership style were particularly addressed to. Their 'faith in the people's capabilities in choosing their future and working to achieve it' was also examined.

METHODOLOGY

The study was conducted in three divisions (Kalsi, Rishikesh and Dehra Dun) of the Doon valley integrated watershed management project. Data for the research were collected from 32 project staff with the help of a structured schedule developed for the purpose through personal interviews and informal interactions. The data were analyzed, interpreted and reflected upon. The details about various scales included in the schedule and scoring patterns are as under:

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Perceived condition of work (PCOW): PCOW refers to one's attitude towards his work and work place. This was measured with the help of an inventory developed for the purpose (Mehta, 1989 and 1997).

Development functioning: Development functioning provides ones' perceptions regarding functioning of public systems and development programmes. This perception was measured with the help of an inventory, which contained twenty-one items or statements.

Leadership style: Leadership style refers to values preferred in responding to the given work and development situations. The L-scale consists of ten work and development situations, in each situation, four responses are provided in the scale. One has to respond to only one of the given choices, which best represents his opinion and thought. The four given action choices represent the four styles or values in functioning i.e., directive, prescriptive, facilitating and enabling. Each of the four styles gets a score between 0-10, i.e., the number of times a particular style (response) is checked under the ten given situations. The scores would thus indicate a pattern of leadership depending on the scores obtained by a respondent on the ten given dimensions.

Empowerment: Empowerment refers to ones' own dominant thoughts and tendencies towards self-efficacy while working at the work place, in the field or at home. Such thoughts or tendencies represent a continuum of sense of efficacy to sense of powerlessness. This empowerment powerlessness universe has three major dimensions: Autonomy vs. Dependence, Self esteem vs. Self Depreciation, Reflective vs. Repetitive Behaviour. This is measured with the help of an inventory consisting of 15 work/job related statements, developed for the purpose.

Faith in People (FIP): Faith in people refers to socio-political outlook of the project staff and the faith they repose in people for development activities. This was measured with the help of an inventory developed for the purpose (Mehta, 1989). The inventory contains 10 statements on misanthropy, sense of political powerlessness, sense of political normlessness and conservative-dogmatism. Their responses were obtained on a five point scale. The point on the scale at the extreme right i.e., 'strongly disagree' was the most favourable level of faith and vice-versa.

RESULTS AND DISCUSSION

Perceived Work Climate

The success of the project will depend on the extent to which the project provides its grassroots functionaries an enriching and nurturing quality of work life. The work life perceived by the project staff was rated on four dimensions: perceived influence, perceived amenities, nature of job and supervisory behavior. The scores obtained on this scale are reported in Table 1.

The data in Table 1 reveal the project staff's dissatisfaction with amenities provided to them by their organization. Out of the maximum obtainable score of 30, the mean score of their perceived amenities was found to be 13.7, which is less than half of the obtainable score. The next higher mean score was obtained in case of perceived influence which is very close to the mid value of the scale and can be treated as medium level of satisfaction with the influence that they are able to exert in decision making process in the organization. So far the nature of job and supervisory behavior are concerned the project functionaries' perception was remarkably good. They appeared to be reasonably satisfied with the job they are doing and their dealings with the superiors. The overall condition of work as perceived by them, therefore, does not appear to be counter-productive.

Development Functioning

The project staff were administered a scale as reported in the 'methodology' to measure their faith in the functioning of the government development departments. The scale has seven dimensions each containing statements, which were rated on a 4-point scale. The seven dimensions are as follows:

1. Caste like rigidity: refers to the tendency present in public system which is symptomised as inflexibility based on perceived self pompousness and rigidity discriminating self from others. This does not permit the administrator or change agents of development programmes to effectively empathise with the client system and base their actions on logic completely deprived of spontaneity.

2. Centralization: refers to some sort of self-isolation, which does not yield space to others and directs all the actions with absolute authority. They are swollen headed decision makers and prescribers.

Table 1: Perceived conditions of work life of project functionaries

S.No.	Dimension	Frequency	Percentage	
1.	Perceived influence			
	Low (<mean - 1SD)	5	15.62	Mean = 19.438
	Medium (mean ± 1SD)	22	68.76	SD = 4.008
	High (>mean + 1SD)	5	15.62	Range 10-28
2.	Perceived amenity			
	Low (<mean - 1SD)	7	21.87	Mean = 13.72
	Medium (mean ± 1SD)	18	56.36	SD = 5.088
	High (>mean + 1SD)	7	21.87	Range = 6-23
3.	Nature of Job			
	Low (<mean - 1SD)	7	21.88	Mean = 22.47
	Medium (mean ± 1SD)	21	65.62	SD = 4.008
	High (>mean + 1SD)	4	12.50	Range 16-30
4.	Supervisory behavior			
	Low (<mean - 1SD)	7	21.88	Mean = 22.94
	Medium (mean + 1SD)	20	62.50	SD = 2.884
	High (>mean + 1SD)	5	15.62	Range 17-28
5.	Total			
	Low (<mean - 1SD)	6	18.76	Mean = 78.28
	Medium (mean ± 1SD)	21	65.62	SD = 12.622
	High (>mean + 1SD)	5	15.62	Range 51-109

Table 2: Development functioning of the project functionaries

	Dimension	Frequency (N=32)	Percentage	
1.	Caste like rigidity			
	Low (<mean - 1SD)	3	9.37	Mean = 6.344
	Medium (mean ± 1SD)	24	75.00	SD = 1.677
	High (>mean + 1SD)	5	15.63	Range 3-10
2.	Centralization			
	Low (<mean - 1SD)	5	15.625	Mean = 6.500
	Medium (mean + 1SD)	22	68.75	SD = 1.191
	High (>mean + 1SD)	5	15.625	Range = 4-9
3.	Number and target syndrome			
	Low (<mean - 1SD)	3	9.37	Mean = 7.750
	Medium (mean ± 1SD)	25	78.12	SD = 1.778
	High (>mean + 1SD)	4	12.50	Range 4 -12
4.	Lack of community participation			
	Low (<mean - 1SD)	4	12.50	Mean = 7.531
	Medium (mean ± 1SD)	21	65.62	SD = 2.000

High-(>mean + 1SD)	7	21.88	Range 4 -11
5. Rentier-Dole syndrome			
Low (<mean - 1SD)	4	12.50	Mean = 7.594
Medium (mean ± 1SD)	23	71.87	SD = 1.663
High (>mean + 1SD)	5	15.63	Range 4 -11
6. Tokenism			
Low (<mean - 1SD)	10	31.25	Mean = 6.406
Medium (mean ± 1SD)	21	65.62	SD = 1.365
High (>mean + 1SD)	1	3.13	Range 4 -10
7. Paternalistic manipulation			
Low (<mean - 1SD)	3	9.37	Mean = 7.562
Medium (mean ± 1SD)	24	75.00	SD = 1.684
High (>mean + 1SD)	5	15.63	Range 4 -11
Total			
Low (<mean - 1SD)	4	12.50	Mean = 49.156
Medium (mean ± 1SD)	21	65.62	SD = 7.633
High (>mean + 1SD)	7	21.88	Range 33 - 62

3. Number and target syndrome: refers to the officials' concern for physical evidence of work rather than the qualitative outcome of work, which implies impersonal involvement and almost complete lack of concern for well being of others.

4. Lack of community participation: refers to dissociating clients from the activities carried out for them. It believes in the doctrine that development programme is 'of the government', 'for the people', 'by the beaurocracy' and not *"of the people, for the people, and by the people"*. It is because of this that the development programmes often miss to hit the goal and always seriously suffer from sustainability.

5. Rentier-Dole syndrome: refers to the lack of seriousness of purpose. It reflects the attitude of public functionaries towards development as an act of compassion born out of pity for the people who are perceived as helpless, incapable, miserable and so on.

6. Tokenism: refers to public functionaries' lack of faith in development programmes and activities. They are there because they need the job for themselves and they somehow manage to pass time and keep their job.

7. Paternalistic manipulativeness - Mai-baap syndrome: refers' to exploitation of work situation by the public functionaries to satisfy their need to feel big by making others feel small. It is an act of manipulation of situation to make others seek dependence, support, undue favour etc. so that own ego may get a boost by assuming artificial power.

All these components of development functioning are counter-productive. Their presence impedes and absence promotes development. The main scores of all the seven components and the overall development functioning score with distribution of respondents around mean + 1SD are reported in Table 2.

The data reported in Table 2 appear to be quite interesting. The average agreement level of the respondents with the dimensions like 'number and target syndrome', 'lack of community participation', 'rentier dole syndrome' and 'paternalistic manipulation" is quite high (obtained score is above 7 out of the total obtainable score of 12). This clearly communicates that the project staff are favorably disposed to physical targets as against quality performance. They do not value people's participation in the project activities. They treat project activities as dole for the village people and have a tendency to achieve self-gratification by projecting self-image as 'mai-baap' to the project beneficiaries.

This psychological state of being, particularly, for change agents like the project functionaries, is seriously counter-productive and is certainly not tuned to promote people's participation in the project activities for community

well being. The mean score on the other dimensions of the scale like 'caste like rigidity', 'centralization', and 'tokenism', obtained by the respondents were little lower, yet high enough indicating unfavorable orientation towards the development functions which they perform. Even in these cases, the average score was found to be little above the mid value of the obtainable score. This is a real serious situation and it requires special efforts to be made, may be through appropriately designed training programmes to reorient their attitudes towards social well being of the people for whom this project is being run.

Empowerment

The success of the project will depend on the extent to which the project staff empowers the people for their participation and involvement in the project. The project staff were administered a scale as already reported in the 'methodology' to measure the psychological orientation of the project functionaries towards empowering people. There were four components in this scale, which are as follows:

1. Autonomy: represents one's subject hood which is reflected in one's actions, initiative, hope of success and problem solving, where as the dependency represents object hood which is reflected in one's behavior related to conformity, fear of failure, lack of self confidence, and problem avoiding.

2. The self esteem: indicates the extent to wh one is innovative and creative while self depreciatio reflected in behavior related to safe playing and securi

3. The concept of **reflective behavior** indicates *actor role* for the work, which is challenging and qua seeking while the repetitive behavior indicates *pawn r* which has a tendency for routine performance.

Each of these components represents a continu from empowering to disempowering. Higher the sco greater would be the positive tendency towa empowerment and lower the score greater would be opposite (negative) tendency. The score on the th components and the overall score are reported in Table

The data reported in Table 3 reveal that the me scores of project functionaries on initiative and reflecti behavior were poor. However, the mean score on se esteem was relatively better. The total obtained scor ranged from 15.53 to 17.53 out of an obtainable score 25. The mean scores were towards the central level, i very close to the mid value indicating thereby that the proje functionaries were psychologically not strongly orient towards empowerment. The distribution of proje functionaries on the scores of these three components well as on the overall score reveal that the tendency w towards the negative end of the continuum. It refers th

Table 3: Empowerment of the project functionaries

	Dimension	Frequency (N=32)	Percentage	
1.	Initiative vs Dependence			
	Low (<mean - 1SD)	9	28.12	Mean = 16.53
	Medium (mean ± 1SD)	20	62.50	SD = 1.586
	High (>mean + 1SD)	3	9.38	Range 14-21
2.	Self esteem vs Self Depreciation			
	Low (<mean - 1SD)	5	15.62	Mean = 17.531
	Medium (mean + 1SD)	23	71.88	SD = 2.314
	High (>mean + 1SD)	4	12.50	Range = 14-24
3.	Reflective vs Repetitive behavior			
	Low (<mean - 1SD)	6	18.75	Mean = 15.53
	Medium (mean + 1SD)	23	71.88	SD = 2.110
	High (>mean + 1SD)	3	9.37	Range = 12-21
4.	Efficacy vs Powerlessness			
	Low (<mean - 1SD)	7	21.88	Mean = 49.594
	Medium (mean ± 1SD)	21	65.62	SD = 4.72
	High (>mean + 1SD)	4	12.50	Range 43-63

the project functionaries are not charged with initiative, and self-esteem rather they tend to pursue routinised behavior and thus were more inclined to create powerlessness and dependency in people.

A comparison of the scores on development functioning also reveals the same tendencies of the project staff and supports the behavioral tendencies prevalent among the project functionaries. As already mentioned, the project functionaries do not value people's participation in the project activities. They treat project activities as dole for the village people and have tendency to achieve self-gratification by projecting self image as "mai-baap" to the project beneficiaries. This attitude of the project functionaries would only disempower people and would not enable to help them realize that they are capable of causing difference in their own social well being.

The project functionaries need to be reoriented through training so that they learn to empower people and give up all that disempowers them and take initiative in creating power in people and help them realize their potential. In essence, the project functionaries lack initiative; self esteem and are victims of repetitive routine behavior, which require to be changed.

Leadership Style

The success of the project will depend on the extent to which the project staff lead the people in achieving the goals of the project through people's participation and involvement in the project. The project staff were administered a scale as already reported in the 'methodology' to measure the leadership style of the project functionaries in working with people. There were four components of this scale, which are as follows:

1. **Dominative** type of leadership envisages controlling others' behavior or actions in the leader's way. The leader, in this case, exhibits dominating tendencies in both nature and effect. The leader dominates the action, situation and objectifies others. Hence, this represents' Dominative' leadership values/style.

2. The second style is **educative** in nature which tries to ensure action to be taken on the initiative of the actor but in accordance with the norms set or the process deemed fit by the leaders. Hence, there is an implicit attempt to patronize one's behavior. This pattern was named as 'Patronizing-Educative' style of leadership.

3. The last style is **enabling** in nature, which basically addresses itself to develop capabilities in the people so that they may initiate actions with full autonomy. This in fact, generates abilities or creates power in people to enable them to take action and then mobilize them to unlease this power. Hence, this style was named as '**Motivating-Empowering**' leadership style. The maximum obtainable score for a respondent on the three leadership styles/values adds up to 10. The data were analyzed to examine the frequency distribution of the project functionaries on the three different leadership styles. The data are reported in Table 4.

The data in Table 4 reveal that the mean score of project staff on Dominative style is very high (4.56 out of an obtainable score of 10 for all the three styles taken together). This indicates that they are dominating in nature when they work with people in project activities. As already mentioned, the score on 'Dominative style' increases with decrease in the scores on 'patronizing-educative' and 'motivating -empowering' style since the total score on all the three dimensions is limited to 10. The mean score on patronizing-educative style of leadership is the lowest (1.88) indicating that the project functionaries were not seriously trying to educate the project beneficiaries on the significance of the project goals and were not patronizing the efforts of people in achieving the project goals. But the mean score on motivating-empowering style of leadership was relatively higher (3.53) indicating thereby that the project functionaries were inclined to motivate and enable the project functionaries during interactions with them.

It has been observed in earlier discussions on development functioning and empowering efforts, that the project functionaries did not value people's participation in the project activities much and that they were treating project activities as dole for the village people and were actually projecting a self image of 'mai-baap' to them. The data on leadership styles of the project functionaries further reinforce this perception. With all the negative tendencies of development functioning and negative values of dependence, low self-esteem and sense of powerlessness, the project functionaries tend to exhibit a leadership style of dominance in nature and effect. But the high score on motivating-empowering leadership style /value signify that they are so in their thought processes but in action they tend to dominate. It is a case of wishing to behave a particular way but actually acting in a different way.

Table 4: Leadership styles of the project functionaries

	Dimension	Frequency (N=32)	Percentage	
1.	Dominative			
	Low (<mean - 1SD)	5	15.63	Mean = 4.56
	Medium (mean ± 1SD)	20	62.50	SD = 0.98
	High (>mean + 1SD)	7	21.87	Range 3-6
2.	Patronizing-Educative			
	Low (<mean - 1SD)	8	25.00	Mean = 1.88
	Medium (mean + 1SD)	20	62.50	SD = 0.71
	High (>mean + 1SD)	4	12.50	Range = 1-4
3.	Motivating-Empowering			
	Low (<mean - 1SD)	4	12.50	Mean = 3.53
	Medium (mean ± 1SD)	22	68.75	SD = 1.02
	High (>mean + 1SD)	6	18.75	Range 1-5

Faith in People

As already mentioned, the success of the project will depend on the extent to which project functionaries have faith in people's capability to initiate group actions and sustain these actions. The faith of the project functionaries in the people's capabilities was measured using a scale specially developed for the purpose. The scores of the scale are compiled and reported in Table 5.

Table 5: The project functionaries' faith in people

Category	Frequency (N=32)	%age	
Low (<mean - 1SD)	4	12.50	Mean = 33.13
Medium (mean D 1SD)	24	75.00	Range = 23-42
High (>mean + 1SD)	4	12.50	SD = 4.405

The project functionaries' faith in the people, their capabilities and strengths is a measure of their effectiveness. If the staff thinks that the people are capable enough to think, decide and plan their futures, then the project functionaries work for this in good earnest. If they doubt the abilities of the people with whom they work, then in every probability, they will only create dependence in them. The scores of project functionaries on this scale appear to be almost normally distributed.

The mean 'faith in people' score obtained by the project functionaries was 33.13 out of an obtainable score of 50, which is enough. The standard deviation of 4 indicates that they were quite homogenous in this respe Seventy five per cent respondents were found to be in t category of medium faith in people. Thus a great major of the project staff has reasonable predisposition towar the people for involving them in the project activities.

CONCLUSION

The major inferences of the study are given below

The project functionaries appear to be reasonab satisfied with the nature of their job and their dealings wi superiors moderately satisfied with their perceived influen and less satisfied with perceived amenities at work plac Their perception of the overall quality of work life is n counter-productive.

The project functionaries appear to be not charge with initiative and self-esteem, rather they tend to pursu routinized behaviour in their development work. Thus, the appear to be more inclined towards self-deprivation, thereb creating a sense of dependency and powerlessness i people. The project functionaries were not seriously trying to educate the project beneficiaries on the significance o the project goals and were not patronizing the efforts o people in achieving the project goals. Though they were inclined to motivate and enable people, they were no successful. But they exhibit, in essence, a leadership styl of dominance in nature and effect when they work wit people in the project activities

The project functionaries' style of development functioning was quite disturbing and counter-productive. Project staffs were favorably disposed to physical targets and not for quality performance. They do not value community participation in the project activities. They treat project activities as dole for the villagers and have a tendency to achieve self-gratification by projecting self-image as 'man-haap' to the project beneficiaries. They were found to be moderately' inflexible with caste-like rigidity, authoritative and also lack faith in the development activities in general.

The project staff have considerable amount of faith in the people's capabilities to organize themselves. They have reasonable predisposition towards the people for involving them in the project activities.

The project functionaries need to be further strengthened to provide an enriching work climate, develop attitudes necessary for participatory approach and finally help to build greater faith in people's abilities.

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Impact of Leadership Style on Job Satisf

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ABSTRACT

The study was conducted in Bankura and Nadia Districts of West Bengal with 20 Agricultu Development Officers (ADOs) to know their leadership style and its impact on job satisfaction and j performance of 90 Krishi Prashikshan Sahayaks working under them. The study revealed that most of t ADOs were democratic in their approach. The KPSs working under them expressed highest job satisfacti The job performance of KPSs working under autocratic ADOs was highest on quantitative and qualitat parameters. The overall job performance of KPSs working under autocratic and democratic type leadership was higher than those working under laissez-faire type of leader. The study further revea that the KPSs working under different type of leaders and having different level of job satisfaction thou did not differ significantly in their job performance. Yet the KPSs working under democratic and autocra leaders with high and moderate level of job satisfaction were certainly better in their job performance t others.

Agricultural extension workers at the grass root level play a very important role in transfer of technology and agricultural development. Their job performance depends on their personal attributes and supervisors' behaviour which help in creating a conducive organisational climate. The supervisory staff have to play a leadership role i.e they must guide, supervise as well as motivate their subordinates. This is, therefore, a very important factor affecting the functioning of employees and the success of an organisation. The present study, therefore, was undertaken in West Bengal to know the effect of leadership style of Agriculture Development Officers on the job satisfaction and job performance of Krishi Prashikshan Sahayaks-grass root level agricultural extension workers working at the village level under them.

METHODOLOGY

The study was conducted in the state of West Bengal. There are 18 district in the state and out of these, two districts namely Bankura and Nadia were selecte Twenty ADOs, who were overall incharge of development activities at block level, in these t were selected randomly to ascertain their lead At the next step, 90 KPSs i.e. nearly 50 per KPSs working in the two districts were selecte to assess their job satisfaction and job perforn

The scale developed by DuBrin (1998) identify the leadership style of ADOs. Job sa the KPSs was measured with the scale de Talukdar (1984) while their job performance w on three parameters-quantitative, qualitative An index was developed to measure job perf quantitative parameters which included six ma performed by the KPSs as a part of their orga State Department of Agriculture. West Bengal the KPSs were also evaluated by their superv important 'qualitative' parameters viz. sense of r communication skill, team spirit, sincerity and i

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on 7 point continuum scale. The scores obtained on quantitative and qualitative parameters were pooled together to find out their overall job performance. Data were collected through mailed questionnaire and personal interview technique.

RESULTS AND DISCUSSION

Background information of the ADOs and KPSs was collected on 7 aspects. It was found that mean age of the ADOs was 39.17 years. Academically, three fourth of them were post graduates. About 60 percent of them had a total service tenure of less then 10 years. The study also revealed that one third of them were from farming background and 44 percent belonged to rural areas. On the basis of family type the ADOs were equally divided into joint and nuclear family system.

As far as KPSs were concerned, more than half of them were of middle age group (Table 1). About 2/3rd of the respondents were educated upto higher secondary only. The study revealed that the KPSs differed widely on the basis of their service tenure as it ranged from 3 to 36 years with an average of 18.38 years. Majority of the KPSs belonged to farming families (46.67%) and more that 8.5 per cent of them had rural orientation. It was also observed that about 61 per cent of the respondents belonged to nuclear families.

Table 1: Background information of the KPSs

Variable	Category	Criteria	Frequency	% tage
Age	Young	Upto 35 years	17	18.89
	Middle	36 to 50 years	50	55.56
	Old	Above 50 years	23	25.56
Education	Matric		17	18.89
	Intermediate		42	46.67
	Graduate		31	34.44
Total service tenure	Short	Upto 10 years	21	23.33
	Medium	11 to 20 years	38	42.22
	Long	Above 20 years	31	34.44
Service tenure as KPSs	Short	Upto 10 years	28	31.11
	Medium	11to 20 years	42	46.67
	Long	Above 20 years	20	22.22
Parental Occupation	Farming		42	46.67
	Service		29	32.22
	Trade		19	21.11
Rural-urban back-ground	Rural		44	48.89
	Urban		34	37.78
			12	13.33
Family type	Joint		35	37.78
	Nuclear		55	62.22

Leadership Style of ADOs

The study revealed that 70 percent of the respondent were democratic in their leadership behaviour and some of them (20%) were following autocratic approach of supervision. The study further indicated that only 2 out of 20 ADOs were laissez-faire in their approach.

Job satisfaction of KPSs

The job satisfaction of the KPSs was measured with the help of the scale developed by Talukdar (1984). The mean job satisfaction score was 100.67 out of a maximum possible score of 185. It indicates a moderate level of job satisfaction. Similar findings were reported by Umeshmeti and Ketteppa (1997) in their study with Agricultural Assistants in Karnataka. The study revealed that 22.22 per cent of the KPSs were dissatisfied as their score was less than 75. On the other had, nearly 29 per cent of them got scores more than 111 which shows that they were highly satisfied with their existing job. The majority of the respondents got scores between 75 and 111 which suggests that thay were neither satisfied nor dissatisfied. They were further categorised into low, medium and high on the basis of their mean job satisfaction score and SD. Simultaneously, they were classified according to leadership style of the ADOs under whom they were working. The findings are presented in Table 2.

The table shows some very significant results. Firstly, among less satisfied category the percentage of KPSs working under laissez-faire leadership is maximum (50%) while it is minimum in case of autocratic type of leadership. The common assumption that the persons working under autocratic leaders are more dissatisfied does not get support from the study; rather the percentage of dissatisfied KPSs is more under laissez-faire type of leadership. It might be due to the fact that many a times a situation of no intervention, no direction and no control is also highly frustrating to the employees. Another observation is that all the 11 highly satisfied KPSs were working under democratic leadership whereas no KPS working under other two type of leadership was in this category. It means

Table 2: Job satisfaction of the KPSs

Leadership style of ADOs	(f)	$\bar{X}$	SD	CV	F-ratio	CD	Job Satisfaction		
							Low (<81.90)	Medium (81.90-119.44)	High (>119.44)
Autocratic	21	101.29	13.22	13.05	6.21*	Autocratic Vs. Democratic = 9.02	3 (14.29)	18 (85.71)	0
Democratic	59	103.58	20.00	19.31		Autocratic Vs. Laissez-faire = 13.37*	12 (20-34)	36 (61.02)	11 (18.64)
Laissez-faire	10	82.20	9.09	11.06		Democratic Vs. Laissez-faire = 11.90*	5 (50.00)	5 (50.0)	0
Overall	90	100.67	18.77	18.65	-	-	20 (22.22)	59 (65.56)	11 (12.22)

*Significant at P 0.05 level

that persons working under democratic leadership are comparatively more satisfied with their job. The study further indicated that mean job satisfaction score of the KPSs working under democratic ADOs is highest i.e. 103.58 while it is minimum in case of those working under laissez-faire type of leaders (82.00). Significantly the CV is the lowest (11.06) in case of the respondents working under laissez-faire type of leadership which indicates a high degree of homogeneity also in this group.

The data were further analysed and single factor analysis of variance was worked out to have more accurate results. The F-ratio (6.21) was found to be significant which implies that the group differs significantly with respect to their job satisfaction. The CD values were also worked out which indicate the mean job satisfaction level of the KPSs working under democratic and autocratic type of leadership.

Thus, it is evident by the study that the most desirable supervisory style of ADOs is the democratic approach which leads to high degree of job satisfaction of their subordinate extension workers.

Job Performance of the KPSs

The job performance of the KPSs was measured both on quantitative as well as qualitative dimensions. Later on, the score on both the dimensions were pooled together to know their overall job performance. The salient findings in this regard are presented in the following paragraph.

Job Performance on Quantitative Dimensions

Table 3 shows the mean job performance score of the KPSs under different types of leadership as well as their distribution into different categories.

It is seen from the table that the average job performance score was 16.25. It was highest (16.90) among the KPSs working under autocratic ADOs, while it was minimum (15.60) in case of laissez-faire type of ADOs. The SD value of the overall sample is 4.32 while it is the lowest (3.90) in case of laissez-faire type of leadership. The overall CV is moderate which indicates that the sample was comparatively homogeneous with reference to their job performance.

All the KPSs were further classified into five categories on the basis of mean job performance score and SD. The table shows that most of the respondents (nearly two third) fall in the average category. Moreover, almost all of them (97%) fall only in middle three categories. Among 90 KPSs only two of them were found to be in very good job performance category, while one was in the poor class. In all, only 19 percent of them were found to be performing good in terms of quantitative dimension while the vast majority (67.78%) was only of average standard. The study got support from the findings of Bhardwaj *et al.* (1989), Hedge and Chennegowda (1989) and Singh and Sandhen (1993).

Table 3: Job Performance of the KPSs on Quantitative dimension.

Leadership style of ADOs	(f)	$\overline{X}$	SD	CV	Job satisfaction				
					Poor	Below average	Average	Good	Very good
Autocratic	21	16.90	4.47	26.45	0	3 (14.29)	14 (66.67)	3 (14.29)	1 (4.76)
Democratic	59	16.13	4.27	26.47	1 (1.69)	6 (10.17)	40 (67.80)	11 (18.64)	1 (1.69)
Laissez-faire	10	15.60	3.90	25.00	0	2 (20.00)	7 (70.00)	1 (10.00)	0
Overall	90	16.25	4.32	26.58	1 (1.11)	11 (12.22)	61 (67.78)	15 (16.67)	2 (2.22)

Value within parenthese indicate percentages.

Job Performance on Qualitative Dimensions

Besides measuring their job performance on quantitative aspect, the KPSs were also assessed on five qualitative parameters viz., responsibility, communication skill, team spirit, sincerity and initiativeness.

Table 4 shows that that mean job performance score of the sample was 21.27 which is equivalent to 61 per cent which shows a moderate level of job performance. On qualitative dimension also, the KPSs working under autocratic leadership secured the highest score (21.80) closely followed by those working under democratic ADOs (21.35). The performance score of KPSs under laissez-faire type of leaders was the lowest (19.40). The lowest SD (3.36) and CV value (15.41) of the KPSs working under autocratic ADOs indicate their homogenity in the job performance score.

Their distribution into five different categories on the basis of mean and SD of job performance score shows that almost all of them (98%) are in middle 3 categories viz., below average, average and good categories. About

Table 4 : Job Performance of the KPSs on Qualitative dimension

Leadership style of ADOs	(f)	$\overline{X}$	SD	CV	Job satisfaction				
					Poor	Below average	Average	Good	Very good
Autocratic	21	21.80	3.36	15.41	0	2 (9.52)	15 (71.43)	3 (14.29)	1 (4.76)
Democratic	59	21.35	3.83	17.94	1 (1.69)	8 (13.56)	38 (64.41)	12 (20.34)	0
Laissez-faire	10	19.40	3.46	17.84	0	3 (30.00)	6 (60.00)	1 (10.00)	0
Overall	90	21.27	3.74	17.58	1 (1.11)	13 (14.49)	59 (65.56)	16 (17.78)	1 (1.11)

Values within parentheses indicate percentages.

19per cent of them were rated to be good performers. But on the other hand, the percentage of poor and below average is also considerable i.e. about, 16 per cent. This is surprisingly the highest in case of KPSs who are working under laissez-faire type of ADOs.

Overall job performance

Finally to have an overall picture of the performance of the KPSs. The scores obtained by them on both the dimensions, i.e quantitative and qualitative were pooled together. The table 5 shows the overall mean performance score of KPSs and their distribution into different categories.

It is seen from the table that overall mean job performance score of the KPSs was 37.52. It is nearly equal among the KPSs working under autocratic (37.76) and democratic (37.49) type of leaders but it seems to be certainly lower among the KPSs working under laissez-faire type of ADOs (35-20). The low value of SD (7.82) and CV (20.84) indicates that the sample was homogeneous.

Further classification of the respondents into five categories with their mean score and SD reveals that almost all of them i.e., 97 percent are only in middle three categories. About two-third of them have only average level of job performance. The percentage of high performers is only 19 while that of poor and below average KPSs is 16. It shows that job performance of vast majority of the KPSs (81%) is average or below average. This is a matter of serious concern because the ultimate effectiveness extension work depends on their performance. It imperative that immediate measures should be taken enhance productivity of KPSs for effective transfer technology and promoting Agricultural development.

Job Satisfaction and Job performance of KPS working under the ADOs having different leadershi style

The data were further analysed to know the jo performance of the KPSs working under the ADOs havin different leadership style, keeping their job satisfaction a an intervening variable. Though, there were nine possibl categories, but there was no respondent in two categorie namely Autocratic Leadership with high level of jo satisfaction, and Laisser-faire leadership with high level o job satisfaction. Hence, practically there were only seve categories. The mean job performance score of the KPS falling in these seven categories was worked out and Singl Factor Analysis of Variance was applied to ascertain th significance. It suggests that the KPSs working unde different types of leadership and having different level o job satisfaction did not differ significantly in their jo performance. However, a trend can be seen. The KPS working under democratic type of leadership with hig degree of job satisfaction had the highest mean jo performance score (41.27) where as it was minimum (34.0 among those working under laissez-faire type of leadersh with low level of job satisfaction. It is also seen from th table that first four categories are dominated by the KPS

Table 5 : Overall job performance of the KPSs

Leadership style of ADOs	(f)	$\bar{X}$	SD	CV	F-ratio	Job satisfaction				
						Poor	Below average	Average	Good	Very good
Autocratic	21	37.76	7.74	20.49	0.5NS	0	2 (9.52)	16 (76.19)	2 (9.52)	1 (4.76)
Democratic	59	37.49	7.93	21.14		2 (3.39)	6 (10.17)	39 (66.10)	12 (20.34)	0
Laissez-faire	10	35.10	7.36	20.91		0	2 (20.0)	7 (70.00)	1 (10.00)	0
Overall	90	37.52	7.82	20.84		2 (2.22)	10 (11.11)	62 (68.89)	15 (16.67)	1 (1.11)

Value with parentheses indicate percentage: NS : Non-significant.

Table 6 : Mean job performance score of the KPSs working under different leadership styles having different level of job satisfaction

Category		Job performance		F-ratio
Under leadership style of ADOs	Level of job satisfaction	No.of KPSs	Mean job performance score	
Democratic	High	11	41.27	1.09NS
Autocratic	Medium	18	38.72	
Democratic	Low	12	36.91	
Democratic	Medium	36	36.72	
Laissez-faire	Medium	5	36.40	
Autocratic	Low	3	35.00	
Laissez-faire	Low	5	34.00	

NS = Non significant

working under democratic type leadership. Thus, democratic leadership seems to be more effective. In addition, there is another interesting finding. Out of 90 KPSs 21 of them were working under autocratic leadership and majority of them (18) had medium level of job satisfction and they stood at the 2nd rank in terms of their job performance. It might be due to the fact that autocratic leadership forces compliance though simultaneously it also affects job satisfaction adversely. The KPSs, having low job satisfaction, working under either autocratic or laissez-faire type of leadership were comparatively poor performers than those having moderate level of job satisfaction.

CONCLUSION

The study revealed that majority of the ADOs (70%) were democratic in their leadership behaviour. About two third of the KPSs working at the village level had moderate level of job satisfaction. There was no significant difference in the job performance of KPSs working under different categories formulated on the basis of leadership style and job satisfaction. However, comparatively the KPSs working under democratic and autocratic type of leadership with moderate to high level of job satisfaction were good in job performance. It was also seen that the job performance of the KPSs working under democratic type leaders was comparatively higher. Hence, it is suggested that ADOs and other supervisory staff members may be given thorough training to develop their supervisory ability and desirable leadership style.

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Group Attributes of Artisanal Fish

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ABSTRACT

This paper deals with the differential socio-personal and technological variables of three grou fisherman and their group attribute characteristics. The results revealed that there were significant differe between the three group on eight key variables. But this heterogeneity was lesser when the fishe were classified as fishing labourers and shareholders. Further, it was found that the independent va did not have any significant influence over the group attributes index score. Among the five compone group attribute index, the mean values of four components viz. group structure, group objectives, performance and group interaction differed significantly between the group. The results also reveale there was more scope to improve the groups attributes characteristics in the three groups as the c average index score ranged from 48.94 to 64.33. The constraints reported by the fishermen in the ad of technological innovation are also reported.

Extension education is concerned with changing the knowledge, attitudes and practices of large number of rural people. But to do so effectively, according to Addison (1972), it must take into account not only the wants of individuals, but also how they act and react as groups. In Kerala, the MATSYAFED (An Apex Co-operative Federation for Fisheries Development) has established fishermen village societies and they function as nodules of all development and welfare activities in the fishing villages, since 1985. By considering the fisheries co-operative societies as social groups, a research study was undertaken with the following specific objectives: i) To evaluate the differential socio-personal and technological variables of three groups of fishermen in three fishing villages ii) To compare the socio-personal and technological variables of fishing labourers and shareholders of fishing units irrespective of villages/groups iii) To determine the variables influencing the group attribute index scores of fishermen iv) to evaluate the group attributes characteristics among the selected three group of fishermen and the group attributes characteristics among f and shareholders.

METHODOLOGY

For measuring the group attributes following key components were ide structure, Group objectives, Group per interaction and group values. By deli components, an index was developed f group attributes. The reliability co-effic attributes index was calculated by the t and was found to be 0.9350. The validit measured by content validity.

Independent variables such as age, of days employed, experience, size of fa crew, size of craft, number of fishing lag in selling the catch, annual in

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communication channels used, land area owned, and number of family members employed were included in the study. Structured interview schedules were used for collecting the date from random samples of fishermen in three fishing centres viz., Kannamaly (n_1 = 30), Chellanam (n_2 = 30), and Thaikkal (n_3 = 33) located in Ernakulam district, Kerala. Appropriate statistical techniques were used for the analysis and interpretation of data.

RESULTS AND DISCUSSION

The mean values of socio-personal and technological variables of three groups of fishermen are given in Table 1. The results in Table 1 revealed that of the 14 variables, the F values are significant for eight variables such as number of days employed, experience, fishing craft size, number of nets operated, time-lag in selling the catch, annual income, number of communication channels used and group attibutes index scores. It was found that though all the respondents in three groups were fishermen, there were significant differences between the three groups on the above key variables. Thus in Kannamaly village, the fishermen had operated larger fishing crafts; in Chellanam village, the fishermen were employed for more number of days, had used more communication channels and had higher group attributes index scores. In Thaikkal village, the fishermen were more experienced, had operated more number of fishing nets and had higher annual income than the other two village groups.

It was further observed that since these fishermen were heterogeneous on key variables, cohesiveness between three groups was found to be lesser and this concurred with the reports of Nair (1990) who had elaborated on the psychology of group actions.

In contrary, Table 2 presents the mean values of socio-personal and technological variables when the fishermen were classified as fishing labourers and shareholders irrespective of the village groups.

The 't' tests revealed that of the 14 variables, there was no significant difference between the fishing labourers and shareholders on 11 variables. It is seen that only on three variables, there were significant mean differences, and the shareholders were found to have higher annual income, used more number of communication channels and had lesser fishing crew in their crafts. Thus the heterogeneity

Table 1: Mean values of socio-personal and technological variables of three groups of fishermen

Sl. No.	Variables	Kannamaly (n = 30)		Chellanam (n = 30)		Thaikkal (n = 33)		F
		Mean	S.D.	Mean	S.D	Mean	S.D.	
1.	Age (yrs)	38.87	10.15	39.77	9.54	44.51	9.92	3.01
2.	Education (yrs)	4.37	1.99	4.90	1.79	5.15	2.72	1.01
3.	No.of days employed	186.33	60.59	226.00	47.70	176.36	37.79	8.76**
4.	Expereince (yrs)	21.73	10.43	22.90	10.33	28.09	10.99	3.24**
5.	Family size	6.00	2.11	6.90	3.11	5.45	1.77	2.93
6.	Crew size	32.20	3.97	35.43	5.30	33.45	11.02	1.39
7.	Craft size (mts)	21.37	2.90	17.64	1.23	16.85	2.28	35.47**
8.	No. of nets operated	1.06	0.25	1.47	0.51	1.76	0.43	22.01**
9.	Time lag (hrs)	2.92	1.12	2.30	1.04	3.25	1.35	5.15**
10.	Annual income (Rs.)	24033.33	7053.89	29688.33	12536.43	51000.00	60046.38	4.78**
11.	No.of communication channels used	4.16	0.98	5.33	1.75	4.78	1.27	5.46**
12.	Land area (cents) owned	5.31	2.67	13.13	29.60	10.41	8.91	1.51
13.	No. of family members employed	1.47	1.10	1.97	1.47	1.54	0.90	1.58
14.	Group attibutes index	50.83	14.91	64.33	12.43	48.94	14.56	10.98**

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

Table 2: Mean values of socio-personal and technological variables of fishing labourers and share hold irrespective of groups

No.	Variables	Fishing labourers (n = 63)		Share holders (n = 30)		t-valu
		Mean	S.D.	Mean	S.D.	
1.	Age	39.7	10.5	4.3	9	1.46
2.	Education	4.87	2.41	4.7	1.80	0.39
3.	No.of days employed	202.06	57.52	185.33	35.0	1.44
4.	Experience (Yrs)	23.49	11.52	26.2	9.22	1.11
5.	Family size	6.12	2.59	6.03	2.11	0.18
6.	Crew size	34.84	8.06	31.27	5.97	2.16*
7.	Craft size (Mts)	18.40	3.14	18.95	2.64	0.07
8.	No. of nets operated	1.44	0.50	1.43	0.50	0.08
9.	Time lag (Hrs)	2.79	1.03	2.95	1.59	0.31
10.	Annual income (Rs)	23515.07	9709.79	580.40	59568.80	4.48**
11.	No. of communication channel	4.51	1.31	5.3	1.53	2.57**
12.	Land area	7.56	4.94	14	30.36	1.64
13.	No. of family members employed	1.68	1.07	1.6	1.40	0.30
14.	Group attribute index	53.25	16.82	57.17	12.01	1.13

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

was lesser; when the fishermen were classified as fishing labourers and shareholders. Shankariah *et al.*, (1980) reported that the change agents or extension personnel should search for broad grouping of members of social systems who could be approached as separate homogenous (on certain variables or enterprises) group for increasing the extent of adoption. Further, to identify the beneficiaries for the developmental programmes, these criteria viz. ownership patterns and annual income could be the useful indicators. Table 3 presents the correlation and regression coefficients calculated between the independent variables and the origin attribute index scores of fishermen.

The correlation results revealed that in all the three groups, except one or two variable, most of the independent variables did not show significant relationship with the group attributes index scores. In the multiple regression analyses, the R^2 values were not significant ($R_1^2 = 0.61$; $R_2^2 = 0.49$; $R_3^2 = 0.33$). Among the partial regressing coefficients, age had shown positive and significant influence while experience had shown significant negative influence over the group attributes index scores respondents in the Challanam group. In Kannamaly, income had shown significant negative influence. By large, most of the regression coefficients were significant in all the groups. Thus it could be interpre that in the three village groups, the independent variab studied did not have any significant influence over the gr attributes index scores. The results are in conformity w the findings of Kumar and Singh (2000) who had repor that the variable such as age, occupation and farm experience did not have any correlation with the gr dynamics effectiveness.

The components of group attributes index scores the three groups are given in Table 4. It is seen that overall group attributes index scores differed significan between the groups (F = 10.98**)

Though Kannamaly (X = 50.83) and Thaikkal 48.94) had more or less equal scores, Chellanam 64.33) had higher mean group attributes index score.

Table 3 : Variables influencing group attributes index score of fishermen

S.No.	Variables	Chellanam (n = 30)			Kannamaly (n = 30)			Thaikkal (n = 33)		
		'r'	'b'	't'	'r'	'b'	't'	'r'	'b'	't'
1.	Age	0.04	2.73	2.45*	0.18	1.08	0.57	0.25	1.45	1.35
2.	Education	0.14	-0.21	-0.14	-0.05	-1.53	-0.66	-0.07	-0.51	-0.26
3.	No. of days employed	0.27	0.02	0.34	0.25	0.06	1.03	0.14	0.06	0.53
4.	Experience	-0.08	-2.74	-2.71*	0.21	-0.78	-0.42	0.15	-1.36	-1.55
5.	Family size	-0.36	0.31	0.21	0.03	2.88	1.49	-0.15	-3.72	-1.36
6.	Crew size	0.13	0.16	0.30	0.08	1.45	1.46	0.004	0.20	0.41
7.	Fishing craft size	-0.15	-0.17	-0.70	-0.26	-2.71	-1.75	0.27	-0.02	-0.01
8.	Time lag	0.08	2.15	0.68	-0.21	-6.57	-1.60	0.38*	4.65	1.10
9.	Number of nets operated	0.46**	5.31	0.96	0.12	23.71	1.65	0.10	2.02	0.26
10.	Annual income	0.16	-0.001	-1.16	-0.02	-0.001	-2.09*	0.21	0.00	0.24
11.	Number of communication channel	0.05	-0.46	-0.29	-0.01	-0.06	-0.01	0.16	0.32	0.11
12.	Land area	0.29	0.17	1.57	0.26	1.84	1.60	0.05	0.80	0.71
13.	Number of family members employed	0.22	3.99	1.25	-0.09	3.08	0.83	-0.22	0.97	0.19

*Significant at 5% level and **Significant at 1% level; $R_1^2 = 0.61$; F = 1.94 $R_2^2 = 0.49$ F = 1.21 $R_3^2 = 0.33$ F = 0.74.

Table 4: Mean values of group attributes of three group of fishermen

No.	Attributes	Kannamaly		Chellanam		Thaikkal		F-value
		Mean	S.D.	Mean	S.D.	Mean	S.D.	
1.	Group structure	2.30	1.29	3.37	0.98	2.42	1.20	7.65*
2.	Group objectives	1.73	1.18	2.93	0.74	1.99	1.10	11.03*
3.	Group performance	0.53	0.86	1.47	1.38	0.52	0.90	8.19*
4.	Group interaction	3.70	0.65	3.33	0.48	3.15	1	4.10*
5.	Group values	1.90	0.61	1.77	0.97	1.61	0.6	1.23
6.	Group attribute index	50.83	14.91	64.33	12.43	48.94	14.56	10.98**

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

seen that there is more score to improve the attributes scores in the three groups. Further, except group values, on all other four components, the mean values differed significantly between the groups.

Thus, it could be interpreted that these three groups were distinctly groups with reference to group dynamics and attributes offered more scope to introduce technological interventions and to increase the rate of adoption of innovations.

The group attributes characteristics of fishing labourers and shareholders irrespective of village groups are given in Table 5. Of the five group attributes, only on two attributes viz. group interaction and group values, there was significant difference between the labourers and shareholders. On the overall group attributes index scores, the 't' was not significant (t = 1.13) and indicated that there were no significant differences between the labourers and shareholders on their group attributes perception. This

Table 5 : Mean of group attributes characteristics among shareholders and fishing labourers

Group Attributes	Shareholders (n = 30)		Fishing labourers (n = 63)		't'
	Mean	SD	Mean	SD	
Group structure	2.87	1.07	2.60	1.31	1.08
Group objectives	2.20	0.96	2.22	1.20	0.08
Group performance	0.73	0.58	0.87	1.31	0.56
Group interaction	3.63	0.56	3.27	0.87	2.10*
Group values	1.97	0.81	1.65	0.70	2.03*
Group attributes index	53.25	16.82	57.17	12.01	1.13

*Significant at 5% level.

might be because when these fishermen were classified as labourers and shareholders instead of the real village groups, one group was found to become smaller and in smaller groups, there could be relationship oriented activities rather that goal-oriented activities and this could have resulted in the differential perceptions. To evaluate further on the group action processes, more indepth studies are suggested by focusing on the smaller groups under diverse conditions.

The constraints reported by the fishermen respondents in the adoption of technological innovations are as follows: i) Shortage of kerosene and high price of kerosene (55%) ii) lack of fish in the near shore areas of the sea due to over-exploitation (48%) iii) lack of loan facilities (26%) iv) competition from foreign trawlers (24%) (v) High cost of engine repair (15%) and (vi) lack of more fish landing cent (10%).

CONCLUSION

The study revealed that in the three village gro the selected socio-personal and technological variables not have any significant influence over the group attrib index scores. It was found that there was more scop improve the group attributes characteristics in the t groups as the average index scores ranged from 48.9 64.33. As the fishermen were fisheries cooperative soc members, strengthening of education, services and trai programmes would enhance the attributes of groups result in better group dynamics.

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Change in Cropping Pattern Subsequent to Farm Mechanization

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ABSTRACT

This study was conducted in Haryana and Rajasthan states to know the change in cropping pattern subsequent to farm mechanization. It was found that in the study area of Haryana the crops under which the area decreased after farm mechanization are, cotton (82.35%), green manuring sunn-hemp (70.58%), pigeon pea (63.63%), chillies (51.85%), green gram (42.00%), cowpea (40.00%) and sorghum (36.00%) followed by others. The crops under which the area increased are, onion (666.66%), vegetables (457.14%), wheat (94.67%) and rapeseed/mustard (73.58%) followed by green fodder and pea. In case of study area of Rajasthan, the highest area decreased under groundnut (57.14%), green manuring sunn-hemp (56.76%), pigeon pea (54.00%), green gram (36.11%), pearl millet (24.13%) and sorghum (20.27%) followed by others, while the crops under which the area increased subsequent to farm mechanization are, rapeseed/mustard (135.71%), wheat (74.69%) and green fodder (40.90%) during *rabi* season.

In the wake of green revolution, the Indian farmers adopted various modern agricultural technologies. The adoption of farm machineries like tractors, power tillers, combine harvester, threshers, irrigation pump sets, etc. for timely and efficient completion of farm operations was a remarkable change in Indian agriculture. An introduction of farm machineries resulted in replacement of the traditional means and methods used by the farmers for different farm operations. As a consequence of farm mechanization, the mode of farm operations, crop combinations and crop preferences of the farmers also changed. These changes led to change in cropping pattern on farmer's field. Although, the change in cropping pattern in a particular area is affected by numerous factors. The mechanical means and methods used by the farmers in completion of different farm operations play a crucial role in altering the existing cropping pattern. In the states like Punjab and Haryana (being the states with highly mechanized farm) various changes have occurred in cropping pattern after the farm mechanization. However, there is no authentic source/study which can provide reliable information about the influence of farm mechanization on cropping pattern. Thus, a comparative and systematic study is needed to understand and explain the above issues. Keeping these issues in mind, a systematic study was conducted in Haryana (has highly mechanized farms) and Rajasthan (has comparatively low mechanized farms) to assess the changes in cropping pattern subsequent to farm mechanization.

METHODOLOGY

Locale: The study was conducted in Pataudi block of Gurgaon district, Haryana and Bandikui block of Dausa district, Rajasthan. Four villages were selected from each block using purposive-cum-random method of sampling.

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Sample: From the so selected villages of Pataudi block, 30 tractor owning and 30 neither tractor not bullock/camel owning farmers were selected randomly and all the available 24 bullock/camel owning farmers were included as sample of the study. From the four villages of Bandikui block, 30 bullock/camel owning and 30 neither tractor nor bullock/camel owning farmers were selected randomly while all the available 23 tractor owning farmers were included purposively. Thus, in all, a total of 84 farmers were selected from Pataudi block of Gurgaon districts (Haryana) and 83 farmers from Bandikui block of Dausa district (Rajasthan), which made a total of 167 respondents of the study.

Data collection and analysis: The data were collected by participatory interview method using specially developed semi-structured interview schedule. The data were coded, decoded, tabulated and statistical tools like average, percentage etc; were used for the analysis and drawing inferences of the study.

RESULTS AND DISCUSSION

The outcomes of present study (Table 1) reveals that the area under *kharif* crops viz: pearl millet, shorghum, pigeon pea, maize, green gram, cowpea, green fodder and sunn-hemp decreased subsequent to farm mechanization in both Haryana and Rajasthan. But this declivity was higher in Haryana being a higher mechanized state. Bansil (1997) also stated that as a consequence of farm mechanization, the whole of 0.15 million ha under sorghum and pearl millet (Bajra) in Haryana and about 0.1 million ha under maize in Punjab shifted to rice crop during 1986-87 to 1993-94.

In study area of Haryana, the maximum area decreased under cotton (82.35%), green manuring sunn-hemp (70.58%), pigeon pea (63.63%), chillies (51.85%), green gram (42.00%), cow pea (40.00%) and sorghum (36.00%) followed by others. In case of Rajasthan, the highest area decreased under groundnut (57.14%), green manuring sunn-hemp (56.76%), pigeon pea (54.00%), green gram (36.11%), pearl millet (24.13%) and sorghum (20.27%) followed by others. Similar kind of findings were also observed by Arya (1999) while conducting a study in Meerut district of Uttar Pradesh. He reported that there was a significant change in area under different crops on mechanized farms. He revealed that after farm mechanization, 38.2, 36.92 and 33.46 per cent area increased under potato, green fodder (barseem) and mustard respectively while 26.21, 16.24 and 35.51 per cent area decreased under pearl millet, maize and redgram respectively in Meerut district (U.P.). Further these findings also supported by Manick (1998) that in last 30 years or more, the area under wheat, rice and cotton has increased tremendously while area under maize, chillies, sugarcane and pearl millet decreased in Punjab due to technological advancement in agriculture.

Although the area under these crops have been decreased in both the study areas after farm mechanization but it is evident from the data in the Table 1 that the declivity in area under these different crops was higher in Haryana being a state of higher farm mechanization than Rajasthan. It implies that farm mechanization has some effect on changing cropping pattern.

In Haryana, the crops under which the area increased after farm mechanization are; cluster bean, groundnut, seasemum while in case of Rajasthan, cluster bean and chillis are the crops under which area has been increased. The area under current fallow land also has been increased in both the states. The farmers have fallow land during *kharif* season and utilized it to grow rapeseed/mustard and wheat crops during *rabi* season. Since the production of rapeseed/mustard and wheat is higher while growing on current fallow land, therefore, farmers used to have current fallow land during *kharif* season and grow these crops in Rabi season on it. However, the rapeseed/mustard and wheat crops require comparatively more field preparation but due to availability of farm machineries like tractor, more field preparation is not a problem for the farmers. Electric-pumpset/diesel-pumpsets also facilitate to grow rapeseed/mustard and wheat crops. So farmers have started growing these crops on larger area than the minor crops like sunn-hemp, cowpea, green gram, cotton, sorghum, maize, etc. during *kharif* season. Hence, area increased under current fallow land during *kharif* season is used to grow rapeseed/mustard and wheat during *rabi* season.

The area increased under clusterbean, groundnut, seasemum is not only due to the farm mechanization but also due to the profitability and climatic changes.

Newly introduced crops

After farm mechanization, farmers had not only reduced area under low return crops but also they simultaneously increased area under more remunerative new crops as added to their farms (Table 1).

Table 1: Shift in area under *kharif* crops in Haryana and Rajasthan after farm mechanization

(average area in ha)

	Crops	Haryana (N = 84)				Rajasthan (N = 83)			
		BM	AM	D	D%	BB	AM	D	D%
1.	Pearl millet	0.88	0.68	-0.20	**-22.72**	1.16	0.88	-0.28	**-24.13**
2.	Sorghum	0.50	0.32	-0.18	**-36.00**	0.74	0.59	-0.15	**-20.27**
3.	Cluster bean	0.35	0.43	+0.08	**+22.85**	0.55	0.77	+0.22	**+40.00**
4.	Pigeon pea	0.44	0.16	-0.28	**-63.63**	0.63	0.29	-0.34	**-54.00**
5.	Maize	0.24	0.17	-0.07	**-29.16**	0.24	0.20	-0.04	**-16.70**
6.	Groundnut	0.17	0.23	+0.06	**+35.29**	0.56	0.24	-0.32	**-57.14**
7.	Chilli	0.27	0.13	-0.14	**-51.85**	-	0.21	+0.21	**NIC**
8.	Cotton	0.17	0.03	-0.14	**-82.35**	-	-	-	-
9.	Sesamum	0.30	0.50	+0.20	**+66.66**	0.47	0.40	-0.07	**-14.90**
10.	Green gram	0.24	0.14	-0.10	**-42.00**	0.36	0.23	-0.13	**-36.11**
11.	Cowpea	0.30	0.18	-0.12	**-40.00**	0.22	0.18	-0.04	**-18.18**
12.	Green fodder	0.27	0.20	-0.07	**-25.92**	0.27	0.24	-0.03	**-11.11**
13.	Sunn-hemp (GM)	0.34	0.10	-0.24	**-70.58**	0.37	0.16	-0.21	**-56.76**
New introduced crop									
1.	Onion	-	0.35	+0.35	**NIC**	-	0.33	+0.33	**NIC**
2.	Vegetables	-	0.44	+0.44	**NIC**	-	0.44	+0.44	**NIC**
3.	Flower	-	0.29	+0.29	**NIC**	-	-	-	-
4.	Current Fallow land	0.44	0.56	+0.12	**+27.27**	0.53	0.94	+0.41	**+77.35**
	Total	4.91	4.91			6.10	6.10		

NIC = New introduced crop; D = Change over pre-mechanization; % D = Per cent change over pre-mechanization; BM = Before mechanization; AM = After mechanization; NC = No change; Note : The crop which is grown ³ 0.10 hactare after mechanization was considred as NIC : Before and after mechanization as applied to individual farmer.

The new crops introduced during *kharif* season are onion, vegetables and ornamental flowers (marigold, chrysanthemum). All these new crops were adopted more by those farmers who were using more of mechanized means on their farms. Sharma (1991) also reveals that most of the farms which used tractors, produced cash crops as opposed to bullock operated farms which produced subsistence crops. New crops reportedly covered larger area in Haryana than Rajasthan. The reasons attributed to adoption of these new crops, besides mechanization, are better irrigation and transportation facilities, higher returns, varieties and provisions of income on daily basis, all these being cash crops.

***Rabi* crops**

The crops which are generally grown during *rabi* season, specially in northern states of India are; wheat, barley, gram, rapeseed/mustard, coriander and horticultural crops. These crops are grown in different proportion, in terms of area under farmers holding. From time to time the area under these crops have been observed to change due to some situational market demand factors. Recent technological development in agriculture like introduction and use of farm machines and equipment have contributed to the shift in area in favour of crops which are more profitable and provide higher return to the farmers like wheat, rapeseed/mustard, vegetables, flowers, etc.

In the present study, an attempt was made to find out changes in cropping pattern/shift in area under different Rabi crops subsequent to farm mechanization in Haryana and Rajasthan.

The results of the study (Table 2) revealed that wheat, rapeseed/mustard, vegetables green fodder (Barseem, Lucerne, Oats, etc.) are the major crops under which area has been increased tremendously while gram, barley, coriander, taramira, on the other hand are the crops under which the area has been reduced after farm mechanization in both Haryana and Rajasthan. Singh, *et al.* (1998-99) based on their study conducted in Madhya Pradesh Villages, confirmed these findings that due to technological advancement in agriculture, the area has increased under wheat, soyabean and rice while it has decreased under gram and sorghum. Gill (1994) while studying in Punjab, Haryana and Uttar Pradesh also observed that during 1960-61 to 1992-93, the increase in area under wheat was three-fold in Haryana and more than two fold in Punjab and Uttar Pradesh due to technological advancement in agricultu The cumin crop has been totally abandoned by the farm of Haryana while the farmers of Rajasthan are still growi this crop as a minor crop.

Due to the development of transportation, irrigatio ploughing and marketing facilities, some crops have be introduced as a newly adopted crops like flowers in Harya and vegetables and onion in study area of Rajasthan.

In case of Haryana, the maximum area in terms percentage increased under onion (666.66%), vegetabl (457.14%), wheat (94.67%) and rapeseed/musta (73.58%) followed by greenfodder and pea. While in ca of Rajasthan the maximum area increased under rapese mustard (135.71%), wheat (74.69%) and green fodd (40.99%). Singh and Singh (1989) 'also recorded simi type of finding while studying the cropping pattern Haryana and Punjab. They reported that the remarkab shift in area in favour of rice, and wheat crop has occur

Table 2: Shift in area under *rabi* crops in Haryana and Rajasthan after farm mechanization

(Average area in h

	Crops	Haryana (N = 84)				Rajasthan (N = 83)			
		BM	AM	D	D%	BB	AM	D	D%
1.	Wheat	0.75	1.46	+0.71	**+94.67**	0.83	1.45	+0.62	+74.6
2.	Rapeseed/Mustard	0.53	0.92	+0.39	**+73.58**	0.56	1.32	+0.76	+135.7
3.	Gram	1.10	0.45	-0.65	**-59.09**	1.19	0.70	-0.49	-41.1
4.	Barley	0.60	0.31	-0.29	**-48.33**	0.83	0.57	-0.26	-31.3
5.	Pea	0.24	0.27	+0.03	**+12.50**	0.65	0.54	-0.11	-16.9
6.	Coriander	0.46	0.06	-0.40	**-86.95**	0.54	0.11	-0.43	-79.6
7.	Cummin	0.24	0.00	0.0	**AC**	0.27	0.02	-0.25	-92.5
8.	Taramira	0.21	0.10	-0.11	**-52.38**	0.38	0.21	-0.17	-44.7
9.	Green fodder	0.24	0.34	+0.10	**+41.66**	0.22	0.31	+0.09	+40.9
10.	Vegetables	0.07	0.39	+0.32	**+457.14**	0.0	0.38	+0.38	NIC
11.	Onion	0.03	0.23	+0.20	**+666.66**	0.0	0.20	+0.20	NIC
12.	Flower	0.00	0.22	+0.22	**NIC**	-	-	-	-
13	Pigeon pea (*kharif*)*	0.44	0.16	-0.28	**63.63**	0.63	0.29	-0.34	-53.9
	Total	4.90	4.90			6.10	6.10		

AC = Abandoned crop; NIC = New introduced crop; D = Change over pre-mechanization; %D = Per cent change Over pre-mechanization; BM = Before mechanization; AM = After mechanization; NC = No change; *Area already covered under *kharif* Pigeon pea (Arhar) crop Note: The which is grown > 0.1 hactare after mechanization was consided as NIC; Before and after mechanization as applied to individual farmer

subsequent to farm mechanization. On the other hand, the maximum 86.95, 59.09, 52.38 and 48.33 percent area had decreased under coriander, groundnut, taramira and barley crop, respectively, in study area of Haryana. Moreover cumin was the crop which had totally been abandoned by the farmers from their field.

In case of Rajasthan, the maximum 92.59, 79.62, 44.73 and 41.17 percent area had been reduced under cumin, coriander, taramira and gram, respectively.

It is clear from the data in the table 2 that the shift in area under different crops is comparatively higher in Haryana being a state of higher farm mechanization than Rajasthan. It implies that besides other factors, farm mechanization also plays important role in shifting the area under different crops.

Zaid (summer) crops

Table 3 reveals that the farmers of Haryana had allotted 0.46 ha of land comprising 9.37 per cent of their land holding while the farmers of Rajasthan had begun to grow vegetables on 0.44 ha of land comprising 7.21 per cent of their existing average land holding of 6.10 ha. Thus the coverage of area under vegetable during zaid season was higher (4.54%) in Haryana than Rajasthan. Sharma *et al.* (1991) also found that proportion of area under cash crops like cotton and sugarcane was more on tractor operated farms than on the bullock operated farms.

The reaons explained by farmers for introduction of vegetable crops during zaid season were, not only use of farm machines and mechanization in general but also the factors of demand and supply in the market. The increased facilities of irrigation coupled with transportation facilities were the major factors contributing to introduction of summer vegetables.

Further, it was observed that the farmers of Haryana planted green gram, on an average 0.31 (6.11%) ha while the farmers of Rajasthan planted 0.21(3.44%) ha of their total existing land holding after farm mechanization during the zaid season. It was also observed that the area on an average covered under green fodder crops in Haryana (5.70%) was higher than that of the area covered under green fodder crops in Rajasthan (3.77%). According to the farmers, the facilities which helped in growing green fodder on their fields during the zaid (summer) season were: availability of irrigation water and electric motors/diesel engines to draw the water from wells/tube wells and the tractor services available for land preparation, sowing and transportation of green fodder from crop fields to consumers. Thus, farm mechanization had helped in growing of green fodder crops on the farmers fields during zaid season.

Table 3: Shift in area under Zaid crops after farm mechanization

(Avearge area in ha)

	Crops	Haryana (N = 84)				Rajasthan (N = 83)			
		BM	AM	D	D%	BB	AM	D	D%
1.	Vegetables	0.00	0.46 (9.37)*	+0.46 (+9.37)	NIC	0.00	0.44 (7.21)	+0.44 (+7.21)	NIC
2.	Green gram	0.00	0.30 (6.11)	+0.30 (+6.11)	NIC	0.00	0.21 (3.44)	+0.21 (+3.44)	NIC
3.	Green fodder	0.00	0.28 (5.70)	0.28 (5.70)	NIC	0.00	0.23 (3.77)	+0.23 (3.77)	NIC
	Total area	0.00	1.04 (21.18)	+1.04 (+21.18)	NIC	0.00	0.88 (14.42)	+0.88 (+14.42)	NIC
	Average size of land holding		4.91 (100)				6.10 (100)		

*Figure in parenthesis indicates percent area of total average size of land holding; NIC = New introduced crop; BM = Before mechanization; AM = After mechanization; D = Change in area over pre-mechanization; %D = Per cent change in area over pre-mechanization.

CONCLUSION

The farm mechanization viz; use of tractors and their related implements, in land preparation, sowing, harvesting, threshing and transportation, use of electric motors, diesel engines in irrigation, use of sprayer, etc., are the major factors which have played very important role in changing the cropping pattern. However some other factors like market demand, profitability, improved varieties, low rainfall transportation facilities, etc. also contribute to change in cropping pattern in both Haryana and Rajasthan study areas.

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Adoption of Broiler Farming Practices

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ABSTRACT

The study reveals that the poultry farmers had high level of adoption of the practices of releasing chicks from the boxes at the earliest, preparation of brooder house before the arrival of chicks, use of good quality litter material, maintaining the required temperature during 1st week of age, recommended number of chick feeders, taking proper precautions while serving water to the chicks, feeders of required height, vaccination of chicks at right time, proper disinfection of house before starting a lot, and keeping themselves aware of prices of poultry products However, the poultry farmers' poorly adopted practices were: ensuring optimum weight of chicks during purchase, removing chick guard after prescribed days, slight hoeing of litter material at regular intervals, use of automatic temperature regulation devices, filling feeders to half level, proper cleaning the water before serving to birds, required floor space to the birds at different ages, sending dead birds for postmortem, layer of lime or phenyl soaked footpad at the door of shed and keeping record of bird mortality.

The revolutionary changes in poultry industry in the last 30 years itself is a matter of great pride. It may be accepted that advances under free range system are quickly transferred to any area applying latest poultry technology and may have continuous impact on the production and growth. The current reality is that more than 80 per cent of the Indian population has not begun to derive the benefits from the poultry industry.

Effective transfer of farm innovations and their practical application to the field situation is key to the economic development of India where majority of the population depends on agriculture and allied activities. Several programmes which are helping farmers in the adoption of new technologies are in implementation through out the country but their exploitation by the farming community has not taken place to the level considered best.

In fact, adoption - a mental process is a decision to make full use of an innovation to the best course of action available. Today, extension services in India have a large number of professional extension workers. But still there exists a wide gulf between technology available at the research system and its ultimate adoption by the client system.

Keeping all this in the background, the present investigation was undertaken with the specific objective of finding out the extent of adoption of advocated poultry keeping practices by the poultry farmers.

METHODOLOGY

The present study was conducted in Kathua district of Jammu and Kashmir. The basis for selecting the district was that it had maximum poultry farms in operation. Kathua

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district consists of eight blocks, of which four blocks viz; Kathua, Barnoti, Hiranagar and Ghagwal were selected based on maximum number of poultry farms functioning in these blocks. From each selected block, 30 peripheral(Within the radius of 10 km. distance from the block Poultry Demonstration Centre of State Department of Animal Husbandry) and 30 distant poultry (Away from this 10 k m. distance) farmers were selected following simple random sampling technique thereby constituting a sample of 240 poultry farmers (120 peripheral and 120 distant poultry farms). Data were collected using personal interview technique on a well developed and pre-tested instrument. The data obtained were analyzed using Mean Percent Scores (MPS) and ranks accordingly.

RESULTS AND DISCUSSION

Adoption by both the categories of famers i.e. Peripheral and distant has been measured under 10 major aspects viz., chick procurement practices, brooding practices, litter management practices, temperature regulation practices, feeding practices, watering practices, equipment and spacing practices, disease management practices, sanitation practices and; record keeping and marketing practices. The outcome of the study has been presented in the subsequent tables.

Adoption of chick procurement practices by the respondents:

Data presented in Table 1 explicate that nearly all the respondents release the day old chicks from the boxes at the earliest (MPS 97.91). Besides, 93.96 percent of the farmers purchased the chicks from reputed hatcheries. Majority of the respondents used to keep the uniform lot of birds (MPS 87.08) followed by counting the chicks before keeping them in brooder (MPS 79.99). They also reported keeping the chicks of recommended breed more frequently (MPS 62.70). It is quite dissatisfying that they had very poorly adopted the practice of checking wings, legs, eyes etc. of chicks while purchasing them (MPS 13.75) which is indeed an important practice to be followed.

Besides, very few farmers purchased chicks from some nearby hatchery (MPS 9.16). They were found very poorly adopting the practice of ensuring optimum weight of chicks during purchase.

Further, it is quite interesting to observe that the similar pattern of ranking for all the eight practices included under chick procurement head was observed for both the categories of respondents. This reflects that both the peripheral and distant poultry farmers had adopted the chick procurement practices with almost similar intensity.

These results might have come due to the reasons that most of the poultry farmers of the study area purchase day old chicks through commission agents from the adjoining states of Punjab, Himachal Pradesh and Haryana. Under such circumstances, they could not check the qualities or weight of the birds rather they can follow post-delivery practices very effectively in which obviously high level of adoption has been observed.

Table 1: Extent of adoption of chick procurement practices by the respondents

(n = 240)

S.No.	Practices	Peripheral		Distant		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Purchasing chicks from a reputed hatchery	96.67	II	91.25	II	93.96	II
2.	Ensuring optimum weight of chicks during purchase	5.42	VIII	4.58	VIII	5.00	VIII
3.	Keeping a uniform lot of birds	86.67	III	87.50	III	87.08	III
4.	Purchasing chicks of recommended breed/sirain	59.16	V	66.25	V	62.70	V
5.	Purchasing chicks from a nearby hatchery	10.42	VII	7.91	VII	9.16	VII
6.	Checking wings, legs, eyes ect. of chicks while Purchasing	16.67	VI	10.83	VI	13.75	VI
7.	Counting chicks before keeping them in brooder	77.91	IV	82.08	IV	79.99	IV
8.	Releasing chicks from the boxes at the earliest	97.50	I	98.33	I	97.91	I

MPS: Mean Percent Score; n: Sample Size.

(b) Adoption of brooding practices by the respondents:

The data in Table 2 vividly depict that majority of the respondents used to prepare the brooder houses well before the arrival of chicks (MPS 96.25) followed by the practice of mixing tonic in drinking water to be offered to the brooding chicks (MPS 92.70). Majority of them were also found providing proper feed and water for the brooding chicks in the brooder houses (MPS 86.25) followed by the practice of providing feed to the day old chicks on old papers/ newspapers (MPS 83.75). The practice of heating brooder house before letting in the chicks was also adopted by the respondents to an extent of 81.45 percent. They were also found frequently spreading the required thickness of bedding material on the floor (MPS 61.25). It is quite discouraging outcome of this part of study that extremely low level of adoption was found regarding use of thermometer for measuring temperature fluctuations inside the shed (MPS 4.37). Negligible adoption was found for the use of chick guard (MPS 2.91) and removal of chick guard after the prescribed number of days (MPS 1.87) both of which got last ranks.

Once again, a similar pattern of ranking was observed for all the brooding practices in both the categories of respondents.

The results might be the outcome of reason that poultry farmers of the study area usually follow the brooding in the same shed in which they are to be reared further. So, very seldom the practice of using chick guard is applied. However, the remaining practices are necessary to give a good start to the unit which might have resulted in higher level of adoption of these practices.

These findings are in contradiction to those of Khandekar and Sharma (2000) who reported that 40 percent of the poultry farmers used thermal checking devices.

Adoption of litter management practices by the respondents:

The data incorporated in Table 3 reveal that the respondents had used good quality litter material for spreading on the floor of shed (MPS 81.25) followed by the replacement of wet and crust formed litter frequently (MPS 79.17). They also had optimally adopted the required thickness of litter material at the time of starting a lot (MPS 59.16). Low adoption was found with regard to the change of litter after every lot (MPS 31.87) which is considered essential to prevent the out break of diseases and keep birds healthy. They were not frequently found to spread the recommended thickness of bedding material every month (MPS 23.74). Very low adoption was reported regarding

Table 2: Extent of adoption of brooding practices by the respondents

(n = 240)

S.No.	Practices	Peripheral		Distant		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Preparing brooder house before arrival of chicks	99.17	I	93.34	I	96.25	I
2.	Heating brooder house before letting in the chicks	85.41	V	7.50	V	81.45	V
3.	Use of thermometer for measuring temperature fluctuations	6.25	VII	2.50	VII	4.37	VII
4.	Providing proper feed and water in brooder house	88.75	VI	83.75	III	86.25	III
5.	Spreading required thickness of bedding material on brooding floor	63.34	VI	59.16	VI	61.25	VI
6.	Providing feed to the day old chicks on old newspapers	86.67	IV	80.83	IV	83.75	IV
7.	Use of chick guard	3.75	VIII	2.08	VIII	2.91	VIII
8.	Removing chick guard after prescribed days	2.08	IX	1.67	IX	1.87	IX
9.	Mixing tonic in drinking water of brooding chick	95.83	II	89.58	II	92.70	II

MPS: Mean Percent Score.

Table 3. Extent of adoption of litter management practices by the respondents

(n = 24

S.No.	Practices	Peripheral		Distant		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Use of good quality litter material	83.75	II	78.75	I	81.25	I
2.	Required thickness of litter material at the time of starting a lot	62.08	III	56.25	III	59.16	III
3.	Spreading recommended thickness of bedding material every month	24.58	V	22.91	V	23.74	V
4.	Slight hoeing of litter material at regular intervals	12.08	VII	10.41	VII	11.24	VII
5.	Maintenance of required percentage of moisture in the litter	13.34	VI	10.83	VI	12.08	VI
6.	Replacement of wet and crust						
7.	Change of litter after every lot	31.67	IV	32.08	IV	31.87	IV

MPS: Mean Percent Score.

maintenance of the requisite moisture in the litter (MPS 12.08). Very few, nearly 1/10th of the respondents were found to hoe the litter material slightly at regular intervals as recommended (MPS 11.24).

It is quite interesting that both the categories of respondents granted equal ranks to all the practices selected under the category of litter management practices indicating their uniform adoption by both of them.

Adoption of temperature regulation practices by the respondents:

The study showed that majority of the respondents maintained the required temperature inside the house during first week of age of birds (MPS 86.04). Practice of reduction of 5°F temperature every week was also found to be adopted by the respondents to the extent of 67.70 percent. Very few respondents had adopted alternative heating arrangements in case of power failures (MPS 19.79). Nearly four percent of the poultry farmers had fixed the thermometers at the recommended height on the wall from the floor/litter (MPS 3.96). Only negligible proportion of respondents i.e. 0.42 percent had used automatic temperature regulation devices in their poultry farms.

Both the peripheral and distant poultry farmers had ranked equally to all the practices included under temperature regulation category. It is further discouraging that none of the distant poultry farmers had adopte automatic temperature regulation devices.

These findings might be the outcome of the reaso that most of the farmers know the temperature requireme of poultry birds during first week but knew poorly abo the same in the subsequent weeks. Regarding alternati heating arrangements, the power in Jammu and Kashmir cheaper than other states which might have prompted the to depend solely on electricity.

Adoption of advocated feeding practices by th respondents:

A glance at the data contained in Table 4 makes vivid that the selected poultry farmers had adopted th recommended number of chick feeders to fairly a high level i.e. to an extent of 96.25 percent. They had also high adopted the recommended ratio of poultry concentrate an grinded maize (MPS 91.87). About 66.46 percent adopti was found for the use of balance ration for poultry feedi and at the same time, the adoption of the starter and finish mesh in proper proportion was found to be 41.46 percen Practices like mixing recommended doses of antibiotics the poultry feed, use of recommended differential doses feed for the poultry birds at different age groups and tilli the feeders to the half level to avoid wastage of feed we very poorly adopted by the respondents with MPS 12.0 10.83 and 10.20 respectively.

Table 4: Extent of adoption of advocated feeding practices by the respondents

(n = 240)

S.No.	Practices	Peripheral		Distant		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Recommended ratio of poultry concentrate and grinded maize	94.58	II	89.17	II	91.87	II
2.	Balanced ration for feeding poultry	63.34	III	69.58	III	66.46	III
3.	Mixing recommended dose of antibiotic in poultry feed	10.83	VI	13.34	V	12.08	V
4.	Starter and finisher mesh in proper balance	41.67	IV	41.25	IV	41.46	IV
5.	Recommended differential doses of feed to poultry birds at different age groups	12.91	V	8.75	VII	10.83	VI
6.	Recommended number of chick feeders	95.83	I	96.67	I	96.25	I
7.	Filling feeders to half level	8.33	VII	12.08	VI	10.20	VII

MPS: Mean Percent Score.

Further, it is interesting that adoption of recommended differential doses of feed for the poultry birds at different age groups obtained fifth rank in case of peripheral (MPS 12.91) and seventh rank in case of distant poultry farmers. Likewise, adoption of mixing recommended doses of antibiotic in the poultry feed secured sixth rank (MPS 41.67) for peripheral and fifth rank for distant poultry farmers (MPS 13.34). Similarly, adoption of the practice regarding filling feeders to half level got seventh and sixth rank for peripheral and distant poultry farmers with MPS 8.33 and 12.08 respectively.

Adoption of watering practices by the respondents:

The study revealed that almost all the respondents used to take proper precautions while serving water to the chicks (MPS 97.92) followed by the adoption of cleaning the chick drinkers as per the recommendations (MPS 91.45). A higher degree of adoption was also observed for providing water to the chicks for the required number of times (MPS 87.50). However, comparatively poor adoption was found for keeping drinkers at the required distances and proper cleaning the waterers before serving it to the birds with MPS 35.84 and 24.37 respectively.

Further, similar pattern of ranking has been observed for both the categories of farmers in relation to the adoption of watering practices by them. These findings are in agreement with those of Mathivalagan (1997) who revealed that waterers were kept at proper space by majority of the respondents.

Adoption of equipment and spacing practices by the respondents:

The study showed that almost all the poultry farmers had used the feeders of required height (MPS 92.71) followed by feeders and waterers of required depth (MPS 91.04). However, low adoption was found for the required waterer space to the birds (MPS 18.50), required feeder space to the birds at different ages (MPS 17.49) and required floor space to the birds at different ages (MPS 14.58). Thus regarding equipments, there was higher adoption but lower adoption was found in case of space requirements.

A further perusal of data makes it vivid that the required feeder space to the birds at different ages obtained third rank in case of peripheral (MPS 14.58) and fourth rank in case of distant (MPS 20.41) poultry farmers. Contrarily, required waterers space to the birds obtained fourth rank for peripheral (MPS 13.67) and third rank for distant (MPS 23.34) poultry farmers.

Adoption of disease management practices by the respondents:

The study showed (Table 5) that respondents were found to perform vaccination of chicks at proper time

Table 5: Extent of adoption of disease management practices by the respondents

(n = 24

S.No.	Practices	Peripheral		Distant		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Examining chicks regularly for their health	85.41	II	81.67	II	83.54	II
2.	Isolation of underdeveloped and weak chicks	15.83	IV	14.58	IV	15.20	IV
3.	Vaccination of chicks at right time	95.83	I	92.91	I	94.37	I
4.	Sending dead birds for postmortem	1.25	V	0.00	V	1.25	V
5.	Recommended doses of vaccine	75.84	III	79.17	III	77.50	III

MPS: Mean Percent Score; n: Sample Size.

to a highly commendable level as evident from its intensity nearly total (MPS 94.37). Besides, majority of them were found examining the stock of chicks regularly for their health (MPS 83.54), followed by use of recommended doses of vaccines (MPS 77.50). However, respondents very poorly reported following the practice of isolating the underdeveloped and weak chicks from the rest of lot (MPS 15.20). It has also been found that the respondents very rarely send or take the dead birds for post-mortem operations (MPS 1.25) to identify the cause of diseases.

There had been a similar pattern of ranking by both the categories of respondents assigned to the items under important disease management practices. It is alarming indeed that none of the distant poultry farmers used to send dead birds for their post mortem examinations.

CONCLUSION

It can be concluded from above findings that the sampled poultry farmers were found having high level of adoption of the practices of releasing chicks from the boxes at the earliest, preparation of brooder house before t arrival of chicks, use of good quality litter materi maintaining the required temperature during 1st week age, recommended number of chick feeders, taking prop precautions while serving water to the chicks, feeders required time, vaccination of chicks at right time, prop disinfection of house before starting a lot and keepi themselves aware of prices of poultry products. Howev the poultry farmers were found poorly adopting practic viz. ensuring optimum weight of chicks during purchas removing chick guard after prescribed days, slight hoei of litter material at regular intervals, use of automat temperature regulation devices, filling feeders to half lev proper cleaning the water before serving to birds, requir floor space to the birds at different ages, sending dead bir for postmortem, layer of lime or phenyl soaked footpad the door of shed and keeping record of bird mortality. It therefore suggested that the extension efforts strengthened in the study area to augment the rate adoption and create proper awareness among poult farmers regarding the practices for which poor adopti has been found.

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Traditional Folk Media in Rural Maharashtra

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ABSTRACT

Traditional folk media have a remarkable impact on the rural society because of their acceptable idioms, functional significance and entertainment component. The present study was conducted in Nagpur district of Vidarbha region in Maharashtra state. Only five traditional media namely Tamasha, Bhajan, Kirtan, Dhandhar, Quawali were studied. The most liked traditional media was Tamasha due to its lively performance and story contents based on current topics. Overall first preference for items on traditional media was given to social themes followed by patriotic songs. The major reasons attributed to declining trends all traditional media were poor presentation of folk artists followed by easy availability of variety of programmes on television. The artists were encouraged during the show for good performance by clapping and rewarding money. There is need to give financial support, incentives and training if we want these arts to be conserved and promoted.

Role of communication is very important since dawn of history. It is an essential input in development process of the society. No communication fully exists in cultural vacuum. Modern mass media is flourishing now-a-days, but these are not performing roles which are expected from them due to several reasons like illiteracy, high cost, highly technical, lack of electricity, improper transports etc. Our country is very rich in various culture and traditions. Traditional folk media have a remarkable impact on the rural society because of their acceptable idioms, functional significance and entertainment component. Several authors have stated that traditional media are very effective in rural communication process. Also some of the five star hotels are using these media for entertaining the tourists and some popular artists making lots of money by performing their shows in cities. Unfortunately traditional media are not used frequently in extension teaching methods. Keeping this in view, this study was undertaken with following specific objectives of collecting and documenting the important traditional folk media in rural Maharashtra.

METHODOLOGY

The present study was conducted in Nagpur district of Vidarbha region in Maharashtra state. For the purpose of this study, three villages namely Ghorad, Budhala and Kaniyadhol were purposively selected in which traditional media shows were performed regularly. Using random sampling method, sixty viewers each from all villages were selected. Documentation of traditional folk media was done through primary as well as secondary sources.

RESULTS AND DISCUSSION

Documentation of traditional media

Earlier, there were several traditional media found in rural Nagpur district. All are not doing well at the moment. The following traditional media in order of importance are still popular as indicated by perusal of documents and observations:

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1. *Tamasha*, 2. *Bhajan*, 3. *Kirtan*, 4. *Dhandhar*, 5. *Quawwali*, 6. *Jatra*, 7. *Ganeshutsav*, 8. *Drama*, 9. *Dhind hi*, 10. *Shankarpat*, 11. Song at the time of harvesting and 12. Songs at the time of festivals, child birth and marriage.

Socio-personal characteristics

The study showed that more than half of the viewers (56.66%) belonged to the young age group and most of them (74.93%) were educated upto high school, 86.58 precent belonged to the backward castes 46.07 per cent were engaged in the occupations such as farming only, 41.67 per cent, belonged to the lower annual income i.e. up to Rs. 22,500, 86.58 per cent possessed small land holding i.e. up to three hectares only, 71.60 per cent were of medium socio-economic status. Same was true for their family members (63.27%) and majority (64.38%) had medium mass media exposure.

The investigation further showed that a large number of respondents were visitors of *Tamasha* (71.59%) and *Bhajan* (59.94%). Comparatively lower number were visitors of *Kirtan* (29.97%), *Dhandhar* (16.65%) and Drama (8.33%). It was observed that more programmes of *Tamasha and Bhajan* were organised which led to their popularity.

Preferred place of viewing of traditional media was village itself (71.59 to 100%). A little over one fourth viewers (28.31%) went to see *Tamasha* at *Tehsil* level when some eminent group performed. This point needs to be considered while performing traditional media for agricultural development. Such shows should be organised in the village itself to have maximum participation and impact.

Most of the shows of *Dhandhar* (100 %), *Tamasha* (77.22 %) and *Kirtan* (76.44 %) were performed during Diwali. Same was true for *Bhajan* (69.69 %) and Drama (40.02 %). *Bhajans* were organised during *Navratras* as mentioned by about one fifth (21.21 %) respondents.

During that time people are in spiritual mood and like to have such gatherings. Relatively less traditional media shows were organised at the time of *Ganesh mahostav* (7.0 to 11.77 %). Drama was the highlight of *Makar Sankaranti* celebrations as told by 60 percent respondents.

Cent percent respondents have reported that Bhajan, Kirtan, Drama and Dhandhar were organized by the interested people in the traditional media shows of the village. According to about one-third respondents (32.81%) *Tamasha* programme was organized by the young people in the village. This point needs to be noted that there were some interested people in the village who took a lot of initiatives in organising such activities. If we want to use

Table 1: Distribution of viewers according to most liked traditional media and its reasons (n = 180)

Most liked traditional media	Frequency	%
I. *Tamasha*	**111**	**61.61**
Reasons :		
Lively performance	45	40.50
Story or content based on current topics	33	22.70
Colourful style of presentation	12	10.80
Melodious voice of the singer	6	5.40
Well synchronized voice of the singers and rhythm of instruments	6	5.40
Good dance steps	6	5.40
Compatible with audience culture	3	2.70
II. *Bhajan*	**84**	**46.62**
Reasons :		
Contents covering familiar religious themes	72	85.68
Melodious voice of the singer	9	10.71
Compatible with audience's culture	3	3.57
III. *Kirtan*	**48**	**26.64**
Reasons :		
Contents covering familiar religious themes	21	43.68
Story or content based on current topic	15	31.25
Compatible with audience's culture	9	18.72
Colourful style of presentation	3	6.24
IV. *Dhandhar*	**12**	**6.67**
Reasons :		
Lively performances	3	25.00
Well synchronized voice of the singers and rhythm of instruments	3	25.00
No vulgarity in the contents/ performance	3	25.00
Content related with religious theme	3	25.00
V. *Quawwalli*	**11**	**6.11**
Reasons :		
Melodious voice of singer	8	72.73
Colourful style of presentation	3	27.27

traditional media for agricultural development purpose, we need to get in touch with them, train and give them the needy help might be in cash or kind.

Among the different traditional media Tamasha was the most liked one as perceived by 61.61 per cent of the viewers. Out of 111 viewers who placed *Tamasha* at first rank, the most mentioned reasons for the likedness were: lively performance (40.50 %) followed by story or contents based on current topics (22.70 %). Other reasons contributing towards its favourability were, content related to current topics (10.80 %), melodious voice of singer (5.40 %) and due to well synchronized voice of the singer and rhythm of instruments (5.40 %) and good dance by the dancer (5.40%). It is concluded that *Tamasha* was most liked due to lively performance and its story based on the current topic. This finding needs to be given special attention. Artists doing *Tamasha* shows need to be given full support in terms of training, financial assistance and appreciation in the form of awards. They can be trained in social development themes such as agricultural development to reach each and every farmer of Maharasthra. Electronic media can also telecast *Tamasha* shows incorporating developmental themes to take full advantage of its popularity.

According to 46.62 per cent viewers, *Bhajan* was their all time favourite and most liked traditional media. Reasons given by them were; contents covering familiar religious themes (85.68 %) melodious voice of the singer (10.71 %) 'and folk artists performances compatible with audiences' culture (3.57 %). The results show deep religious inclination of a large number of rural viewers. Care should be taken that their religious sentiments are respected while planning traditional media for agricultural development. Nothing controversial or hurting should make the contents of such gatherings.

Nearly one fourth (26.64%) of the viewers felt that *Kirtan* was their most liked traditional media. Reasons given by them were, content covering familiar religious themes (43.68%), story or content based on current topics (31.25%) followed by its compatibility with audiences' culture (18.72%) and colourful style of presentation (6.24 %). Extension programmes especially for women are normally started with *Kirtan*. It attracts a lot of women. Same strategy can be used for male farmers based on this result.

A few viewers (6.67 %) felt that *Dhandhar* was their most liked traditional media. Reasons given by viewers were lively performances, synchronization of voice of the singer, rhythm of instrument and no vulgarity in the content and content related with religious theme (25 % for each reason). It was however, found that there were very few viewers of *Dhandhar*. Lack of availability of such programmes in this area could be the reason for its less popularity.

Tamasha was mentioned as least liked traditional media by 26.64 percent of the viewers (Table 2). The main reason attributed for dislike was poor quality performance by artist (87.5 %). Since *Tamasha* was most commonly visited traditional media, the viewers had most responses

Table 2: Distribution of viewers according to their least liked traditional media and its reasons (n = 180)*

Least liked traditional media	*Tamasha*	*Bhajan*	*Kirtan*	*Dhandhar*	*Quawwalli*
Least liked	48 (26.64)	33 (18.32)	33 (18.32)	39 (21.65)	3 (1.67)
Reasons :					
Poor quality performance by artists	42 (87.50)	6 (18.18)	9 (27.27)	9 (23.07)	-
Folk artists have low status in the society	3 (6.24)	3 (9.09)	-	6 (15.36)	-
More religious contents	-	24 (72.72)	21 (63.63)	-	-
Lack of availability	-	-	3 (9.09)	21 (53.76)	-
Due to role of dancer performed by male	3 (6.24)	-	-	-	-
Political conflict in the village	-	-	-	3 (7.68)	-

*Multiple responses.

Table 3: Distribution of viewers according to their preference for the themes of traditional media (n = 180)

Themes of traditional media	Preference of the viewers				Total score
	I	II	III	IV & above	
Social development	87 (48.28)	30 (16.65)	33 (18.31)	18 (9.99)	522
Patriotic songs	60 (33.30)	60 (33.30)	36 (19.98)	9 (4.99)	501
Recreational and entertainment	21 (11.66)	48 (26.64)	42 (23.31)	51 (28.30)	363
Political aspects	3 (16.65)	6 (3.33)	21 (1.66)	84 (46.62)	177
History of freedom fighter	3 (16.65)	12 (6.66)	27 (14.99)	69 (38.29)	171
Religious	12 (6.66)	18 (9.99)	9 (4.99)	51 (28.30)	171
Ritual and ceremonial	0 -	6 (3.33)	6 (3.33)	42 (23.31)	72

to it in least liked category also. Next in the list was *Dhandhar* (21.65 %). The main reason given for its unpopularity was its lack of availability (53.76 %). *Bhajan* the dislike was their more religious contents which they did not enjoy as mentioned for *Bhajans* (72.72 %) and *Kirtan* and *Kirtan* were least liked by about nearly one fifth (18.32 %) of the viewers each. The most important reasons for (63.63 %). Overall first preference items of traditional media (Table 3) was given by viewers to social development themes (522 total score), second to patriotic songs (501 total score) and third preference was for recreation and entertainment (363 total score). The fourth highest overall score for theme preference went to political (overall score 177) followed closely by history of freedom fighter and religious (overall score 171 each).

Ritual and ceremonial themes were least popular. Extension personnel should take special note of it. While organising developmental theme shows of traditional media, focus on social' themes, patriotic themes and entertainment themes should be made. Only then success of such programmes will be assured.

The major reasons attributed to declining trends in all traditional media were poor presentation of the folk artists (37.98%) followed by easy availability of variety of programmes on television (25.74 %).

In case of *Tamasha*, the most popular traditional media, declining trend was due to poor presentation of the folk artists (37.98 %) and easy availability of variety of programmes on television (25.74 %). A substantial number of viewers (18.72 %) attributed the declining trend to lack of incentives and economical support to folk artists and also poor response from the audience (8.58 %). A few viewers (2.34 %) of *Tamasha* expressed their concern about low status of folk artists and lack of proper caring by organisers towards the folk artists.

Same reasons were attributed for *Bhajan* as a declining trends, poor presentation of folk artists (92.30%) followed by easy availability of variety of programmes on television (7.68%).In case of *Kirtan* and *Dhandhar*, the decline was due to old people still continuing their performance as youngsters were not willing to take it up.

It is noted that most of the viewers (89.91%) registered their response during the show by clapping as it provided self satisfaction (81.48%) and helped encourage the folk artist (18.60%). Only three viewers had given response by shouting for self enjoyment. Some viewers

(34.97 %) preferred to respond by rewarding money to the folk performer. The reasons attributed to such response was personal prestige (28.57 %) and encouragement for the folk performer (71.55 %). It was also noted that not more than Rs. 50/- were rewarded. Only a few viewers (3.33 %) had responded during the show by walking out due to the content related with more religious themes which probably did not interest them.

CONCLUSIONS

Traditional folk media are still popular in rural Maharashtra though they show a declining trend. Quality of performers needs to be improved through proper training through established music and dance schools which are virtually non-existant at the moment. There is need to give financial support and incentives to the artists if we want these arts to be conserved and promoted.

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Clientele of Public, Private and NGOs Agricultural Extension

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ABSTRACT

The pluralistic agricultural extension system demands to generate information on type of clientele they concentrate and it is necessary to formulate future extension approach and to revitalize the public extension system. Hence, a research study was undertaken with the objective to find out the clientele characteristics in the public, private and NGOs extension in three districts of Karnataka State, India, during 2003. Based on judges relevancy rating eight characteristics of clientele were selected. Information was collected from 210 clientele covered by public and private extension organizations like; Farmers' Contact Centres (FCCs), Agri-Business Firms (ABFs), Agricultural Consultancies (ACs) and Non-Governmental Organizations (NGOs). To quantify the selected clientele's characteristics, standard measurement tools such as summated rating scales, index and structured schedule have been used. Personnel interview method was employed for collection of data. Results revealed that Agricultural Consultancies clientele had high level of education, annual income, farm size, irrigation intensity, innovation proneness and extension service commitment. Whereas, NGOs clientele had low level of education, annual income, marginal and small farm size. The Farmers' Contact Centres and Agri-Business Firms clientele had medium level of annual income, farm size and low level of extension service commitment.

Over the years, agricultural extension viewed as a public good and has been financed by the public sector in most countries (Dinar, 1996). But, in recent past, financial burden on governments, disappointing performance of public extension (Ameur, 1994; Hansra and Adhiguru, 1998; and Saravanan, 1999a) and opportunities in Global free market economy calls for structural and functional adjustment with cost effective and demand driven approach (Saravanan, 1999b). Further, in the present globalization and liberalization era, plant breeders rights, patent rights to specific technologies has facilitating emergence of private sector in agricultural extension (Umali, 1997). The NGOs are entering in a big way in agricultural extension service provision (Saravanan, 2001). In this existing scenario, emerging pluralistic agricultural extension system demands to generate information on type of clientele they concentrate and it is necessary to formulate future extension approach and to revitalize the public extension system (Saravanan, 2003). Hence, a research study was undertaken with the objective to find out the clientele characteristics in the public, private and NGOs extension.

METHODOLOGY

The research was conducted in Chitradurga, Kolar and Tumkur districts of Karnataka State, India, during, 2003. The extension organizations selected are given in Table 1. Considering number of extension personnel working in field level, one client for each extension person was selected randomly in Farmers' Contact Centers. But in private extension system, comparatively less number of extension

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personnel and clientele were available. Hence, two clientele for each extension personnel were selected.

Table 1: Selected public and private extension organizations and sample size

Public and private extension organizations	Clientele sample size
Public extension	
Farmers' Contact Centers -15	60
Private extension	
Agri-Business Firms	
1. Hindustan Lever Limited (HLL)	6
2. Global Green Co. Ltd.	22
3. Unicom Ltd.	24
4. PEPSICO: India Holdings Pvt. Ltd.	8
	60
Agricultural Consultancies	
1. Rallis Kissan Kendra - A TATA Enterprise	8
2. Vaishnavi Farm Services: Agricultural Consultants and Agro-Chemical Suppliers	22
	30
Non-Governmental Organizations (NGOs)	
1. Bharat Agro-Industries Foundation (BAIF)	
2. Institute for Rural Development-Karnataka (BIRD-K)	28
3. Mysore Resettlement and Development Agency (MYRADA)	14
4. OUTREACH: Volunteers of Rural Development	12
PRAYOG: Centre for Agricultural and Rural Development	12
	60
Public extension clientele	60
Private extension clientele	150
Total sample size	210

Clientele's characteristics: Referring books, journals, discussion with the extension experts, academicians, farmers, extension personnel from state developmental departments and NGOs a large number of clientele characteristics were listed. The listed characteristics were mailed with appropriate instructions to 110 judges and they were asked to check each of the characteristics for being relevant or not relevant, using three point continuum viz., Most Relevant, Relevant and Not Relevant. The response were obtained from 74 judges (67.27 per cent). The relevancy score for each objective was worked out by using following formula:

$$\text{Relevancy percentage} = \frac{\text{Most Relevant Response} \times 2 + \text{Relevant Response} \times 1}{\text{Maximum Possible Score } (72 \times 2 = 148)} \times 100$$

The characteristics having relevancy percentage of more than 75 were selected. Accordingly, eight characteristics were selected. To quantify the selected clientele's personal, economic, situational and psychological characteristics, standard measurement tools such as; summated rating scales, index and structured schedule have been used. Personnel interview method was employed for collection of data. Based on the scores obtained by the respondents they were categorized in to three categorized in to three categories like Low (< Mean-1/2 SD), Medium (Mean + 1/2 SD) and High (>Mean + 1/2 SD). Results were expressed in percentage.

RESULTS AND DISCUSSION

Personal, Economic and Situational Characteristics of the Clientele

Education: Comparison of all the agricultural extension organisations' clientele education level in Table 2 clearly indicates that there is not much difference in educational level among the clientele of different organisations. However, NGOs, Farmers' Contact Centres and agribusiness firms clientele are mostly less educated and in contrast to this agricultural consultancies clientele had high level of education. It is a fact that, farmers in rural areas possess less education. In agricultural consultancies, most of the clientele were progressive and well educated. Further, most of them were holding some office, based on their education as a primary education and agriculture becoming secondary occupation for them.

Farming experience: Overwhelming majority of the public and private extension clientele had high to medium

Table 2: Education level, farming experience and annual income of the public and private extensi

Category and characteristics score	Public extension	Private extension	
	SDA-FCCs ($n_1 = 60$)	Ag. buss. firms ($n_2 = 60$)	Ag. consultancies ($n_3 = 30$)
	Per cent (%)	Per cent (%)	Per cent (%)
Education			
Low - Up to primary	43.33	46.67	23.33
Medium - 6th std to 12th std	46.67	38.33	43.33
High - Degree	10.00	15.00	33.33
Farming experience			
Low - Up to 4.54	0.00	0.00	2.17
Medium - 4.55 to 9.50	10.00	26.67	13.33
High - 9.51 and above	90.00	73.33	83.3375.00
Annual income			
Low - Up to 33, 750	21.67	13.33	13.33
Medium -3 3, 751 to 1,44,500	63.33	78.33	40.00
High - 1, 44,00 1and above	15.00	8.33	46.67
Mann - Whitney U test			
Education		Public vs private: 0.445*	
	FCCs vs ABF: 0.372*	FCCs vs ACs: 0.073**	FCCs vs NGO
	ABFs vs ACs: 0.016**	ABFs vs NGOs: 0.3 15*	ACs vs NGO
Farming experience		Public vs private: 0.403*	
	FCCs vs ABF: 0.1 70*	FCCs vs ACs: 0.456*	FCCs vsNGO
	*ABFs vs ACs: 0.1 88**	*ABFs vs NGOs: 0.3 15**	*ACs vs NGOs*
Annual income		Public vs private: 0.026	
	FCCs vs ABF: 0.876*	FCCs vs ACs: 0.000**	FCCs vs NGO
	ABFs vs ACs: 0.000*	ABFs vs NGOs: 0.000**	ACs vs NGOs

*,**Significant at 5 and 1 per cent level respectively.

is ranges from Rupees 33,750 to Rs. 1,44,000, whereas, agricultural consultancy clientele were having medium and *high level of income. It was mainly because of their potential of land, favourable soil with sufficient water resources. Further, most of them earning from non-agriculture* occupation also, as a continuous income. In contrast to this, great majority of NGOs clientele had low income level. It is a fact that majority of the NGOs are concentrating on resource poor farmers and also few NGOs are exclusively concentrating rural population who are below poverty line.

Farm size: The data in Table 3 reveals tha *of the Farmers' Contact Centres clientele were small and medium land holders. Whereas, small p of marginal farmers, who are approaching Farmers Centers . It is due to majority of the marginal far* not have the sufficient resources to practice the a technologies, this may restrict them to appro agricultural advisory service. Further, generally big are proportionately less compared to small and farmers. Hence, data shows less proportion

landholders. Whereas majority of the clientele of agribusiness firm and agricultural consultancies had medium and large land holdings. This was mainly due to some agribusiness firms only concentrating on large landholders with assured irrigation potential (HLL, PEPSI for tomato and chilli contract farming) whereas, some' agribusiness firms concentrating farmer who are having assured irrigation and they will allow only small land area to maintain quality of the produces (Gherkin cultivation). In contrast to this, overwhelming majority of the clientele of NGOs had marginal and small land holdings, because generally NGOs concentrating on farmers who are below poverty line, resource poor, rainfed area and farmers possessing lands in watershed area. Interestingly, clientele of agricultural consultancies had big and medium land holdings. Because it is elite at educated farmers with large land holdings who approach for agricultural advisory service for which they normally pay.

Table 3: Farm size, irrigation intensity and cropping intensity of the public and private extension clientele

(n = 210)

Category and score	Public extension	Private extension		
	FCCs ($n_1 = 60$)	Ag. buss. firms ($n_2 = 60$)	Ag. consultancies ($n_3 = 30$)	NGOs ($n_4 = 60$)
	Per cent (%)	Per cent (%)	Per cent (%)	Per cent (%)
Farm size				
Marginal - below 2.50 ac	18.33	3.33	13.33	50.00
Small - 2.51 to 5.0 ac	30.00	20.00	23.33	40.00
Medium - 5.01 to 10.00 ac	36.67	28.33	20.00	6.67
Big - above 10.00 ac	15.00	48.33	43.33	3.33
Irrigation intensity				
Low - up to 63.21	35.00	0.00	6.67	58.33
Medium - 63. 22 to 115.28	48.00	46.67	66.67	31.67
High - 11 5. 29 and above	16.67	53.33	26.67	10.00
Cropping intensity				
Up to 94. 81	8.33	1.67	3.33	5.00
94.82 to 128.38	81.67	46.67	80.00	93.33
1 28.39 and above	10.00	51.67	16.67	1.67

Mann - Whitney U test			
Farm size		Public vs private: 0.053**	
	FCCs vs ABF: 0.000**	FCCs vs ACs: 0.060**	FCCs vs NGOs: 0.000**
	ABFs vs ACs: 0.2633*	ABFs vs NGOs: 0.000**	ACs cs NGOs: 0.000**
Irrigation intensity		Public vs private: 0.0937**	
	FCCs vs ABF: 0.000**	FCCs vs ACs: 0.005**	FCCs vs NGOs: 0.001**
	ABFs vs ACs: 0.173*	ABFs vs NGOs: 0.000**	ACs vs NGOs: 0.000**
Cropping intensity		Public vs private: 0.644*	
	FCCs vs ABF: 0.000**	FCCs vs ACs: 0.001**	FCCs vs NGOs: 0.021**
	ABFs vs ACs: 0.003**	ABFs vs NGOs: 0.000**	ACs vs NGOs: 0.275**

*,**Significant at 5 and 1 per cent level respectively

Irrigation intensity: Majority of the clientele of Farmers' Contact Centres and NGOs had low to medium level of irrigation intensity. This was mainly because of NGOs clientele were mostly resource poor and they were from rainfed area. Whereas, agribusiness firms selecting only those farmers who are having assured irrigation supply because of tomato and gherkin cultivation needs assured irrigation. Further, gherkin crops were cultivated three times in a year. This was main factor to show high level of irrigation intensity among agribusiness clientele. Whereas agricultural consultancy farmers were mainly from plantation crops, hence they are coming under medium to high level of irrigation potential.

Cropping intensity: Clientele of Farmers' Con Centres agricultural consultancies and NGOs had medi level of cropping intensity, which is due to most of Farm Contact Centers ; NGOs cultivating annual crops with sn proportion may be with plantation crops. Due to continu guidance of NGOs extension personnel, rainfed farm also atleast cultivating seasonal crops. Whereas, most the agricultural consultancies clientele were plantat growers, which gives cent percent of cropping intens In contrast to this, majority of the clientele of agri busin firms had high cropping intensity, which was mai attributed by the gherkin contract cultivation where farm cultivate three crops in a year. Consultancies also aim increasing the overall profit of farmers by advising h cropping intensity.

Table 4: Innovation proneness and extension service commitment of the public and private extension client

(n = 2

Category and score	Public extension	Private extension		
	SDA-FCCs ($n_1 = 60$)	Ag. buss. firms ($n_2 = 60$)	Ag. consultancies ($n_3 = 30$)	NGOs ($n_4 = 60$)
	Per cent (%)	Per cent (%)	Per cent (%)	Per cent (%)
Innovative proneness score				
Low - upto 6.21	36.67	25.00	33.33	41.67
Medium - 6.22 to 8.25	31.67	36.67	20.00	40.00
High - 8.26 and above	31.67	39.33	46.67	18.33
Extension service commitment				
Up to 18.77	31.66	47.67	30.00	25.00
18.78 to 26.51	43.33	31.67	17.67	18.33
26.52 and above	25.00	21.67	53.33	56.67

Mann - Whitney U test		Public vs private: 0.787*	
Innovative proneness	FCCs vs ABF: 0.000**	FCCs vs ACs: 0.291*	FCCs vs NGOs: 0.019*
	ABFs vs ACs: 0.619*	ABFs vs NGOs: 0.000**	ACs vs NGOs: 0.019**
Extension service commitment		Public vs private: 0.1 58*	
	FCCs vs ABF: 0.263*	FCCs vs ACs: 0.022**	FCCs cs NGOs: 0.019*
	ABFs vs ACs: 0.000**	ABFs vs NGOs: 0.000**	ACs vs NGOs: 0.965**

*,**Significant at 5 and 1 per cent level respectively.

Innovation proneness: Table 4 indicates that, with respect to innovation proneness character, the Farmers' Contact Centres and agri business firms clientele, almost equally distributed in all the three categories. But, three-fourths of agricultural consultancy clientele possessed medium and high level of innovation proneness character, which is mainly due to the clientele mostly came from non-agricultural background, more educated and also they had non-agriculture as a primary occupation. They also ready take high risk by going for advanced technologies to make more profit. Whereas, four-fifths of NGOs clientele had low and medium innovation proneness character, which is mainly attributed to their less education level, rainfed nature of agriculture makes to complacent in using recent technologies and resource poorness may made them less innovative.

Extension service commitment: Three-fourths of Farmers' Contact Centres clientele had low and medium extension service commitment, which might be due to difficulty in access of extension personnel, lack of timely input supply, less accountability of public extension personnel, blanket nature of recommendations. Absence of extension personnel even during normal office hours was found. Similar trend was also noticed in agri business firms. Which is due to the fact that extension personnel of agri business firms generally concentrate only on contract crops like gherkin and tomato cultivation. Further, the extension personnel are not from technical background and they are less competent to provide advice to other crops.

Majority of the clientele of agricultural consultancies and NGOs had high level of extension service commitment, which is mainly due to the high accountability and committed service of the extension personnel. Services are need based and client-specific. In agricultural consultancies, clientele were paying for the extension services and hence the demands appropriate service to increase their farm income.

Mann-Whitney U test in all the tables revealed that in public and private extension organizations, the study variables were compared with all possible seven combinations. Interestingly, all the variables had significant difference from each other.

CONCLUSION

From the results it is concluded that Agricultural Consultancies clientele were had high level of education, annual income, farm size, irrigation intensity, innovation proneness and extension service commitment. Whereas, NGOs clientele had low level of education, annual income, marginal and small farm size. The Farmers' Contact Centres and Agri-Business Firms clientele had medium level of annual income, farm size and low level of extension service commitment.

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Impact of Summer School on Mechanizat Rice Production S

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ABSTRACT

The impact of Summer School on Mechanisation of Rice Production System was conducted amor 13 participants of SAU's, KVK's and State Department of Agriculture with participatory mode. questionnaire was devised to collect the information about socio-personal characteristics, opinion abo summer school, feed back, knowledge level of participants and the resons for attending the summ school. Collected informations were analysed with the suitable statistical techniques. Majority of t participants were in the age group of 30-50 years. They had very good opinion about the learning experienc use of audio-visual aids including power point projection. More than three-fourth participants expresse that subject matter covered were highly useful. Participants had increased knowledge level and the ga was only 12.70 per cent at the completion of summer shcool. The reasons for attending were to get i depth knowledge about equipments, to acquire skills, to establish rapport and linkage with scientists. Mo than half of the participants had high level of satisfaction and they commended May/June months we appropriate period to organize the summer school.

Monitoring and evaluation is an in-built mechanism in extension and training system. It serves as a tool for efficient operation of training programmes by providing feed back. It assists for taking corrective measures by the course/ training coordinator for effectiveness of training programmes. CIAE, Bhopal conducted the summer school on Mechanization of rice production system for increased productivity from 28 May to 17 June 2003 for 13 participants with a view to prepare trainers of SAUs and KVKs and agricultural officers with participatory mode to equip them with better understanding of mechanized rice production system. The impact of the summer school was assessed by evaluating different components of the programme.

METHODOLOGY

The evaluation was aimed to know the per all the thirteen participants on different aspe summer school. The participants were in the scientists/teachers of ICAR Institutes and S summer school was conducted in participatory update the SAU/ICAR researchers, teachers and specialists to the latest knowledge and techniqu mechanization.

A questionnaire was devised in consultatio participants. Socio-personal information of the pa were collected. The opinion of the participants c aspects of the summer school were recorded vi disagree. Feedback were collected in respect of

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of the course: highly useful/useful /less useful; coverage and quality of presentation : very good/good/average and time to cover the topics: too long/adequate/short. Feed-back with respect to the practicals were recorded on a three point continuum: learned a new skill/a known skill further sharpened/no new learning.

To assess the impact of the summer school in terms of increase in knowledge level of the participants, knowledge tests were made before and after the summer school. For each of the correct answer of the participants score of one was assigned. The data were statistically analysed to measure the knowledge gained by the participants after completeting the summer school.

To determine the level of satisfaction, the participants were asked to rate the summer school in respect of the course content, coverage and method of presentation by the instructors, relevance of the subject to their need, general arrangement and lab facility on a five point continuum: very well satisfied/well satisfied/partially satisfied/partially dissatisfied/ dissatisfied with the scores of 5/4/3/2 and 1 respectively. Accordingly the satisfaction of the participants were classified into three levels having scores > 20 (high), 16-20 (medium) and <16 (low). The maximum and minimum scores were 25 and 5 respectively. The data were presented in frequency and percentage basis to draw inferences.

The reasons for attending the summer school by the participants were collected on a three point continuum; strongly agree/ agree/ disagree and expressed in percentage.

RESULTS AND DISCUSSION

Profile and personal characteristics of the participants

The participants were scientists/teachers/trainers of ICAR Institutes, SAUs and state agricultural departments from 07 states of the country. The group was heterogeneous in respect of their age, education and service experience. Majority (84.62%) of the participants were in the age group of 30-50 years and only 7.6 % were each below 30 and above 50 years of age. This has shown the need of refresher course for the middle aged group.

Opinion of the participants on different aspects of the summer school

All participants expressed their opinion (Table 1) that it was a good learning experience and they gained knowledge and skill by participatory discussion and interactions. Use of A-V aids including power point projections were adequate and time was fully and effectively utilized. More than 90% of the participants have agreed that it was easy to remain attentive, helped to change their attitude by participation and they would like to attend another programme when organized in similar way. Majority of the participants have expressed that boarding and lodging were good.

Table 1: Distribution of participants with respect to their opinion on different aspects of the summer school

(n = 13)

Sl. No.	Opinion/Statement	Agree (%)	Disagree (%)
1	It was a good learning experience	100.00	0.00
2	It was easy to remain attentive	92.40	7.60
3	Knowledge was gained by participation	100.00	0.00
4	Attitude changed by training	92.40	7.60
5	Skill developed by participation	100.00	0.00
6	Training sessions followed by discussion	100.00	0.00
7	AV-Aids were used for training	100.00	0.00
8	Time was fully utilized	100.00	0.00
9	Boarding was good	84.62	15.38
10	Lodging was good	84.62	15.38
11	I would like to take another training presented in this way	92.40	7.60

Feedback of participants on the topics covered

The feed-back showed that the utility of the subject matter/topics covered were highly useful and useful as expressed by majority of the participants. For the coverage and quality of presentation more than three-fourth of the participants have rated very good and good. They expressed that the resource persons were highly competent and devoted to the classes. The time allocated for each subject/ topic was adequate as expressed by more than three-fourth of the participants except for few topics. Forty six per cent of the participants opined that the time required to cover the topics: manufacturing technology of selected rice

Table 2: Feed back of participants on practical classes

Sl. No.	Topic/Technique	Learned a new skill (%)	A known skill further sharpened (%)	No learn
1	Self propelled rice transplanter : 8 row -single wheel	30.76	69.24	(
2	Self propelled rice transplanter : 6 row 4-wheel drive	53.86	30.76	1
3	Wet sieving measurements	38.46	61.54	(
4	Moisture measurement by TDR technique	69.24	15.38	1
5	Bulk density measurements	0.00	76.92	2
6	Penetrologger and data analysis	92.31	7.69	0
7	Shear meter : Measurement technique	46.16	46.15	7
8	pocket penetrometer	69.23	30.77	0
9	Pocket shear meter	61.54	38.46	0
10	Mat type rice nursery raising technique	53.85	46.15	0
11	Mech. tray preparation for rice nursery raising	53.85	46.15	0
12	Load car measurements	53.85	30.77	15
13	Testing of straw baler	76.92	23.08	0
14	Testing of straw combine	76.92	23.08	0
15	Buck scraper : Field operation and measurements	53.85	38.46	7
16	Tracer blade : Field operation and measurements	38.46	53.85	7
17	Land plane : Field operation and measurements	46.16	46.15	7
18	CAD of selected rice machinery	92.31	7.69	0
19	Manufacturing technology of rice machinery	69.23	30.77	0

production equipment and computer aided design (CAD) of selected rice production machinery were short.

Feed back of participants on practical classes

Majority of the participants have expressed that (Table 2) the practical classes conducted in the summer school helped them to learn new skills and also helped them to further sharpen their known skill in respect of equipment, instrumentation, methods of measurements, test techniques, calibration etc.

Knowledge gained by participation

The Study showed that pre-entry knowledge of the participants were 44.76 per cent which increased to the maximum actual gain of 42.53 per cent. The participants were having only 12.70 per cent knowledge completion of the summer school compared to 55.24 p prior to the summer school.

Views of the participants for attending the su school

Views of participants were ascertained based reasons given by them for attending the summer (Table 3). Almost all the participants stated that they joined the summer school to learn in-depth abou mechanization, to get practical knowledge on imp equipment, to acquire skills for imparting training to fa on improved equipment for rice cultivation, to est rapport and linkage with CIAE Scientists for f requirements and to promote rice mechanization

Table 3: Distribution of participants based on their views to attend the summer school

Sl. No.	Possible reasons for attending the summer school	Strongly agree (%)	Agree (%)	Disagree (%)
1	To learn in-depth about the improved rice cultivation equipment	69.23	30.77	0.00
2	To gain practical knowledge on improved equipments and instrumentation	46.16	46.15	7.69
3	To acquire skills for imparting training to farmers on improved tools/implements/machines	38.46	61.54	0.00
4	To establish rapport and linkage with CIAE scientists for future requirements	23.08	69.23	7.69
5	To earn certificate of the course for future promotion	15.38	46.15	38.47
6	To join the course by force as I was nominated by my organization	7.69	15.38	76.93
7	To visit the venue and enjoy it	7.69	15.38	76.93
8	To keep away himself from regular working environment and family for few days	15.38	30.77	53.85
9	To promote farm mechanization for increasing production and productivity	61.54	30.77	7.69
10	Hope to meet the old fellow colleagues	7.69	46.15	46.16

country for increasing production and productivity. Sixty two percent of participants have stated that they have joined the summer school to earn certificate for promotion to higher grade. More than three-fourth of the participants have expressed their views by disagreement that they have joined the course by force being nominated and to visit the venue and enjoy. The reason with hope to meet old fellow colleagues was expressed by 53.84 per cent of the participants.

Satisfaction of participants on the summer school course

Satisfaction of the participants were ascertained with respect to the course content, technical competency of the faculty, relevance of the course to their need, general arrangements and laboratory facilities of the summer school. The study showed that more than half of the participants (53.85 %) were in the high level of course satisfaction. The above ratings have reflected that the facilities and expertise made available for the summer school were of high standards. Mahipal and Prasad (1997) observed that more than 90 per cent of the participants were in the medium and high level of training satisfaction similar to this study.

General feed back on the summer school

Majority of the participants have expressed that the daily schedule of classes was comfortable. Local field trips were useful to them. They were satisfied with the 21 days duration of the summer school and recommended that May/ June months were the appropriate period to organize the summer school.

CONCLUSIONS

The participants rated that the summer school on rice mechanization was a good learning experience; they gained knowledge and skills through participatory discussion and interactions and they fully and effectively utilized their time. Around 90 per cent of the participants have agreed that it was easy to remain attentive in the classes and the course structure helped them to change their attitude and perception on farm mechanization.

Majority of participants have rated highly useful/ very good/adequate for course coverage, technical competency of the faculty, quality of presentation and time allotted for each topic. They have expressed their opinion that they would like to participate in another such programme when organized in similar fashion.

The feed back in general have revealed that the summer school was well planned with expert faculty members and organized effectively satisfying the need and requirements of the participants.

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Participatory Issues in Implementation of Watershed Proj

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ABSTRACT

People's participation is an essential part of the approach and strategy of watershed projects. Several factors are responsible in people participation. The present paper attempts to identify participatory issues in the implementation by interviewing 70 project personnel selected from watershed projects in Bihar. The study revealed the following organisational issues: lack of training to grass-root level people; non-consideration of local needs; knowledge and suggestions; poor coordination among line departments and lack of professionalism/dedication; manipulation tendency of project staff and lack of awareness creation due to non-availability of vehicle.

Watershed development is a programme of conserving natural resources and uplifting socio-economic conditions of people living in the watershed area. Encouraged with results of the project, Govt. of India launched a nation wide programme on watershed development for rain-fed area during 1991. Stimulating and promoting people's participation is an essential part of approach and strategy of the programme. Zoghy (1987) reported that the government organizations should do on priority for increasing participation at the local level with addressing important needs of the community, allow members to express their ideas and discuss their problems in meeting and allow whole community to benefit from the activities. Naidu (1992) was in view that in people's participation appropriate education, communication, persuasion and demonstration were factors in promoting their involvement. Jaiswal (1985) reported that 92.00 per cent of beneficiary farmers knew about tree plantation, while 31.00 per cent knew about gully plugging. Only 10.00 and 8.00 per cent of them knew other activities like sericulture and pasture development respectively. In view of these observations, a study was undertaken to determine participatory issues in the implementation of watershed development projects and the results are discussed here.

METHODOLOGY

This is an exploratory study and was carried watershed development projects running in Bihar stat project personnel involved in the implementation projects constituted sample of the study. The data collected from 70 project personnel selected purpo from watershed projects. The structured schedul open-ended questions and group discussion were u data collection device. The information collecte categorized into 3 groups viz. organizational, progr guidelines related and socio-economic aspects of pe participation. The data were tabulated & analyz interpretation of results.

RESULTS AND DISCUSSION

Organizational issues in people's participation

Project personnel perceived ten major organiza issues that were influencing the people's participat the project. These were pertaining to awarenes training, local needs and knowledge based plan coordination among line departments, professionalism and commitment of project personnel, incentives, availability of fund for wages, personnel policy, perso

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motivation, organizational climate etc. The responses of project personnel collected on these organizational issues were analysed and presented in Table 1.

The most important organizational issue in the implementation of watershed development programme was observed to be lack of training to grass root level people and poor awareness of watershed programme as perceived by 35.71 per cent of the project personnel. The second important issue was non-consideration of farmers' needs, their knowledge and suggestions in the implementation of watershed programme as perceived by 21.42 per cent of project personnel. The other important issues in order were poor coordination among line departments; lack of professionalism and dedication and manipulation tendencies of project personnel; lack of awareness creation due to unavailability of vehicle; untimely availability of fund to payment of labour and improper fund flow mechanism; de-motivated project staff, low credibility of implementing agency due to past records, lack of incentives to good workers and more stress on theoretical aspects rather than practical aspects in programme implementation at watershed level as perceived by 18.57, 18.57, 17.14, 11.42, 10.00, 8.57, 5.71 and 2.85 per cent of project personnel respectively. The observation suggests a strong need for training of project staff about participatory methodology that will help to ensure people's involvement in the programme right from the planning stage based on local needs and aspirations. It is imperative to make the programme as people programme using participatory methods and involving the local people.

Programme related issues for people's participation

There are 10 important issues related to watershed development programme as perceived by the project personnel. The responses analysed on different programme related issues are presented in Table 2.

The data in Table 2 reveal that project staff perceived watershed as a new programme with unique objectives and approach (22.85%). Therefore, they themselves and farmers were not used to such work and unable to follow the set procedure of programme implementation. About 20.00 per cent of them were of the opinion that this programme would not provide immediate gain and direct benefits to the people and hence, farmers would not take initiative in programme implementation. As reported by Joshi (1994) "Soil conservation programmes are more likely to be successfully implemented if they are directly linked to economic benefits to local farmers." Project staff also perceived (11.42%) that this programme could not be implemented without the help of contractors. Sometimes the local situation demands less or more money for particular work, but project personnel cannot do so, due to rigid guidelines. It was also experienced that different agencies at same area had their own norms of expenditure for similar activity and hence, created confusions amongst the people.

Table 1: Organizational issues as perceived by project personnel

Sl.No.	Organizational issues in people's participation	No. of respondents	(n = 70) %
1.	Lack of training to grass root level people and poor awareness	25	35.71
2.	Non-consideration of farmer's needs, knowledge and suggestions in programme implementation	15	21.42
3.	Poor coordination among line departments for multidisciplinary work	13	18.57
4.	Professionalism, ego, lack of dedication and manipulation tendencies in project implementation	13	18.57
5.	Untimely availability of fund to payment of labour and wrong fund flow mechanism	08	11.42
6.	Lack of extension work for awareness generation due to unavailability of vehicle	12	17.14
7.	De-motivated staff due to wrong personnel policies of state government	07	10.00
8.	Lack of incentives to good workers	04	05.71
9.	Low credibility of implementing agency due to past functioning records	06	8.57
10.	More teaching and less concern on demonstrations for model at watershed level	02	02.85

Table 2: Programme related issues as perceived by project personnel (n =

Sl. No.	Programme related issues in people's participation	No. of respondents	Percenta
1.	A new programme with unique objectives and approach against previous schemes	16	22.85
2.	Programme would not give immediate gain and direct benefits	14	20.00
3.	Rigid guidelines and involvement of contractors in implementation directly or indirectly	08	11.42
4.	No facilities for tour to visit model watershed project	08	11.42
5.	Lack of programme teaching, training in local language and dialect	07	10.00
6.	Lack of flexibility in fund utilization according to field situation	04	5.71
7.	Unrealistic programme activities that had more formalities and paper works	03	4.28
8.	No provision for advance payment and loan to needy people	03	4.28
9.	Variations in funding for same work among different agencies, which had negative effect in villages	02	2.85
10.	Difficult concept and procedure and not according to field conditions	01	1.43

Table 3: Socio-economic issues perceived by project personnel (n =

Sl. No.	Socio-economic issues in implementation	No. of respondents	%
1.	Illiteracy and lack of basic education in people	42	60.00
2.	No knowledge of programme objectives and its benefits to village people	33	47.14
3.	Poor economic condition of village people	32	45.71
4.	Lost faith in Govt. work due to their previous functioning records	20	28.57
5.	De-motivated, prejudiced and suppressed people having no courage to interact with staff	12	17.14
6.	Prevailing perception in people for getting cash and quick benefit from government's programme	08	11.42
7.	Social chain of marriages, customs, conflicts and alcoholism that restrict to think on development	08	11.42
8.	Soil and water erosion perceived as natural and on-going process that need not to be improved	02	02.85
9.	Fear of terrorist in village people as well as in staff	02	02.85
10.	Development is not free from politics in village	02	02.85
11.	Fear in farmers that land will go in govt. hands	02	02.85
12.	Less equity concern and more fraction in society	01	01.43
13.	Lack of interest in contribution of money	01	01.43
14.	Migration of people for wages and common people had no faith in *Mitra kisan*	01	01.43
15.	Poor marketing facilities for sale of new commodities	01	01.43
16.	Indebtedness due to govt. loan keep the farmers away from other programme	01	01.43
17.	No visit by progressive farmers to model watershed	01	01.43

e things could be avoided by proper coordination or ing the guidelines of different programme in one at root level. The entire ten programme related issues found relevant and need to be given due consideration implementation of the watershed projects.

o-economic issues for people's participation

All together 17 socio-economic issues were observed tant one, which were influencing people participation ershed project. The responses of project personnel ted on these issues were analysed and the results are ed in Table 3.

The illiteracy, poverty and lack of basic know-how of ople were perceived (60.00%) as the most important ents in the implementation of watershed projects. ed a significant role and affected the psychology of ge people and their participation. Choudhary (1986) also rted that "traditional attitudes and illiteracy are ps for the rural poor participation in small-scale sector projects." Another important issue was lack reness of project staff about the objectives and ts of the programme (47.40%). About 28.57 per cent project staff reported that village people had lost faith in government functioning and 17.14 per cent at farmers were highly de-motivated and remained iced and suppressed, therefore, had no courage to act with project staff. Wandesrman (1981) reported itive relationship between the psychological acters of the individual and their participation in unity process." Therefore, training and education e very important to arouse interest and develop ion and confidence among people. Involving people gh their leaders may help to a great extent in this t. The other factors were wrong perception of people ing cash or kind benefits from government schemes 5%). The social chain of marriages, customs, conflicts ages and alcoholism were equally important and responsible in the participation of the programme (11.42%). Farmers perceived soil and water erosion as the natural and on-going process; therefore there is no need of any interference. Social situation such as terrorism, equity concern as rich wants to become richer etc. resulted into increased social fraction, fear about the land to go to governmental account, lack of interest in contribution of money for community work, rural migration for wages and lack of faith in *Mitra kisans* due to their negative attitude. The government loans on farmers and fear to pay kept the farmers away from the project and lack of provisions in project for visits to model watershed projects were also responsible for poor implementation of project. All the seventeen issues identified played key role in people participation in the implementation of watershed projects.

CONCLUSION

The study identified major issues pertaining to organizational, programme/guidelines related and socio-economic aspects of people's participation in the implementation of watershed development programmes. All these issues appear to be strong enough to force the people away from the programme. A concerted effort is required to deal with these issues and mitigate them. Frequent open discussion and involvement of key people and panchayat members may help to arouse interest among farmers to take initiative for their benefits under the project. The role of project staff is very crucial in this matter and they should have thorough understanding of the activities of watershed projects and practical knowledge of participatory methodology. As far as possible, programme implementation through contactors should be avoided and care should be given to select those as *Mitra kisans* who show interest, liked by majority and have leadership quality to encourage people's participation. The personnel policy and coordination among line-departments are equally important in the implementation of watershed projects.

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Research Note

Group Induced Performance of Agricultural Scientists

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Across the gamut of human experience, we find example after example of group performance: people making decisions, solving problems, completing tasks, and attaining valued goals by working with others in groups. In these, and in all the thousands of other varieties of group performance, interdependent individuals are pooling their personal efforts to reach specific goals. However, people often raise questions viz., is a group more or less capable than a single individual? Are groups the effective vehicles for achieving goals? No simple answer can be offered to these questions. However, much of the research (Shiflett, 1979; Stasser *et al.*, 1980) suggests that the key to the puzzle lies in the way in which the individual inputs are combined. When people work, solve problems, or make decisions individually, their performance depends strictly on their personal resources, including their talent, skill, and efforts. In contrast, when they work in groups, performance depends on individual's resources *plus* the interpersonal processes that determine how these resources are combined (Forsyth, 1990). Keeping this in view an effort was made in this paper to see whether individual performance differs when they work in groups.

METHODOLOGY

Participants: Participants were 60 probationary scientists of 76th Foundation Course for Agricultural Research Service (FOCARS) undergoing induction training at National Academy of Agricultural Research Management, Hyderabad. There were 10 female and 50 male probationers with the mean age of 28 years. Out of these, 30 had doctoral degree and 30 were masters degree holders with specialization in 33 disciplines of agriculture and allied subjects. They were part of a wide heterogeneous group from 14 states of India who had come for attending the Agricultural Research Service induction training. They were divided into 10 groups with 6 members in each group. Care has been taken to form multidisciplinary and multilinguistic individuals in each group.

Task: The exercise was undergone by the participants as part of group dynamics module in the training. The task is to design a preliminary plan for managing a project. A list of 20 management activities from A through T (Table 1) arranged in random order was given to each individual in first step. They were asked to rank order these activities individually in 20 minutes without discussing with the fellow group members, according to the sequence they can follow in managing the project. They were asked to give first rank to the foremost activity through 20 to the last activity. After individual ranking the second step was ranking the project activities as a group. The 60 participants were divided into 10 groups of 6 members each, to discuss among themselves about sequence of activities that should be followed and were asked to rank the project activities again as a group through consensus. In step 3, they were informed the ranks originally given by planning experts to manage the project. Under step 4 and 5 the teams were asked to calculate the difference of individual and team rankings from planning experts ranking. The teams were asked to total the differences in step 4 and 5 (Table 1). The average of individual scores in each team and the team score were obtained (step 6 and 7). The positive or negative gain score of each team was obtained by the difference between the team score and average individual score (step 8). The lowest score of one individual in each team was

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obtained (step 9) to know the number of individual scores lower than the team score (step 10). Finally the gain or loss over most accurate individual (step 11) was calculated by the difference between team score under step 5 and the lowest score on the team from step 9 (Table 2).

RESULTS AND DISCUSSION

The random order of the project activities and format for ranks given by individuals, the 10 groups and the planning experts given in Table 1 formed the basis for the data in Table 2. A perusal of Table 2 reveals that average individual scores in 10 groups ranged from 65.1 to 105.3. This is the sum of differences of individual ranks from planning experts ranking i.e. the lower the total score, better the matching of individual ranking with experts ranking. Individuals in 2, 4, 5 and 9 groups were best in ranking the project activities at their individual capacity. However, only members of group 4 and 9 performed well as a team and as well as individuals, which was reflected in their high gains of scores (Step 8). The groups 2 and 5 failed to maintain the individual high performance, which was reflected in their negative gain scores. However, the members of groups 1, 3, 6, 7 and 10 did not perform well as individuals, but gained significantly by their association with group members, which was reflected in their positive gain scores. From the step number 10 it could be inferred that only 17 individuals out of 60 performed better at individual capacity compared to their performance in group. Five individuals from group number 5 and four each from group number 2 and 8 and two from group number 7 and one each from groups 1 and 4 performed well than their groups at individual capacity. The remaining 43 members gained by joining in their groups. Finally, the step 11 data revealed gain or loss over most accurate individual, which implies to the potential the individual originally had but was missing while taking decision i.e. -44 gain means they could have gained 44 by utilizing the inherent potential. By a perusal of over all scores, group number 9 can be rated as best one due to their relatively low average individual and group scores, high gain, lowest score of the individual and for high potential to perform as a group.

Potential performance of individuals in groups depends on different sorts of resources: skills, abilities, tools, materials, equipment, time, and so on. If the members of group posses some or all of these resources, they will be pooled together in group to achieve the task. The tasks are of additive, compensatory, disjunctive, conjunctive and discretionary types (Steiner, 1972). In the present study the task is a compensatory type, which require the avera together of individual judgments about ranking the pr management activities to yield the group's product. Althe very few tasks are strictly compensatory, in the sense they can only be performed by the averaging of indivi inputs, groups often choose to use compensatory metl to solve problems (Forsyth, 1990). A review of numb studies that compared the quality of individual and g judgments reached through compensatory meth concludes that the bulk of the judgments yielded by averaging process are more accurate than thos individuals (Shaw, 1981).

The results of the present study also confirm findings of Steiner (1972, 1976) who reported that, a group is working on compensatory task, it's perform exceeds the performance of a substantial number o individual members of the group. However, the gr rarely reach their full potential because processes u within them that detract from their proficiency. This clearly reflected in step number 11 through negative s which is the loss due to faulty processes which incl coordination and social loafing losses. Further Stei (1972) law of group productivity predicts that; A productivity *is equal to* Potential productivity *minus* L owing to faulty process. This faulty process is the tend of groups to become less productive due to coordin losses and social loafing, which is known as Ringel effect (Igham et. al., 1974; Steiner, 1972; Williams *e* 1981). The two interrelated mechanisms in Ringel effect are coordination losses (lack of simultaneity of g member's efforts) and social loafing (tendency of p not to work so hard when they are in groups). Ringelmann effect reflected in step number 11 ca minimized by identifiability and evaluation; involve trust in co-members; and personal responsibility.

Social loafing is minimized when each mem contribution to the group can be clearly identified evaluated (Hardy and Latane, 1986; Kerr and Bruun, Williams *et al.*, 1981). Then the question is why identifiability limit loafing? Social loafing resear suggest that when other members, know individ outcome, this evaluative pressure facilitates hi performance. But when one's contributions unidentified, it reduces evaluative pressures and loafing becomes more likely (Harkins and Jackson, Szymanski and Harkins, 1987). Thus evaluation rathe identifiability *per se*, may be the key to control social lo (Harkins, 1987). Evidence also indicates that when g

are working on interesting, involving or challenging tasks, their members are much less likely to loaf (Brickner *et al.*, 1986 and Zaccaro, 1984). Similarly trust in co-members reduces the free-rider effect and minimize social loafing (Kerr, 1983). When individuals join groups, their feelings of personal responsibility sometimes decreases, known as diffusion of responsibility (Latane and Darley, 1970). Reduction in responsibility can lead to failures to contribute to group goals. Steps can be taken, however, to minimize the responsibility diffusion. The free-rider effect is caused, in part, by the feeling that one plays a relatively small or even negligible part in the group (Kerr and Bruun, 1983). If individual member of the team think that, their efforts will have an impact on the final decision about the project, they are less likely to reduce their efforts as reflected in the outcome of group number 1,3,6,7 and 10 in the present study.

Table 1: Management activities of the project, ranking and scoring

Management activities	Step 1 Individual ranking	Step 2 Team ranking	Step 3 Planning experts ranking	Step 4 Difference between steps 1&3	Step 5 Difference between steps 2&3
A. Find qualified people to fill positions					
B. Measure progress toward and/or deviation from the project's goals					
C. Identify and analyze the various job tasks necessary to implement					
D. Develop strategies (priorities, sequence, timing of major steps)					
E. Develop possible alternative courses of action					
F. Arrange appropriate consequences for individual performance					
G. Assign responsibility/accountability/authority					
H. Set project objectives (desired results)					
I. Train and develop personnel for new responsibilities/ authority					
J. Gather and analyze the facts of current project situation					
K. Establish qualifications for new positions					
L. Take corrective action on project (recycle project plans)					
M. Coordinate on-going activities					
N. Determine the allocation of resources (including budget, facilities, etc.)					
O. Measure individual performance against performance objectives, standards					
P. Identify the negative consequences of each course of action					
Q. Develop individual performance objectives which are mutually agreeable to the individual and his/her manager					
R. Define scope of relationships, responsibilities and authority of new positions					
S. Decide on basic course of action					
T. Determine measurable check-points for the project and variations expected					
	Total A to T (The lower score the better)				
	Individual score Step 4			Team Score Step 5	

Based on Steiner's law and Hackman's input variables a model was designed for effective work of individuals in groups. Hackman's normative model of group effectiveness (Hackman, 1987) identifies two sets of input variables that have a major impact on performance: organizational context and group design. These two factors as moderated by synergy, determine the level of effort, the knowledge, and the task performance strategies used by the group. These process criteria determine group effectiveness, provided sufficient material resources are available to accomplish the task. By applying Hackman's model, we can modify the Steiner's law as; Actual productivity *is equal to* Potential Productivity *minus* Losses owing to faulty process *plus* Gains due to group process.

CONCLUSIONS

There are several advantages in forming the proje teams comprising multidisciplinary scientists in agricultur research. If team members are diverse enough, the sharin of talent can produce a synergistic effect. Working individu scientist in groups sets the stage for both social facilitatio and loafing. The presence of others in group motivat individuals and hence often improves individual's work, bu if personal contributions to the total group effort cannot b identified and evaluated, social loafing can wipe out thes gains. The implications of these findings are significant t the research organizations, wherein, many a time peopl have to work in groups.

Table 2: Scoring of the individual and groups

Steps	Teams										Averag
	1	2	3	4	5	6	7	8	9	10	
Step 6: Average individual score (Total of all the individual scores in step 4 divide by the number of group members i.e. 6)	103	65.1	104.5	78.1	81	101	92	93.2	82.6	105.3	90.58
Step 7: Team score (Step 5)	54	80	78	46	100	68	78	104	26	78	71.2
Step 8: Gain score (The difference between the team score and the average individual score. It could be positive or negative)	+49	-14.9	+26.5	+32.1	-19	+33	+14	-10.8	+56.6	+27.3	19.38
Step 9: Lowest score among the team members (lower is the best)	52	41	96	38	64	72	48	60	38	78	58.7
Step 10: Number of individual scores lower than the team score	1	4	-	1	5	-	2	4	-	-	-
Step 11: Gain or loss over most accurate individual (Difference between team score (step 5) and the lowest (best) score (step 9) on the team). If the team score is lower than the best (lowest), then gain is positive and if it is higher, then gain is negative i.e. loss	-2	-39	+18	-8	-36	+4	-30	-44	+12	0	-

In many situations individuals work with others on projects, yet their own individual contribution to the group goal is unclear or hazy. When evaluation and identifiability are low, social loafing may limit the quality of the group work. If group members in these projects do not seem to be expending sufficient effort, for example, adjustments may be needed in the organizational context. Alternatively, the group can be redesigned, so that members experience their work as meaningful, feel collectively responsible for the outcome of the project, and know on a more or less continuous basis, how they are doing.

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Research Note

Participatory Assessment of Fishpond for Multiple uses of Irrigation Water

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There exists good opportunities of water resources development for enhancing the fish production to feed the rising populations. The farm ponds (Sivasankar and Upperti, 1990) or other water bodies available with the farmers may suitably be utilized for fish production. Integration of agriculture with fish production has immense prospects to enhance the overall productivity of land and irrigation water. Efforts in this direction were undertaken at the ICAR-RCER, Patna and it was experimentally found that routing of irrigation water through a fishpond (may be used at secondary reservoir) enhances the water quality and makes the environment more congenial for intensive fish production. A yield of more than 10 t/ha was obtained consistently for the four years of study as against 2 t/ha normally obtained in ordinary fishpond (Anonymous, 2003). In order to assess the technology in participatory mode under farmer's field condition, this intervention was included in the Institute-Village Linkage Programme (IVLP). The paper presents the details of the system adopted and farmer's responds multiple uses of water using fish ponds.

METHODOLOGY

An existing fishpond (32m long, 8m wide and 1.5m deep) was selected at village Bhelure Rampur (Naubatpur block, Patna), owned by Sh. Anil Sharma. The source of water was a 5 hp tubewell located at about 150m away and the water was conveyed through open channel, which is partly lined. Although the length-width ratio of 4.0 was not suitable for better fish production, but there was an opportunity for routing irrigation was as the tubewell water was also meant for irrigating fields. In 2001, around 54 kgs of fishes were harvested using high supplementary feed. The farmer had poultry farm adjacent to the pond and hence, used poultry waste (including some uneaten grains and manure) in the pond, which was a good source of fertilizers and supplementary feed.

Composite fish culture was followed in the fishpond with stocking of fish fingerlings of Grass Carp (*Ctenopharyngodon idella*), Catla (*Catla catla*), Rohu (*Labeo rohita*) and Mrigal (*Cirrhinus mrigala*). As fry of the fishes were available to stock, higher mortality was expected. In view of this and the possibility of water exchange, higher stocking density around 1,00,000 fry/ha) was used. The number of stocked fishes of different species is given in Table 1.

Before stocking, small amount of chemical fertilizers 0.5 kg urea; 0.5 kg SSP and 0.5 kg of MOP) were broad casted on the water surface to initialize the plankton growth. Subsequently, poultry waste (include fresh droppings and left over feed) was added (approximately 1 kg/day) to the fishpond that fertilized the water as well as supplemented fish feed. Farmer also supplemented fish feed using rice bran/wheat/bran and mustard oil cake. However, application of poultry waste was discontinued as and when required depending upon the observed water quality and plankton bloom.

A gravity aerator was designed and installed in the pond during November 2002 as dissolved oxygen was adequately supplemented through rainfall during monsoon period. It consisted of 2" PVC pipes connected with a small pump (0.5 hp) drawing water from a hand pump. Water emits as a water jet at an angle of 45° from the horizontal

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from 1"PVC pipe that created bubbling and splashing in the water surface and replenished the dissolved oxygen.

For better water exchange and mixing, 6" PVC pipes were installed so that the inflow was delivered near to one end of the pond, while on the other end, outflow pipe had opening at the bottom of the pond that takes water from the bottom layer and delivers to the irrigation channels and convey to the rice-wheat fields. Near first end, a small channel conveys outflow water to the berseem (*Trifolium alexandrium*) plots. Farmer had routed water as and when required through the pond and applied water to rice-wheat fields or berseem plots. This way the intigration of fish and crop was achieved at the farmer's field.

RESULTS AND DISCUSSION

The growth of different species of fished in the pond was satisfactory. The growth of catla and grass carp was better than rohu and mrigal. However, suddenly in the early morning of 20th January 2003, fishes started dying and a total of 918 fish died. The reasons may be the low water level (about 50 cm.) and prolonged low temperatures (minimum temperatures fell to even below 3°C) along with overcast sky (that must have reduced the dissolved oxygen concentration in the bottom water layer). Bottom feeder mrigal was affected the most, column feeder rohu affected marginally, and surface feeder (catla and grass carp) were very less affected. Although, complete water exchange was made with application of 5 kg slaked lime, this incidence was a set back to the farmer. Some live fishes were also sampled and shown to the farmer that still enough fishes are surviving. Before this incidence, the farmer was paying full attention to the fish culture but afterwards he paid q less attention and even provided supplementary f unevenly. As the growth rate was reduced after 20th Janu 2003, which was expected to be rising due to increas temperatures. After the incidence, farmer routed irriga water 5-6 times till final harvesting and each time allo water to flow through the pond for several hours du summer months. This indiscriminate flow of water redu the natural feed (planktons) available in the pond.

Three harvesting were conducted (including the d fishes harvested on 20th January 2003) as given Tabl Only 1177 fishes could be harvested which was 46.9% the actual number of fishes that were stocked. The num of fishes (as percent) harvested as compared to stoc was maximum for mrigal (98.7%), followed by Rohu (35 Grass Carp (19%), and catla (15.7%). This indicates hig survival for mrigal as compared to other species. Howe the number of surface feeders (Catla and Grass carp) m have reduced due to bird catching and poaching discussed below). A total production of 76.80 kg obtained from 256m2 of the fishpond that amounts to 3 t of the fish production. It is about 23 kg more as compa to the farmers obtained during 2001-2002.

The production was less than expected. Based the participatory response analysis of the farmer, followi reasons are identified for reduced fish yield;

Under the farmer's condition much mortality w expected due to change in environment for fish fry, intrusi of snakes, carnivorous fishes (*Clarias batrachus, Chan sp.*, etc.).

Table 1: Stocking and harvesting of the fishes from fishpond

Date	Grass carp		Catla		Rohu		Mrigal		Total	
	Nos.	Weight	Nos.	Weight	Nos.	Weight	Nos.	Weight	Nos.	Weigh
					Stocking					
3-Aug-02	594		522		616		776		2508	
					Harvesting					
20-Jan-03	0	0.00	37	2.55	204	7.24	677	20.52	918	30.31
30-Apr-03	57	10.55	23	3.96	0	0.00	4	0.33	84	14.84
31-May-03	56	12.50	22	4.95	12	2.50	85	11.70	175	31.65
Total	113	23.05	82	11.46	216	9.74	766	32.55	1177	76.80

Weight in kgs.

Catching of fish by birds (storks, etc.) was observed and reported by the farmer. However, the farmer tried to minimize such losses through special care (watch and ward).

Loss of natural fish feed (planktons) due to excessive water flows through the fish pond,

Aeration mechanism was not properly utilized,

Poor supplementary feed made available during summer months, mostly owing to the disappointment due to mass fish mortality in January, and

Poaching (unauthorized harvesting of fishes) that remained unrecorded, as the pond is in open field.

Economics: Economics of fish production was evaluation. The total cost of production included fish fry, fertilizers, feed, energy needed to replenish the water (including surface evaporation and seepage losses). However the farmer did not feel the cost on water lost through seepage and evaporation as he routed the irrigation water and the losses were of negligible quantity as compared to the total amount of irrigation was routed. The fishpond was dug for acquiring soil for house construction and hence the cost of digging was insignificant for the farmer. Table 2 shows a profit of Rs. 1743.00 that amounts to around Rs. 668,000/ha.

If the cost of digging is considered @Rs. 40/m^3 with repayment period of 25 years and interest rate of 8%, the annual installment comes to Rs. 68,000/ha.

If the cost of digging is considering @Rs. 40/m^3 with repayment period of 25 years and interest rate of 8%, the annual installment comes to Rs. 1438.00. Hence, even after considering the cost of digging, the intervention was found to be economically beneficial. However, as the aeration system (costing around Rs.1000 with annual installment of Rs. 150) and water exchange system (costing around Rs.3000 with annual installment Rs. 350) were not utilized properly, hence their benefit could not be realized. It may be noted that only an enhanced fish yield by 12.5 kgs/yr can compensate these costs.

Farmer's Perception: During the course of undertaking the intervention, the farmer's perception was fluctuating. In the beginning, he was very much enthusiastic about growing the fishes in a better way, but the incidence of 20th January 2003 discouraged him a bit. But, he realized that the growth of the berseem was enhanced by 20-30%and improved quality (softer leaves) when irrigated with water routed through the fish pond. However, it was difficult to realize such effect on wheat crop grown on a relatively larger area, which was irrigated with fish pond routed water as well as with direct flow of water. Project team discussed with the farmer from time to time about all pros and cons of the intervention and their experiences. In the end, although the total production was not as per expectation, but the farmer was fully convinced about the technique and felt that the fish farming with the irrigation water will be very much beneficial if managed carefully taking care of all the encountered problems. Apart from integrating aquaculture and agriculture, farmer is now convinced that horticulture can be added as an additional source of income by planting some vegetable and suitable fruit trees on and near the periphery of the pond. He is still enthusiastic and continuing to carry forward this integrated farming system approach on his farm in a better way (based on the lesson learnt).

Table 2: Economics of fish culture in the fishpond

Item	Quantity (Rs.)	Price (Rs.)	Cost (Rs.)
Cost of fingerlings	2500 nos		375
Fertilizers	Lumpsum		50
Rice bran	100/kg	4.00/kg	400
Mustard oil cake	75/kg	7.20/kg	504
Total cost			1329
Fish production	76.8/kg	40.00/kg	3072

CONCLUSIONS

The participatory evaluation of a fish pond for multiple uses of irrigation water produced encouraging results, although the fish harvest was not up to expected level. Special efforts are needed to provide adequate knowledge and training to the farmers on technical aspects so that the fish production activities can be carried out more scientifically and project against losses of production due to various factors. The general perception of the farming community towards subsidies and availability of inputs free of cost or at subsidized prices are the major bottleneck felt in undertaking such activities. However, this aspect was properly taken care and the farmer fully participated in this endeavor and used his own resources to the extent possible. The farmer has shown keen interest in fish farming and now he is undertaking every activity carefully (based on the lessons leant) to realize full benefit in the end of the current season ending in June 2004. The study got an overwhelming response from other farmers also and many farmers are showing keen interest in fish production in conjunction with agricultural production.

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Research Note

Preference of Gender for Effective Extension*

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In India many extension approaches starting from the conventional community development approach to the latest public-private approach have been tried and none is found balanced in meeting extension concerns of farmers and farm women. Most of the approaches made after independence have considered farmers as the ultimate users of extension services and farm women were completely overlooked by the system. With growing realization among the policy makers and planners that women's contribution to farming was quite significant, sudden shift in approach was made and few programmes namely Women and Youth Training and Extension Project (WYTEP), Karnataka, Tamil Nadu Women in Agriculture (TANWA), Training and Extension for Women in Agriculture (TEWA), Orissa, Madhya Pradesh Women in Agriculture (MAPWA) under Danish assistance, Training of Women in Agriculture (TWA), Gujarat, Andhra Pradesh Training of Women in Agriculture (ANTWA) under Dutch assistance were launched exclusively for farm women. The gender mainstreaming in extension reminds us that extension must be a provider of services to both men and women in equal proportion. In other words extension must augment the gender roles in farming for helping the men and women to play a complementary role in farming for productivity, sustainability and equitability.

In the process of transfer of technologies extension must begin with reaching and teaching the gender. As socio-cultural environment of women is different from that of men, differences were often observed between farmers and farm women on various extension needs. The present study was undertaken to analyze the preferences of the gender for extension methods.

METHODOLOGY

The district, Koraput, being an interior district of Orissa and covered under Training and Extension for Women in Agriculture (TEWA) was selected for the study. The district is inhabited largely by STs and SCs population. The data were collected in two blocks, namely Similiguda and Boriguma, covering a sample of 80 farmers and farm women who belonged to Paroja tribe and Mali caste. Gender analysis was made to bring out difference in preferences between farmers and farm women.

RESULTS AND DISCUSSION

Farm women as a class have a district position in tribal areas. The intricate relationship between agriculture and household economy of tribals in one hand and the commitment of farm women to their family and contribution to the agriculture on the other speak volume of the importance of tribal women in agricultural economy of inland district. This could be further substantiated by the fact that most of the farm women (75%) had their entry into agriculture work at an age of 10 years. Some even had their entry into farm work at an early age of 8 years. In this respect, these farm women are a distinct lot not only from the farm women of other regions (coastal) but also from their male counter parts of the same region. Importantly, approximately 92% of farm women did not have any formal education.

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ference of gender for extension methods and related es

The preferences of farmers and farm women for ctive extension as found out from the study have been nted in Table 1. The women farmers preferred most emale extension agent, group contact, forenoon contact time, place of contact at home, group discussion, on campus training, tour within block boundary, referring extension agent within a fortnight/month time gap. Demonstration farmer to be a man/woman, village common place for discussion and starting enterprise individually as well as in group.

le 1: Preference of gender for effective extension

nsion hods/issues	Options	Preference farm of women N = 40			Preference of farmer N = 40			CR value
		F	%	Rank	F	%	Rank	
ideal ion agent	Male extension agent	3	7.50	IV	24	60.00	I	4.47**
	Female extension agent	19	47.50	I	5	12.50	III	3.41**
	Male para extension agent	2	5.00	V	10	25.00	II	0.97NS
	Female para extension agent	10	25.00	II0	-	-	-	
	Any one of the above	4	10.00	III	0	-	-	-
	No choice	2	5.00	V	1	2.50	IV	0.58NS
preferred act	Individual	5	12.50	II	5	12.50	III	-
	Group	30	75.00	I	25	62.50	I	1.20NS
	Mass	2	5.00	III	6	15.00	II	1.49NS
	Combined	2	5.00	III	2	5.00	IV	-
	No choice	1	2.50	IV	2	5.00	IV	0.59NS
for contact	Evening	12	30.00	II	13	32.50	II	0.22NS
	Fore noon	13	32.50	I	10	25.00	III	0.74NS
	After noon	9	22.50	III	14	35.00	I	1.23NS
	Any time	6	15.00	IV	3	7.50	IV	1.06NS
for contact	Home	32	80.00	I	25	62.50	I	1.73NS
	Farm	8	20.00	II	10	25.00	II	0.53NS
	Office of the change agent	0	0.00	-	5	12.50	III	-
preferred methods	Group discussion	25	62.50	I	22	55.00	I	0.68NS
	Training	8	20.00	II	9	22.50	II	0.27NS
	Method demonstration	2	5.00	IV	2	5.00	IV	-
	Result demonstration	0	0.00	-	-	-	-	-
	Tours	5	12.50	III	7	17.50	III	0.62NS
ng	Off campus	5	12.50	II	12	30.00	II	1.91NS
	On campus	33	82.50	I	17	42.50	I	3.70**
	Both type	2	5.00	III	11	27.50	III	2.72**
	No training	0	0.00	-	-	-	-	-
ary of tour	Within block	24	60.00	I	12	30.00	II	2.70**
	Within district	7	17.50	II	15	37.50	I	2.00*
	Outside district	2	5.00	III	8	20.00	III	2.03*
	Any place	7	17.50	II	4	10.00	IV	0.97NS
	No tour	0	0.00	-	1	2.50	V	-

Time gap to refer extension agent	Within a week	10	25.00	II	24	60.00	I	3.46**
	Within a fortnight	15	37.50	I	8	20.00	II	1.72N
	Within a month	15	37.50	I	8	20.00	II	1.72N
Preference for demonstration farmer	Be a man	5	12.50	III	18	45.00	I	3.21**
	Be a woman	6	15.00	II	12	30.00	II	1.60N
	Be man/woman	29	72.50	I	10	25.00	III	4.24**
Location for discussion	Common places of village	36	90.00	I	30	75.00	I	2.69**
	House of progressive farmer	2	5.00	II	8	20.00	II	2.02*
	Inner yard of house	0	0.00	-	-	-	-	-
	Neighboring village	0	0.00	-	-	-	-	-
	Any place	25.00	II	2	5.00	III	-	-
Preference for kind of doing in enterprise	Doing individually	15	37.50	I	12	30.00	II	0.70N
	Doing in group	15	37.50	I	23	57.50	I	1.79N
	Doing both ways	10	25.00	II	4	10.00	III	1.76N
	Any other	0	0.00	-	1	2.50	IV	-

N.S. - Not significant, *,**Significant at 0.05 and 0.1 level of confidence respectively.

The farmers preferred most male extension agent, group contact, afternoon contact time, place of contact at home, group discussion, on campus training, tour within district, one visit per week, man as demonstration farmer, community place for discussion and starting enterprise in groups. Both farmers and farmwomen preferred group contact method, home visit, group discussion, on-campus training, community place for discussion and doing enterprises in groups. Although farmers and farmwomen had some common preferences, still there were some significant differences in certain options of the methods such as the most ideal extension agent, location of training, boundary of tour, gap of contact with extension agent, preference for the demonstration farmer and location for discussion. Significantly higher proportion of farm women preferred female extension agent, on-campus training, t within block boundary, demonstration farmer be a m woman, community place for discussion than farm Farmer's preferences also stood significantly higher in options like male extension agent, both off-campus and campus training, tours within district and outside distr one week interval of contact, demonstration farmer b man and house of progressive farmer as the locatior discussion.

Intensity of contact of farmwomen with change age under TEWA and non-TEWA villages

The general remark that farmwomen have little or exposure to extension has made the researchers to exam

Table 2: Intensity of contact of farm women with extension functionaries in TEWA and non-TEWA villages

Sl.	Name of the extension functionaries	Intensity of contact (mean score) in TEWA village	Rank (N = 20)	Intensity of contact (mean score) non-TEWA village	Rank (N = 20)	Differe ("Z" val
1.	VAW/LVAW	3.00	II	3.50	II	0.92N
2.	Livestock Inspector	3.00	II	3.20	III	0.48N
3.	Gardener/Grafter (Horticulture Department)	2.33	III	2.00	IV	0.54N
4.	Auxiliary Nurse Midwife (ANM)	3.80	I	3.88	I	0.06N

N.S. - Not significantlocation of discussion.

the intensity of farm women with LVAWs and VAWs. The data on intensity of contact of farmwomen with different extension functionaries in two different situations have been shown in Table 2. It reveals that in both situations ANM had rank-I so far as their contact with the farmwomen was concerned. Next in order (Rank-II) was LVAW/VAW of Agriculture Department. Under TEWA area the LVAW had the same intensity of contact as that of Livestock Inspector (both Rank II). The grass root functionaries of Horticulture Department (Gardener/Grafter) had least intensity of contact.

The comparison of intensity scores obtained for different functionaries by Wilcoxson-Mann-Whitney test brought out no significant difference in Z values implying that all the change agents of various department in both the situations have almost similar intensity of contact. The mean intensity of contact of farm women with LVAWs and VAWs was found less than the expected level of contact, i.e. M.S. -4.00. Further it was found that VAWs had higher intensity of contact with farm women than the LVAWs. The following reasons very well support the above findings:

(i) Tribal women are intensely involved in farming and they are the backbone of farming in tribal households.

(ii) Unlike in the coastal tract, tribal women feel free in interacting with male change agents as their culture do not create any barrier in communication between tribal women and male extension worker.

(iii) Further the researchers found that many VAWs have a tribal local background, which give them an edge to work with farm women.

(iv) Many LVAWs working in tribal areas have experienced difficulties as they (a) belong to different socio-cultural background, (b) face problems in reaching interior places and (c) apprehend misbehaviour from the men who remain in drunken state even in day time.

CONCLUSION

The findings emanating from the study conducted in a densely tribal populated area have brought out the patterns of preferences of gender for getting extension services. The differences in the preferences among gender would stimulate the extension experts to conduct such studies in different cross-cultural situations and plan interventions in the existing extension models and develop new extension models for gender mainstreaming in extension. Since, the role of grass-root change agent is crucial in the model, utmost care may be taken to analyse the factors like socio-cultural environment of women and participation of women in agriculture for the purpose of selecting change agents with appropriate background.

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Research Note

Indigenous Knowledge of *Kaippad* Rice Agro-ecosyst

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Farmers are not passive consumers of agricultural technology but active problem solvers, who in fact have developed most of the technology they use (Roling, 1989). In the river marshy coastal belt of Northern Kerala, farmers have evolved special coping mechanisms, in their rice agro-ecosystem, for sustainable agricultural development. In an attempt to study the sustainability of rice agro-ecosystem of coastal areas, locally known as *Kaippad* region, indigenous technical knowledge system of rice farming were recorded and analyzed for the scientific rationality.

METHODOLOGY

The study was conducted in the *Kaippad* region of Kannur district in the Northern parts of Kerala. A special system of rice cultivation is predominantly seen here which is locally known as '*Kaippad* system of rice cultivation'. About 80 farmers formed the sample of the study with 20 farmers each from the four panchayats - Taliparamba, Pattuvam, Ezhom and Kattamballi in the Kannur district. Group interviews and group discussions were used to collect and verify various indigenous technical practices in the *Kaippad* rice cultivation system.

RESULTS AND DISCUSSION

An attempt has been made to document the *Kaippad* rice agro-ecosystem in detail, to discuss each of the indigenous technical knowledge and their scientific validation.

Kaippad rice agro-ecosystem

This is a natural ecosystem of river marshy lands. During monsoon, water keeps moving in and out of these marshy lands depending on the tide. Some sluices are also found, usually constructed by the farmers, to contr flow of water. Flash floods are common in these ma and the soil usually is saline. In this ecosystem, farm the region have evolved some techniques of managin and water resources for cultivation of rice in the *K* season. This type of ecosystem is prevalent in the nor parts of Kerala comprising the district of Kannur. A of about 3000 hectares are seen under this special ecosystem, where in farmers have developed sp techniques, usually traditional and indigenous to the re of cultivating rice.

The major problems faced by farmers were; fre flash floods during monsoon season, marshy lands also saline and cultivation of crops was difficult, risi paddy nursery during the period of on set of monsoo difficult, managing the salinity of marshes, managin water in-flows for better crops and high water table region. *Kaippad* rice cultivation could be described was acidic saline problem area rice cultivation. S cultural practices varied from wetland cultivation. By bunds were being strengthened and sluices repaire regulating water level. Fields were then drained durin tide and sluices were closed. When the soil in the became dry, mounds of 1 meter base and 0.5 meter h were formed. This facilitated the washing down o dissolved salts from the surface of the mounds, which ultimately removed from the field by tidal action. mounds acted as elevated *in situ* nursery and protecte seedlings from flash floods.

In order to solve these problems, farmers ev through age-old traditions, the techniques of ra nursery, leaching of salts and efficient water manage By using these indigenous rice farming practices, fa

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were found to maintain the stability and sustainability of the agro-ecosystem.

Indigenous technical practices in *Kaippad* rice farming

Rice varieties: Among the farmers, a particular traditional rice variety was popular; *Oorkiama*. This rice variety adopted itself well with rice ecosystem of this *Kaippad* region. It withstood water stagnation for longer periods; taller than normal cultivars, did not lodge and gave a good yield. This variety of rice was found to yield on an average, 3.76 tonnes per hectare, while the state average stood at a low 2.2 tonnes per hectare. In addition, *Oorkiama* rice was used for medicinal purpose as it is believed to possess medicinal properties.

Smoking of rice seeds: Farmers *of Kaippad* region were found to store the rice grains in bags, meant for next season's sowing, on the attics in their kitchens. The smoke from the hearths was found to provide fumigation to the rice bags continuously for longer periods. This practice, farmers believed, was found to help in maintaining very high percentage of germination in the nursery. It had been ascertained by the scientists that such a practice of smoking, actually helped to ward off any insect-pest-pathogens attack which used to cause huge lose during storage. Thus this indigenous practice of smoking of seed was found to have beneficial effect on healthy nursery.

Paddy nursery: Knee-height bunds were prepared before the onset of monsoon for nursery beds. With rainfall leaching away salts from the bunds, paddy seeds were sown on these bunds and nursery was ready in about a month. As there is no land available for nursery raising, farmers had evolved this method, whereby they got salt-leached pieces of land on the bunds, quite good enough for raising paddy nursery. This system of raising paddy nursery was also found to ward-off the problem of saline sensitivity of young seedlings. Bunds protected the paddy nursery from flash floods and coastal tides.

Transplanting of paddy seedlings: As the nursery was usually raised on knee-height bunds, in the main field itself, an indigenous method for transplanting was also evolved by the farmers of this region. When the nursery was ready for transplanting, farmers broke off the bunds with rice seedlings and spreaded the seedlings across the field. This was done with a special type of spade with long triangular shaped blade attached to a long wooden handle. Farmers using such special spades, cut the bund with rice seedlings and spreaded the seedlings with a single stoke of cut-and-throw. This indigenous practice involved a lot of skill and practice for effective transplanting of paddy seedlings In addition to this special long handle spade, farmers were also found to use wooden implements for puddling their riverside marshy paddy fields.

Soil and water management: *Kaippad* farmers had evolved special indigenous practices for managing their natural resource of soil and water. This system of rainfed cultivation was specially designed by farmers to take care of salinity and to protect the paddy nursery from flash floods. In addition, sluices were also used by farmers in the field bunds to regulate two way water flows during tides.

Prawn culture after harvesting paddy: After the harvesting of paddy, farmers were found to allowing the tides in to their paddy fields and close the sluices. The natural fauna of prawn seed that came along with the tides was allowed to grow naturally and farmers harvested a good crop of prawn in the winter season. This was again an indigenous practice which was found to be popular among the farmers which was also mutually beneficial to rice ecosystem of *Kaippad* region.

CONCLUSION

The indigenous technical knowledge system evolved by the farmers for sustainable management of the natural resources of *Kaippad* region were unique to such riverside marshy coastal agro-ecosystem. However these indigenous practices might be applicable to other similar regions where natural resource management assumed importance. Such indigenous practices needed to be documented, preserved and their scientific validation be ascertained. The indigenous practices of *Kaippad* were found to be highly effective both ecologically and economically. They needed due recognition and farmers of *Kaippad* region for their system of organic agriculture.

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Research Note

Validity of Cloze Procedur

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Agricultural technology is changing fast. Effective communication of this information to million of farmers in rural areas is essential to bring about accelerated agricultural development. The present day programmes of rural development make use of print media to disseminate the information on modern technology and to motivate its readers for action. The effectiveness of these printed materials depends largely on the extent to which they are readable. Readability implies that the materials must be read easily and understood by the readers.

There are several tools to measure the readability of written messages. The most commonly used method has been the use of readability formula. Readability formula was developed in English language for the first time, followed by construction of similar formulae in other languages such as Spanish, Dutch, Japanese and several Indian languages like Hindi, Tamil, Marathi, Kannada etc. However, they are mechanical and involve rigorous procedure for their application.

A more simple method of measuring readability is cloze procedure. The first scientist who studied and described this method in detail was Taylor (1953). An attempt is made in this paper to show the practical utility of cloze procedure over the formula method in investigation of readability of print material.

What cloze procedure is? Cloze procedure is a psychological tool for measuring the effectiveness of communication. It may be defined as a method of intercepting a message from a transmitter (writer or speaker) mutilating its language patterns by deleting parts and so administering it to receivers (readers or listeners) that their attempts to make the patterns whole again potentially yield a considerable number of cloze unit Taylor (1953) has defined a cloze unit as "any singl occurrence of a successful attempt to reproduce accuratel a part deleted from a message by deciding from the conte that remains what the missing part should be".

What cloze procedure is not?

(a) **Not a formula:** The readability formulae involv the measurement of frequency of occurrence of selecte kinds of language elements, such as common word sentences etc. Cloze procedure counts no such element One can think of cloze procedure as throwing all potentiall readability influences in a pot, letting them interact, the sampling the result. Cloze test takes a measure of th likeness between the patterns a writer has used and th reader is anticipating while reading.

(b) **Not a sentence-completion test:** The typic sentence-completion test is for gauging person's knowledg of specific and more or less independent of informatio Hence, the words to be deleted are selected according Cloze procedure, however, deals with contextuall interrelated series of blanks, not isolated ones, and th method does not deal directly with specific meaning.

The present study was conducted with the followin specific objectives:

1. To apply and standardize the cloze procedure fo measurement of readability of farm magazine in Kannada

2. To find out the comparative validity of cloz procedure with the readability formula developed fo Kannada language.

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METHODOLOGY

The study was carried out in the premises of University of Agricultural Sciences, Bangalore. To measure readability of farm magazine by using cloze procedure, one batch of farm women and one batch of farm youth, who attended training between May and August, 1999 at Farmer's Training Institute (FTI), Hebbal Campus were selected. A quarterly farm magazine called "Krishi Vignana" published by UAS, Bangalore was purposively selected. Looking to the nature of subject matter covered, three articles, one each in Agriculture, Horticulture and Sericulture, were randomly selected. First hundred words in each article, leaving headings, were selected for the purpose of investigation.

Measurement of readability using readability formula: The readability level of the passages was studied by application of readability formula developed by Nanjappa and Siddaramaih (1994) as explained below. The measurement of average sentence length in words (ASL) and word complexity per 100 words (WC) were made, keeping in view the directions for the use of readability formula. The grade level of the all sample articles was arrived at by averaging the readability scores.

$$GL = -7.4232 + 0.6509\ ASL + 0.0177\ WC$$

Where,

GL = Estimated grade level of a sample passage

ASL = Average sentence length in words

WC = Word complexity per 100 words

ASL and WC were calculated as follows:

$$ASL = \frac{\text{No. of words in a passage}}{\text{No. of sentences in that passage}}$$

$$WC = \frac{\text{Total no. of "maathres" in a passage}}{\text{No. of words in that passage}} \times 100$$

Measurement of readability using cloze procedure: In the present research, hundred words sample passages on three subjects viz., Agriculture, Horticulture and Sericulture were selected. The readability was measured with the help of cloze procedure (Taylor, 1953) as detailed below.

(a) Each passage was mutilated by deleting every 5th, 10th and 15th words blank.

(b) In each passage, there were 20 cloze units (blanks) in 5th word blank, 10 cloze units (blanks) in 10th word blank and 6 cloze units (blanks) in 15th word blank.

(c) Firstly, the respondents were given the passages to read for sufficient time.

(d) The three passages were taken back after they have read it carefully for sufficient time. It varied as per respondents education and reading efficiency.

(e) Then each of the passage with uniform and standard blanks was given to the respondents with instruction to fill in the blanks (missing words) in the blank space provided. The time given for this task was more or less same, as given for reading that passage.

(f) Marks were assigned on the basis of words correctly filled by the respondents.

(g) The number of blanks correctly filled gave readability scores of that passage, as perceived by that respondent.

(h) The method was called as "Cloze procedure" and readability score thus obtained was called as "cloze scores".

The data were subjected to analysis of variance test and the results obtained are interpreted below:

RESULTS AND DISCUSSION

The data worked out on the readability standard of the passages are presented in Table 1. The findings on this aspect indicated that the passages on Agriculture was readable at 10th standard and above, the Horticulture passage readable at 9th standard and the Sericulture passage readable at 8th standard level.

Use of cloze procedure method for measurement of readability

The performance of farm youth and farm women on three levels of cloze tests on Agriculture, Horticulture and Sericulture subjects are given in Table 2. As the blanks increased from 5th to 15th word, the percentage of responses also increased uniformly in all the three subject matter areas.

From the point of validation of cloze procedure for use in the Kannada language, it is essential to fix appropriate blanks to be left in the test. Hence, the data relating to three treatments viz. 5th, 10th and 15th word

Table 1: Readability standards of the selected passages according to readability formula

Sl. No.	Type of passage	Reading ease scores	Readability standard
1	Agriculture	14.33	10th standard and above
2	Horticulture	8.66	9th standard
3	Sericulture	8.02	8th standard

Table 2: Cloze scores obtained by the respondents in different subject matter areas

(n = 90)

Subjects	Cloze procedure with various blanks	Cloze scores (%) Farm youth	Farm women	Average (%)
Horti-culture	5th word blank	47.00	41.00	40.83
	10th word blank	61.00	67.00	64.00
	15th word blank	80.00	82.00	81.00
	5th word blank	42.66	39.00	48.83
Agri-culture	10th word blank	55.00	64.00	59.50
	15th word blank	72.00	68.00	70.00
	5th word blank	46.66	51.00	48.83
Sericulture	10th word blank	62.00	71.00	66.50
	15th word blank	83.00	86.00	84.50
Average (%)		78.73	79.04	-

blanks were subjected to analysis of variance and the results are given in Table 3.

Referring to the treatments, it was found the cloze scores increased with the increasing gap in blank words. The cloze scores were highest in 15th word blank and lowest in 5th word blank.

The 'F' value for treatments was highly significant (F = 77.71). This implied that readability increased significantly due to different treatments imposed upon, both among farm youth and farm women. The blank at 15th word was found to have significantly better readability compared to blanks at 5th and 10th words respectively.

The results also indicated that there was no significant difference between two groups of the respondents. This implies that both farm youth and farm women performed more or less similar on cloze test.

Table 3: Mean cloze scores obtained by the responder for varying levels of word blanks

(n = 9

Treatments	Cloze scores Farm youth	Farm women	Averag %
Cloze test with every 5th word blank (T_1)	45.39	43.72	44.5
Cloze test with every 10th word blank (T_2)	59.55	68.21	63.8
Cloze test with every 15th word blank (T_3)	78.72	79.04	78.8
Average percentage	61.22	66.67	-

F = 77.71** (Among the treatments); F = 1.13NS (Between the group

Relationship between reading ease scores and cloze te scores

Although all the three treatments, i.e., varying leve of blanks were significantly related to cloze scores, it w not certain whether these scores were related to readabili scores obtained by the use of readability formula. In ord to establish the relationship between readability ease scor and cloze scores, correlation test was applied and resul were furnished in Table 4.

Table 4: Correlation co-efficient between cloze scor and reading ease Scores for different word blanks

(n = 9

S.No.	Cloze test with varying blanks	"r" valu
1	Every 5th word blank	-0.499*
2	Every 10th word blank	-0.450*
3	Every 15th word blank	-0.103N

** = Significant at 1% level of probability NS = Non-significant C.D for treatments 5.53 C.D. for groups 4.92.

The co-efficient of correlation was highly significa in case of 5th word and 10th word blanks. This implied th cloze procedure is related to readability ease score obtained by the readability formula at 5th and 10 wo blanks and not at 15th word blank. Cloze procedure wi 5th and 10th word blanks can therefore be used in place readability formula for passages on farm information.

The results of the present study are supported by the ngs of Taylor (1953) which demonstrated that cloze edure works well with every 5th and 10th word blank. findings are also supported by a study conducted by ant (2001) on Marathi language, which employed 10th l blank.

Several studies conducted on other foreign languages English (Bormoth, 1966 and Wilson, 1963), Spanish o Mugdub, 1966), Dutch (Douma, 1960) and Japanese ba, 1957) also indicated that cloze procedure is a ure of readability in terms of comprehension. The findings of the present investigation are in confirmity with the above studies.

Cloze procedure is therefore a measure of aggregate influence of all factors which interact to affect the degree of comprehension and indicate the readability of passages as measured by cloze score test.

CONCLUSION

Readability is an essential component of any language that may affect the exchange of information.

Table 1: Readability st
according to readabili

Sl. No.	Type of passage
1	Agriculture
2	Horticulture
3	Sericulture

Table 2: Class scores
different subject matt

Subjects	Class gra with varia levels
Horticulture	[illegible]
Agriculture	[illegible]
Sericulture	[illegible]
Average (%)	

are in confirmity with

measure of aggregate
t to affect the degree
adability of passages

ment of any language
mation.

ers on Pest Management Practi

H. R. Sardana, L. N. Kadu, D. K. Singh and R. V. S

various components of integrated pest managemen
improving the ecosystem as a whole.

METHODOLOGY

Socio-economic studies on vegetable growe
village Raispur, Distt. Ghaziabad, Uttar Pradesh, sel
for validation of IPM in okra and brinjal, were carrie
to assess their knowledge of plant protection prac
Ghaziabad district especially village Raispur is a vege
growing belt covering about 200 ha area under vege
crops, and more than 60 ha area under okra and b
alone. Prior to the implementation of trials on valid
of IPM technologies, base line information of the vege
growers of village was collected which included the
protection practices followed, farmers' knowled
biopesticides, indigenous technical know how, natu
chemical pesticides, spray equipment used, precau
taken, input constraint and IPM.

From the adopted village, 30 respondents
selected, which represented each of marginal, mediu
large vegetable growers.

Knowledge of vegetable growers was meas
through a knowledge test developed for the st
Knowledge test contained 15 items, five each from cul
mechanical and chemical plant protection practices.
total score on the knowledge level were categorized
three groups *viz.*, low (0-4), medium (5-10) and hig
11) level of knowledge.

Data were collected from thirty randomly sel
farm families (vegetable growers) with the help of
tested structured questionnaire by personal inter
methods.

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Research Note

Knowledge of Vegetable Growers on Pest Management Practices

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Vegetables are one of the most important components of Indian horticulture and play a unique role in our daily life both in economic and social spheres for enhancing the income as well as nutritional status of the masses. To meet the requirement of vegetables for our ever increasing population, we need to produce about 95 million tonnes of vegetables every year. Due to their tender and supple nature, vegetables are more prone to pest attack and at conservative estimate cause about 35-40 per cent losses. The management strategy for the insect pests and diseases remains largely confined to pesticides. The overemphasis on the use of chemical pesticides and their indiscriminate use by the vegetable growers lead to their excess chemicalisation with multitude of problems. Fernandez *et al.* (1994) observed that vegetable growers tend to be optimistic with regard to their price forecast and always used pesticides at higher doses than recommended level. That is the reason that the vegetables available in the market are laced with pesticides. Our country with rich agricultural base, tremendous indigenous knowledge and poor farm resources is in need of integration of all the traditional and modern knowledge to develop IPM strategies and to promote their large scale utilization in a participatory approach so that the problems caused due to harmful pesticides could be reduced to a great extent and IPM could prove to be a noble technology for improving the socio-economic status of small and marginal farmers.

Keeping the above in view, the ICAR Adhoc Cess fund project, entitled, "Development and Validation of Adaptable IPM in Selected Vegetable Crops", especially okra and brinjal considering the acreage and consumption of pesticides in these crops, was initiated during 2003, with the main aim of reducing the dependence of the farmers on chemical pesticides and to make them aware about the various components of integrated pest management and improving the ecosystem as a whole.

METHODOLOGY

Socio-economic studies on vegetable growers in village Raispur, Distt. Ghaziabad, Uttar Pradesh, selected for validation of IPM in okra and brinjal, were carried out to assess their knowledge of plant protection practices. Ghaziabad district especially village Raispur is a vegetable growing belt covering about 200 ha area under vegetable crops, and more than 60 ha area under okra and brinjal alone. Prior to the implementation of trials on validation of IPM technologies, base line information of the vegetable growers of village was collected which included the plant protection practices followed, farmers' knowledge of biopesticides, indigenous technical know how, nature of chemical pesticides, spray equipment used, precautions taken, input constraint and IPM.

From the adopted village, 30 respondents were selected, which represented each of marginal, medium and large vegetable growers.

Knowledge of vegetable growers was measured through a knowledge test developed for the study. Knowledge test contained 15 items, five each from cultural, mechanical and chemical plant protection practices. The total score on the knowledge level were categorized in three groups *viz.*, low (0-4), medium (5-10) and high (11) level of knowledge.

Data were collected from thirty randomly selected farm families (vegetable growers) with the help of pre-tested structured questionnaire by personal interview methods.

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RESULTS AND DISCUSSION

Profile of vegetable growers: Analysis of the data ected on socio-personal-economic variables of table growers indicated that majority (64.0 %) of the ers had small land holdings of 1-4.9 acres. Only en per cent of the farmers had land holdings of more 10 acres. All the farmers were literate and about 53.0 ent of them were matriculate. The village being close aziabad city and Delhi, besides farming, many farmers had subsidiary occupations like dairying, tailoring, issioning agent, shoe making etc. About 47.0 per f farmers had family income ranging between Rs.)-50,000 per annum from farming. Twenty four per f the farmers had family income ranging between ,000-50,000 per annum from other sources.

edge level of vegetable growers towards plant tion practices

he data presented in the Table 1 revealed that y of vegetable growers had low level of knowledge t protection practices. Only 5-7 per cent of the lents had high level of knowledge towards the ended plant protection measures.

: Knowledge of vegetable growers of plant on practices (n = 30)

knowledge	Frequency	Percentage of vegetable growers
)	18	60.00
5-10)	10	33.00
1)	2	07.00

s of vegetable growers towards integrated pest ent (IPM)

on farmer's awareness towards ecofriendly plant practices revealed that farmers were totally integrated pest management (IPM), bio-control io-pesticides and their benefits. None of the r got training on IPM. However, they were (40 d to learn, follow and adopt the IPM in their

Knowledge of application of pesticides and use of plant protection equipments

Results (Table 2) on the awareness and knowledge about the application of pesticides and equipments showed that almost all the vegetable growers acquired the knowledge about the dose of pesticides from the pesticides dealers and used higher doses than the recommended ones.

Table 2: Knowledge of applications of pesticide and use of plant protection equipments (n = 30)

Parameters	Farmers No.	Farmers %
Source of information about dose of pesticide*		
Research Institute/KVK/ University	0	00.00
Fellow Farmers	2	07.00
Pesticide dealers	30	100.00
Self decision	0	00.00
Method of application of pesticides*		
Seed treatment	1	03.00
Spraying	30	100.00
Dusting	0	00.00
Source of spray equipment*		
Own	21	70.00
Rented	19	63.00
Borrowed	3	10.00
Type of sprayer used*		
Knap-sack sprayer	25	83.00
Foot sprayer	0	00.00
Power sprayer	13	43.00

*Multiple responses.

Farmers mostly preferred spraying as a method of application of pesticides. The results are in corroboration with those of Shaik and Bahal (2000) who reported that 100 per cent respondents adopted spraying method for the application of pesticides in vegetable crops. Majority (83.0%) of growers used knap-sack sprayer as pesticide application equipment. Power sprayer was also used by 43.0 per cent of the farmers for spraying purpose which they considered to be more effective, efficient and time saving but slightly costlier than knap-sack sprayer. Shaik and Bahal, (2000) also observed the use of hand and power

sprayer by majority of the vegetable growers in Andhra Pradesh. Many farmers did not own power sprayer and it was borrowed from the fellow farmers.

Input constraints faced by the farmers

As regards input constraints faced by the farmers of the village, availability of quality seed (23%) and to some extent the availability of fertilizers were the only constraints faced by a few farmers. Surprisingly, none of the farmers never faced any labour shortage problem. Pest control advisory services were not available to majority of the farmers.

The study further revealed (Table 3) that large farmers gave more number of sprays (12) as compared to small (9) and medium (10) farmers in okra. Correspondingly the expenditure incurred on plant protection was also high by large farmers. The similar trend was also observed in brinjal crop also.

Nature of use of pesticides

The nature of pesticide applied by the respondents were categorized according to there toxic category and were presented in Table 4. Majority of the farmers used moderately hazardous pesticides like imidacloprid, cypermethrin, chlorpyriphos, acetamiprid etc. Shaik and Bahal (2000) also reported use of highly toxic pesticides in vegetable crops in Delhi and surrounding areas. A very astounding fact was that eighty per cent farmers also

Table 3: Average number of sprays and expenditu incurred by different categories of farmers in ok and brinjal in village Raispur (n = 3

Category of farmers	Okra		Brinjal	
	Average no. of chemicals sprays	Average expendi-ture on chemical pesticide (Rs./acre)	Average no. of chemicals sprays	Avera expen ture c chemi pestici (Rs./ac
Small (1-4.9 Acre)	09.00	2217.00	07.00	1839.
Medium (5-10 Acre)	10.00	2340.00	08.00	2029.
Large (> 10 Acre)	12.00	3185.00	07.00	2508.

applied monocrotophos, a highly hazardous pesticic Interestingly enough, none of the farmers used insectici with low toxicity. Educating the farmers about this fa became inevitable if ecosystem had to be protected future. The findings were in concurrence with tho reported by Vasantha and Maraty (1998). Several farme also used mixtures of pesticides available in the mark Sometimes farmers prepared mixtures of differe pesticides i.e. insecticides along with fungicide, grow regulators, phenyl and even alcohol was also used by the on the vegetable crops especially okra and brinjal.

Table 4: Nature of pesticides used by vegetable growers (n = 3

Sr.	Trade name of the pesticide	Chemical name	Category	Farmers	
				No.	%
1.	Monitor	Monocrotophos	Highly hazardous	24	80.00
2.	Megha	Chlorpyriphos 50% + Cypermethrin 5%	Moderately hazardous	29	97.00
3.	Tikona	Imidacloprid	Moderately hazardous	15	50.00
4.	Pride	Acetamiprid	Moderately hazardous	3	10.00
5.	Actara	Thiamethoxam	Moderately hazardous	2	07.00
6.	Mortal	Cypermethrin	Moderately hazardous	15	50.00
7.	Endocil	Endosulfon	Moderately hazardous	2	07.00
8.	Omite	Propargite	Slightly hazardous	3	10.00
9.	Bavistin	Carbendazim	Slightly hazardous	7	23.00

*Multiple responses.

Precautions for application of pesticides

It was observed that most of the farmers were not fully aware of the precautions to be taken while spraying. Fifty per cent of the vegetable growers were aware of the fact that pesticides should not be sprayed against the wind direction and regarding the timing of application of pesticides, only 23% of the growers responded positively. Only 2 % farmers destroyed/ buried the empty container of pesticides after use, others threw in the field itself.

However, all the farmers washed their hands, clothes and used containers with soap water and never used the empty containers of pesticides for any other purpose.

CONCLUSION

An appraisal of the knowledge status of the vegetable growers towards pest management indicated that the almost all the farmers were dependent on chemical pesticides for the management of insect pest and diseases and most of them were using moderately toxic pesticides but at a very high frequency and doses. None of the farmer was aware about the IPM technologies and their benefits. Therefore a large scale validation of IPM technologies involving participatory farmer's driven approach could prove to be a better alternative to this situation as most of the farmers also showed their interest to learn and adopt the IPM technologies at their farms. Further, the advisory and extension agencies need to be employed to follow a systematic, well planned and coordinated approach in the area for improving the knowledge status of vegetable growers towards the pest management.

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Research Note

Methodology of NGO's in Formulation and Execution of Development Programmes

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Voluntary organization are by no means new ones to Indians. The seeds of voluntary action to promote the abandoned rural India were sown in the early years of the century and are continued to play a vital role after independence in the field of rural development through the organization of rural reconstruction programmes, carrying out experiments in the formulation and implementation of development programmes using extension methods and techniques.

In the democratic set up, the voluntary organizations have a great responsibility of reflecting the needs and aspirations of the people in a true sense. The state has to seek the support of voluntary bodies to carryout the development programmes right from planning and in all steps of execution. However, there is urgent need for unifying the scattered efforts of voluntary organizations.

METHODOLOGY

Four NGOs from four districts of Northern Karnataka namely, India Development Service (IDS), Dharwad district, Sahyadri Parisara Vardhini (SPY) Sirsi, Uttar Kannada district, Bijapur Integrated Rural Development Services (BIRDS), Hungund, Bagalkot district and Leering Organisation for Rural Development (LORD) Bellary district were selected, keeping the criteria like long years of service, more technical staff involvement, more resource allocation, more number of agricultural and rural development programmes carried out and also the extent of coverage in terms of villages and beneficiaries covered.

A questionnaire was prepared after thorough discussion with the social scientists, subject matter specialists and the heads of the NGOs. The questionnaire was mailed to the respective NGOs for collecting required information. The researcher also made personal visits, referred annual and other comprehensive reports of the NGOs and also discussed with the heads of the NGOs and also with the field staff of the NGOs for gathering accurate information.

RESULTS AND DISCUSSION

The results (Table 1) pertaining to the methodology followed in the formulation and execution of programme of NGOs revealed that people's participation was the key ingredient in the identification of the problem and execution of programmes. The probable reasons for involving villagers in planning and implementation of all the programmes were for the welfare of both individual farmers and the whole mass of rural area. The real problems of the individual farmer and the villagers were best known to the rural people, the decision to make, problem priorities and solutions for the identified problems with their resources in hand was also left to the villagers to ensure their commitment of participation in each and every step of programme execution. However, NGOs acted as facilitator in each step of the programme formulation and execution, as it pursued the villagers successfully, respected philanthropic consideration, held social responsibility and commitment to work for the whole mass of rural area and never thought of religious and profit aspects. The general observations for the involvement of NGO staff in planning

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Table 1 : Methodology Followed in Formulation and Execution of Programme by NGO's

Programme Component	NGOs			
	IDS	SPV	BIRDS	LORDS
1. Identification of problem				
a. NGO itself diagnose the problem through individual contact/ group meetings/general meetings. (Sometimes)		*	*	
b. Both NGO and villagers are equally responsible to diagnose the problem (Most of the time)	*	*	*	
c. NGO, concerned development departments and village people decide upon the problem				*
2. Selection of problem on priority basis				
a. NGO itself decides the priorities (in certain cases)		*		
b. Both NGOs and villagers discuss and decide (in most of the cases)	*	*	*	*
c. NGOs and concerned development departments fix the priorities. (For govt. sponsored programmes)		*		
3. Identification of solutions				
a. NGO itself finds solution to the problem	*			
b. NGO officials of development and villagers together find solution to the problem		*	*	*
4. Development of the programme				
a. People develop the programme themselves and the agency acts as facilitator			*	
b. The NGO develops the programme through discussion with the villagers	*	*		
c. Experts from the concerned development departments, villagers and NGOs all together develop the programme (in most of the cases).		*	*	*
5. Mobilization of physical and other resources				
i. Man				
a. Some villagers come voluntarily to contribute physical labour required (in most of the cases)	*	*	*	*
b. NGO employs people on payment for getting the physical work done (sometimes)	*	*		
ii. Materials				
a. NGO itself arrange all the materials required for the programme			*	
b. Villagers take the responsibility of arranging all the materials required for the programme	*	*		*
c. Development departments arrange the materials required for the programme (in some cases)			*	
iii. Money				
a. Village contribute their share willingly (some times)	*	*		
b. Sponsoring agency provides capital for some programmes	*			*
c. Government provides money for its programmes	*	*	*	*
iv. Human resources				
a. Technical staff of NGO provides technical guidance (for most of the programmes)	*		*	
b. Scientist of agricultural universities are sought for technical assistance (for few programmes)	*	*		

c. NGO arranges and help from staff of development department for technical service (for majority of programmes)	*		*	*
6. Leadership				
a. Villagers lead the programme with the assistance of NGO	*		*	*
b. Both villagers and NGO together provide leadership		*		
7. Execution				
a. People carry out the programme with the assistance of NGO	*		*	*
b. NGO, development departments and villagers all together implement the programme		*		
8. Evaluation				
a. Evaluation is done at regular intervals by the staff of NGO (regularly)	*	*		
b. Evaluation is carried by an external agency on the request of NGO (sometimes)	*	*	*	
c. Evaluation is done phase wise by the sponsoring agency in all its programmes			*	*
9. Follow up				
a. The NGO has arrangements to guide the beneficiaries after the programme implementation	*	*	*	*

*Alternatives followed by NGOs studied.

and execution was for its positive features like closer to the people for whom it worked, greater flexibility and freedom, personal touch and easy accessibility to the villagers. Further, voluntary concept was dynamic, that it kept on changing to liberate disadvantaged people, enlivend communities to participate more fully and share the benefits of the NGO programmes. Many studies established that NGOs were distinctly more effective in mobilising local resources, articulating peoples' needs and coordinating developmental tasks undertaken by the people.

The results implied that the physical labour required and material requirements for the programmes were also met by the villagers for whom the benefits of the programme was extended. The capital in terms of money and technical guidance was obtained by the government and at times by the sponsoring agency.

This led to the conclusion that more the people's participation in terms of physical work and input resources more would be the success. The probable causes to involve people in work force and their resources was mainly because to draw their utmost interest and complete dedication towards the success of the programme. Further, to make the villagers to involve whole-heartedly in executing their own work. The responsibility and the value for their physical work and input resources were much respected to anticipate the positive and satisfactor outcomes. The capital and technical guidance was secure from the government or sponsoring agency, only becaus they themselves have come forward to nourish and suppo NGOs in executing their programmes. Funding agencie and governments have felt that the villagers have mor faith and confidence with their local NGOs and henc collaborated with NGOs in terms of money and technica guidance.

With respect to leadership and execution o programmes of NGOs, villagers again took the leadersh and execution responsibility with the assistance of staff o NGOs. The plausible reason for this was the participatio of people in any type of programme with their local leade is much more than under the leadership of an outsider. Th interactions and discussions could take place very freel between the villagers and the local village leader tha between villagers and outside leader. Though the staff o the NGO was available at all the times in the villag villagers tend to consult the local leaders for any of the problems in the programme execution and hence the villag local leaders were given the responsibility of leadersh and execution of the programmes of the NGOs.

The results indicated that the evaluation of NG programmes were done by the external agencies on th

request of respective NGOs inspite of regular phase wise evaluation by the NGOs themselves. This might be due to fact that evaluation report done by the respective NGOs was considered as the annual report of the NGOs, in terms of physical and financial achievements, done to keep the records of particular year activities with fact and figures. However, the evaluation report of the external agencies for the complete programme period could highlight the strong and weak points of the programmes and also about the performance of the NGOs in modifying and reorienting the similar programmes planned to carry out in near future. The external agencies or sponsoring agencies evaluate NGOs programmes keeping their own objectives in mind and that fetches the respective NGOs to improve certain aspects of the programmes. General observation was that the evaluation report of this kind would carry much weightage with less of bias and more of accuracy and authencity.

The follow up work was done by the staff of respective NGOs to guide the beneficiaries after the programme presentation. This might be for keeping the effect of the programme for long time. The problems if encountered by the villagers were tackled by the staff of the NGOs on follow up periods for making them confident in accepting and adopting the practices of NGO programmes.

CONCLUSION

From the results, it can be concluded that the concerned NGOs and villagers were equally responsible in identifying the problems, making decision to select the problems on priority basis, searching out proper solutions to the identified problems and also final plan of action for the programmes to be executed.

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Research Note

Constraints in Enhancing Fish Production

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In West Bengal floodplain wetlands locally known as *beel*, covering an area of 42,000 ha, constitute one of the important fishery resources. These common property resources are managed by the Fishermen Co-Operative Societies. The floodplain wetlands unlike other open water systems, by virtue of their productive potential as well as magnitude, constitute one of the front line areas which is capable of contributing substantially to Country's fish production. A production rate upto 1,000 kg/ha/yr is attainable from floodplain wetlands when subjected to scientific management against production of 100 kg/ha/yr under traditional management.

Fishing is generally considered as a low profession and practised mainly by the members of a number of backward communities who by and large are downtrodden. Despite their unstained effort, dexterity and skill, their earning the whole are still at lower level when compared to other industrial and professional workers. The fishermen during participating in management process towards enhancing fish production from the floodplain wetlands encounter many factors as hindrances. Thus, a study was conducted in some floodplain wetlands of West Bengal to unravel the constraints as perceived by the fishermen on the same.

METHODOLOGY

An investigation was carried out in four Fishermen Co-operative Societies of West Bengal namely Barhal Fishermen Co-operative Society (Bharhal *beel*, E-1), Purbahelatala Fishermen Co-operative Society (Purba helatala *beel*, E-2) under Maldah district and Suguna Fishermen Co-operative Society (Suguna *beel*, E-3) and Dakshin Bishnupur Fishermen Co-operative Society (Amda *beel*, E-4) under Naclia district to ,which the *beels* under study belong. A list of member fishermen of respective Societies were prepared and 25% members from the list were selected at random (E-1 = 60; E-2 = 72; E-3 = 52; E-4 = 66) for the study. The perceived problems were measured by a scale developed by Haque, (1981). The respondents were asked to mention three most important problems as perceived by them and ranked them accordingly. The ranked problems 1, 2, and 3 were given score 3, 2 and 1 respectively. The total rank score of each problem is obtained by multiplying the frequency with the respective score and adding them up. The problems were then arranged in descending order of importance on the basis of their total score and were finally ranked.

RESULTS AND DISCUSSION

In order to sustain commercially profitable fishery of floodplain wetlands, there should be enough fish for harvesting, otherwise lower production may depress the income of fishermen. Therefore, *beels* need to be harnessed, so as to augment domestic availability of fish. Appropriate stock-management and post-harvest technology may help in improving the fish yield to a remunerative level so as to make an effective dent on poverty of fishermen. Glorification of the fishermen can be rooted in the traditional beliefs through proper management *of beels*.

The management of the *beels* by the member fishermen becomes the challenge towards enhancement of fish production. The production despite of their best efforts varies due to various problems viz. ecological, biophysical and

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socio-economic etc. Thus, variability both in income and expenditure exists due to nature of uncertainty.

Barhal *beel* (E-1)

The sample of the Barhal Fishermen Co-operative Society (E-1) was constituted with 60 number of fishermen out of its total strength of 240 members. The constrains as perceived the fishermen in the profession in respect of the Barhal *beel* (Table 1) ranked chronologically (I and IX) are siltation in basin (45 score point), irregular stocking of fish (38 score point), unauthorised fishing (36 score point), fish diseases (32 score point), non-availability of finance (28 score point), entry of pollutants (27 score point), weed infestation (24 score point) indiscriminate fishing (22 score point) and improper functioning of the Co-operative Society (16 score point).

Purbahelatala *beel* (E-2)

The sample of the Purba helatala Fishermen Co-Operative Society (E-2) was constituted with 72 member fishermen out of its total strength of 288 members. The constrains which have been lacing by the respondents in the Purbahelatala *beel* (Table 1) as per rank order (I to VII) are narrowing of river month opening (52 score point), unauthorised fishing (48 score point), indiscriminate fishing (44 score point), improper functioning of the Co-operative Society (34 score point), siltation in basin (22 score point), entry of pollutants (18 score point), non-availability of finance (15 score point) and fish diseases (12 score point).

Suguna *beel* (E-3)

The sample of the Suguna Fishermen Co-operative Society, (E-3) was constituted with 52 number of fishermen out of its total strength of 208 members. The respondents perceived some constrains during their activities in the Suguna *beel* (Table 1) which as per rank are entry of pollutants (126 score point), fish disease (68 score point), siltation in basin (34 score point), weed infestation (14 score point), unauthorised fishing (12 score point) and nonavailability of finance (8 score point).

Amda *beel* (E-4)

The sample of the Dakshin Bishnupur Fishermen Co-Operative Society, (E-4) was constituted with 66 member fishermen out of its total strength of 264 members. In the profession of fishing in the Amda *beel*, (Table 1) the respondents have been facing some constraints which as per rank are siltation in basin (52 score point), fish diseases (44 score point), entry of pollutants (42 score point), weed infestation (32 score point), non availability of finance (24 score point), unauthorised fishing (18 score point), narrowing of river mouth opening (16 score point) and irregular stocking of fish in the *beel* (16 score point).

Pooled perceived constraints in the *beels*

While managing the *beels*, the respondents have been facing several constraints (Table 1). The pooled score of the total samples drawn from 4 *beels* (E-1, E-2, E-3 and E-4) reveals that due to entry of pesticide treated agricultural washings, effluents from the hospital and nearby factories

Table 1: Constraints as perceived by the operatives

(n = 250)

Problems	E-1 (N = 60)	E-2 (N = 72)	E-3 (N = 52)	E-4 (N = 66)	Pooled (Score)	Rank order
1. Entry of pollutants	27	18	126	42	213	I
2. Outbreak of fish disease	32	12	68	44	156	II
3. Siltation in basin	45	22	34	52	153	III
4. Unauthorised fishing	36	48	12	18	114	IV
5. Non-availability of finance	28	15	8	24	75	V
6. Weed infestation	24	0	14	32	70	VI
7. Narrowing of river mouth opening	0	52	0	16	68	VII
8. Indiscriminate fishing	22	44	0	0	66	VIII
9. Irregular stocking of fish	38	0	0	16	54	IX
10. Improper functioning of the Co-operative society	16	34	0	0	50	X

in some areas, the production of fish from the affected *beels* is observed not to that extent which it should have been. Thus, *entry of pollutants* has been perceived as most important problem (213 score points) which is detrimental to fish production *vis-a-vis* socio-economic condition of the fishermen. Due to impact of pollution and low maintenance of eco-friendly condition in the *beel*, incidences of *out-break of diseases* are noticed resulting in fish mortality which affects fish production. The respondents have perceived this as the second important problem (156 score point). Siltation occurring in the *beel* due to entry of the washings from the catchment areas during monsoon precipitation. Cumulative deposition of such washings, jute retting as well as fibre extraction from the same and uncontrolled growth of macrophytes lead to constant accumulation of detritus at the bottom and thus gradually raises silt level resulting in reduction of water volume *vis-a-vis* fish production. Thus, *siltation* in the *beel* has been perceived as third problem (153 score point). The *beels* are vested water bodies in West Bengal. Registered Fishermen Co-operative Societies take these on long-term lease from the Department of Fisheries, Govt. of West Bengal. The members of Fishermen Co-operative Societies possess exclusive right of fishing following the norms of the respective Society. Since, the *beels* are vast water bodies and it becomes sometimes difficult to keep constant vigil throughout day and night, a few miscreants availing the opportunist moment on the lapse in surveillance, poach fishes from the *beels*. Thus, a sizeable quantity of fishes is lost from Society's production due to poaching. The respondents have perceived *unauthorised fishing* as fourth problem (144 score points). The development of small scale fishing industry is getting proper attention in the State. It is not expected that poor fishermen might invest large sums of money towards purchase of crafts, gears etc when they are to fight for square meals of the members of their families. Thus *nonavailability of finance* has been perceived by the respondents as fifth problem (75 score point) for improving their fishing activities. Aquatic weeds form an important component of *beel* ecosystem but when *infestation by the weed* occurs to a large extent affect fish production as well as fishing operation. It has been perceived as the sixth problem (70 score point). In case of open *beel* it retains continuity with parent rivers either for the whole year or atleast during the rainy season. But the respondents expressed lesser production as well as fishing activity due to *siltation in river mouth* which caused hindrance in continuous exchange of water as well as fish fauna with the parent river. This has been perceived as the seventh problem (68 score points). The Fishermen Co-operative Societies framed some conservation measures *viz.* mesh regulation, observation of closed season etc for improving fish production in the *beel*. Some (greedy) fishermen with a view to catching more fish operate gears having *smaller mesh* against prescribed mesh size. The respondents have perceived this sort of indiscriminate fishing as the eighth problem (66 score points). Management of closed *beels* is dependent on stocking of fish especially Indian Major Carps which grow faster for economic return. In some *beel* regular *stocking of Indian major carps* with desired density is not followed which has been encountered as the ninth problem (54 score points). The fish production as well as maintenance of eco-friendly environment in the *beel* is dependent on successful management by the Co-operative Society. In some *beels management support from Co-operative Societies* are improper due to their internal problems. It hampers desirable production. Thus, the respondents have perceived it as the tenth problem (50 score points). Biswas (1991) identified 15 constraints among the fishermen of the Sundarbans who participated fishing activities in the estuaries where *non-availability of finance* was perceived as the foremost. Management practices influence the environmental and parasitological factors in these culture areas and consequently various fish diseases epizooties are encountered (Das, 1997). In most of the *beels*, marginal areas are utilized for agricultural purposes. These water bodies are subjected to environmental stress especially for pesticides and agricultural run-off, municipal waste etc. (Sinha, 1997).

CONCLUSION

Indebtedness has become chronic in the life of the fishermen communities. For supporting their livelihood, the fishermen frequently borrow money from various sources. Fishermen Co-operative Societies must accelerate transmission of information to the fishermen for adoption of better management practices for enhancement of fish production. The fish production from the *beels* could be substantially raised if the various factors relating to location specific modern techniques are planned out in details and adopted to meet the needs of those areas which ultimately will help to resolve their problems *vis-a-vis* improve socio-economic conditions of the fishermen.

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Research Note

A Segmented Graphic Rating Scale to Measure Appropriateness of Package of Practices

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Innovation is a matter of perception. The adoptions of an innovation depends upon its impact on the minds of potential adopters. Prior to any concrete overt behavioural manifestation, the initial perception of the new technology may be validated through instrumental information from other. The availability of extension workers and adopters of the innovation in a social system does not necessarily indicate a favourable response on adoption of the innovation. Abundant literature is available on adoption of innovations, with instances where an innovation was either totally rejected in a social system or where it took very long time to be adopted by all the members.

The previous work on adoption of innovations reveals that the research has tended to concentrate on certain ideas only. Until recently, no concerted attention had been paid to the nature of innovations. The relation of the characteristics of an innovating for adoption had remained an unexplored area. Barnett (1953) considers the distinction between material and non-material objects as obstacle to fruitful research in the area of adoption of innovations. This artificial distinction, imposed by our senses, disappears as a perceiver begins operating with an analytic perspective and on a lower level of generality. Consequently, innovation is defined as conglomeration of idea components. Kartz (1961) also points to the need for comparing innovations in terms of their characteristic. The conceptualization of an innovation as a constellation of ideas in the farm practice adoption research is evident in the work of Kivlin (1965) and Fliegel and Kivlin (1967).

The concept of appropriate technology is yet to be fully conceptualized particularly in the field of agricultural technology. Though a serious need for such a research has been realized, the attempts in this direction were very few. Nayudamma (1973) opined that the latest trend in the field of appropriate technology is identification of the same through a research procedure adopted for a particular technology and situation.

Recently, few attempts have been made to determine the degree of appropriateness of technologies recommended for particular type of farming/crop through some selected relevant attributes (Ravishankar, 1978, Niranjana Kumar, 1979, Narasimhulu 1982 and Ramegowda 1991). The methods appear to be lacing scientific sophistication associated with much research lag in determining the appropriateness of technology to the farmers conditions. Hence, it is necessary to examine the appropriateness of technologies as perceived by the farmers for its suitability to their condition. This is a unique attempt on scientific lines to measure the appropriateness of technology with the following specific objective (1) to develop segmented graphic rating scale, (2) to measure appropriateness of package of practices for chawki mulberry garden.

METHODOLOGY

All the 24 attributes of sericultural technology were listed out under "Package of practices for chawki mulberry garden" technology with a three point continuum namely, '*highly applicable*', '*moderately applicable*' and '*least*

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applicable' with weightages of 3, 2 and 1 respectively. To assess the degree of applicability of each attribute to the "Package of practices for chawki mulberry garden", the questionnaire was administered to 138 judges comprising 18 sericultural specialists from the University of Agricultural Sciences, Bangalore, 52 scientists from the Karnataka State Sericulture Research and Development Institute, Thalaghattapura, Bangalore, 44 scientists from the Central Sericultural Research and Training Institute, Mysore and 24 Sericulture Extension Officers from the state Department of Sericulture, Kolar district. They were requested to indicate their opinion by tick marking (Ö) on one of the response categories of the three points continuum against each attribute dimension and they were also requested to suggest relevant attributes. The questionnaries were distributed personally which were requested to be mailed after duly answering them. However, the response were obtained from 83 judges. Total score of each and every attributes for all respondents and total scores for all attributes for every respondent were also arrived at. The mean score (x) for the 24 attributes from all respondents and the population mean (m) were calculated. The critical difference (CD) method was computed for retaining or deleting the attribute under the recommendation under study. If the value of deviation of attribute mean with population mean (-m) was equal to or greater than the value of critical difference, that attribute was retained as significant and attribute with value of deviation less than the value of critical difference was deleted as not significant. The procedure was followed for all the 24 attributes. The formula used for this purpose was

Critical Difference (CD) = SE X t_a (0.05) for a for n – 1 d.f

where

Standard Error (SE) = s /Ön-1

s = Population standard deviation

n = Sample size

RESULTS AND DISCUSSION

The study revealed that 17 attributes had the difference of sample mean and population mean greater than critical difference and the values were retained in the instrument. Remaining seven attributes recording the difference of samples mean and population mean less than the critical difference value were deleted considering them as not significant. All the 17 significant attributes with their mean values of difference between sample mean and population mean compared with critical difference are shown in the Table 1. All the attributes were ranked based on their mean score values to their descending order in the ranks were, initial cost, requirement of skilled labour profitability, social approval, compatibility with existing implements, requirement of physical labour, regularity of returns, maintenance cost, trialability, observability, physical compatibility, compatibility with existing practices, predictability, compatibility with previous practices, local resource utilization, cognitive complexity and use complexity.

In this evaluative instrument the initial cost was placed first in the hierarchy of 17 attributes. Poverty ridden farming community of India has been suffering chronically from credit constraints. Hence, the high initial cost of an innovation serves as a barrier for acceptance. This could be the reason for this attribute to attain first rank in the instrument. Skilled labour requirement and profitability were ranked equally sharing second and third ranks. Even in India with low level of industrialization and surplus of manpower it is observed that a farmer runs shortage of farm labour more particularly skilled labourers for specified operation in peak seasons. This situation demands increase in skilled labour wages and so it is not likely that the Indian farmers adopt these practices which are skilled labour consuming. This might be the reason for the attribute skilled labour requirement to be considered for evaluating this practice. The bulk of the farmers are poverty ridden and inclined to prefer only those new practices which they perceive to be economically sound and yielding relatively larger returns for a given investment. This could be the possible reason for profitability to have been placed in the higher position of the evaluating instrument. In a developing country, the social prestige of the farmers may increase the process of adopting the innovation. The intangible benefit will improve the dignity in the social system. This could be the possible reason for the attribute, social approval to get fourth rank.

Compatibility with existing implements was ranked fifth in the instrument. If changes are not needed in the existing implements, such practices will be accepted by majority of the farmers including traditional farmers. This might be the reason for the attribute influencing the adoption of package of practices for chawki mulberry garden. In India with surplus of manpower it is observed that a farmer runs shortage of farm labour during peak seasons. The general economic theory of demand and supply may cause the shooting up of labour wages during the peak season. So it is not likely that the Indian farmers

Table 1: Standardized instrument evaluate the appropriateness of "Package of practices for chawki mulburry gardens."

S. No.	Name of the attributes	Mean	Rank	X ¯m
1.	Initial cost	2.831	1	0.568*
2.	Maintenance cost	2.627	8.5	0.364*
3.	Saving of time	1.277		-0.986
4.	Saving of discomfort	1.145		-1.118
5.	Physical labour requirement	2.663	6	0.400*
6.	Skilled labour requirement	2.783	2.5	0.520*
7.	Profitability	2.783	2.5	0.520*
8.	Immediacy of returns	1.325		-0.938
9.	Regularity of returns	2.639	7	0.376*
10.	Multiple use potential	1.223		-1.034
11.	Local resource utilization	2.494	15.5	0.231*
12.	Predictability	2.542	13	0.279*
13.	Compatibility with previous experience	2.518	14	0.255*
14.	Compatibility with existing practices	2.554	12	0.291*
15.	Compatibility with existing implements	2.687	5	0.424*
16.	Cultural compatibility	2.398		0.135
17.	Physical compatibility	2.590	11	0.327*
18.	Social approval	2.711	4	0.448*
19.	Cognitive complexity	2.494	15.5	0.231*
20.	Use complexity	2.482	17	0.219*
21.	Input complexity	1.145		-1.118
22.	Risk	1.181		-1.082
23.	Trialability	2.627	8.5	0.339*
24.	Observability	2.602	10	0.339*

Population mean = 2.263; * = Significant at 5% level; Critical difference = 0.17.

adopt these practices, which are labour intensive. It might be the reason for the attribute physical labour requirement to be considered for evaluating this particular practice. If the new practice gives return in a consistent manner over a period of years without any fluctuation, such practice will be definitely accepted by the large majority of the farmers. Hence, this might be the reason for giving preference to this instrument. Maintenance cost and trialability were ranked equally between eighth and ninth ranks. The practices require less maintenance cost over a period of years for continued adoption and a small trial prior to their full acceptance. This might be the reason for these two attributes to have been considered for evaluating this particular practice. In the same manner the results of the practices should be observable, fulfil the needs and interests, possess similarities with the existing practices and yield the receive expected results by the farmers. These could be the possible reasons for observability, physical compatibility, compatibility with existing practices and predictability, being ranked tenth, eleventh, twelth and thirteenth, respectively among the seventeen attributes that constituted the instrument of evaluation. Similarities with the previous experience, utilization of local materials and easy understandability and use by the farmers might be the possible reasons for the attributes namely compatibility with previous experience, local resource utilization, cognitive complexity and use complexity to get forteenth, fifteenth, sixteenth and seventeenth rank in the innovation evaluation instrument. This instrument development to evaluate package of practices, for chawki mulbery garden is in accordance with the instrument used by Ravishankar (1978), Niranjan Kumar (1979), Kantharaj (1980), Tornatzky and Klein (1981), Narasimhulu (1982), Srinivasarao (1990), Shaikh et al (1993), Readdy *et al.* (1997) and Kalyan Ganguly and Premalata Singh (1999).

Reliability

To establish that the developed scale was reliable, the split half method was adopted. The final format with significant attributes was administered to 30 potential adopters of the technology in the non-sample area of two villages. The Spearman Brown formula was applied. A highly significant correlation co-efficient value of 0.8893 was achieved indicating that the scale was reliable.

Validity

Content validity was considered to be the most important and appropriate for this type of scale. It was ensured that the scale covered the entire area or dimension

it dealt with. The attributes of sericultural technological were collected from review of past researches, textbooks, statements from various research articles by extension specialists and discussion with the extension workers and progressive sericultural farmers. The final draft was also distributed to the sericultural scientists and extension workers in sericultural field. Finally, the opinion of the farmers was collected. Their omissions and commissions were executed in the scale. Hence, the scale was considered as valid.

To measure the appropriateness, the graphic rating scale as suggested by Guilford (1971) was developed for package of practices for practices for chawki mulberry garden with significant attributes was obtained on three point continuum which indicated the degree to which it was perceived as favourable with respect to that attribute with the farmer as a point of reference (Fig. 1).

CONCLUSION AND SUGGESTIONS

The segmented graphic rating scale was develop to measure the appropriateness of package of practices chawki mulberry garden. This scale is helpful for t extension workers and future investigation on package practices for chawki gardens among sericultu technologies to find out the degree of appropriateness perceived by the farmers. With the help of this scale, t low degree of appropriateness, if any, could be correct by the scientists and extension workers to ensure rap adoption of the released sericultural technologies. The is need on the part of the future researchers/extensi workers to develop such segmented graphic rating sca for measuring all the sericultural technologies throu attributes, which will be useful for increasing t production and productivity of sericultural enterprise.

Fig 1. Segmented graphic rating scale to measure the appropriateness of "Package of practices of chawki Mulbur garden"

Sl.No.	Attributes	Response of farmers		
1.	Initial cost	Can be affordable	Difficult to afford	Very difficult to afford
2.	Maintenance cost	Can be affordable	Difficult to afford	Very difficult to afford
3.	Physical labour requirement	High	Moderate	Least
4.	Skilled labour requirement	High	Moderate	Least
5.	Profitability.	Least	Moderate	Least
6.	Regularity of return	Very regular	Fairly regular	Least regular
7.	Local resources utilization	High	Moderate	Least
8.	Predictability	Least	Somewhat	Very much
9.	Compatibility with previous experience	High	Moderate	Low
10.	Compatibility with existing practices	High	Moderate	Low
11.	Compatibility with existing implements	Low	Moderate	High
12.	Physical compatibility	High	Moderate	Low
13.	Social approval	Quite a lot	Somewhat	Least
14.	Congetive complexity	Very much	Moderate	Least
15.	Use complexity	Very much	Moderate	Least
16.	Trialability	Difficult	Moderate	Easy
17.	Observability	Least	Somewhat	Most

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Research Note

Socio-economic Impact of Self Help Groups

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Over the past two decades, considerable efforts have been made to increase the quantum of institutional credit for rural development in order to reduce the extent of dependence of rural households on exploitative, non-institutional sources. There is, however a general feeling that the increased flow of institutional credit has not yielded the expected results. The vast majority of rural people were not involved in the development activities because they lacked the economic based frame to intervene in the local development process. In this scenario, the challenge was to develop a village centered development strategy for the marginalised rural poor who always experienced the shortage of liquidity to respond to new investment opportunities, especially in agriculture. The strategy was to develop in such a way that people can 'plan' for their means and have the 'power' to implement their programmes. Analysing this possibility, the Non-Governmental Organizations decided that the strategy can be made possible by putting together small groups of poor people with similar interests and other homogenous factors. The present study was undertaken with the objective to study the socio-economic impact among the members of women Self Help Groups.

METHODOLOGY

The study was undertaken with the women Self Help Groups formed by the NGOs under Tamil Nadu Corporation for Development of Women of Cuddalore District in Tamil Nadu. They were selected considering the criteria of its establishment period and the location of the NGOs. Accordingly, six Self Help Groups were selected from Melbhuvanagiri, Kattumannarkoil, Kurinjipadi, Cuddalore, Chidambaram and Kammapuram blocks of Cuddalore district. Twenty members from each SHGs thus comprising of 120 women SHG members formed the sample for the study.

The socio-economic impact of the members of the SHGs was measured under ten dimensions for the study. The dimensions selected included area, production, income, information, credit, marketing, knowledge, attitude, adoption of recommended paddy technologies and asset creation. The impact of the dimensions viz., area, production and income were measured by taking the difference between the scores before and after becoming member and the respective indices for SHG members were calculated. For the remaining dimensions, viz., information, credit, marketing and attitude, the perceived change in the scales developed was used for calculating the respective SHG members cumulative frequency and indices. The level of knowledge, adoption and asset creation of the members before and after becoming a member were considered based on the scores in the respective scales and were used to calculate SHG members indices. Based on the impact of the individual dimensions, a total impact index was also calculated to bring out the overall socio-economic impact of SHG members.

RESULTS AND DISCUSSION

This section deals with the results obtained from SHG members with respect to individual dimensions as well as the sum total of all the dimensions along with the discussion.

Socio-economic impact of SHG members

The relevant data regarding the impact of women SHG members on various dimensions are presented in Table 1.

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Table 1: Distribution of SHG members according to the impact **(n = 120)**

S.No.	Dimensions	Low				Medium				High			
		N	P	I.S	I	N	P	I.S	I	N	P	I.S	I
1.	Area	56	46.67	56	0.15	16	13.33	32	0.09	48	40.00	144	0.40
2.	Production	20	16.67	20	0.05	84	70.00	168	0.46	16	13.33	48	0.13
3.	Income	20	16.67	20	0.05	62	51.66	124	0.34	38	31.67	114	0.32
4.	Information	9	7.50	9	0.02	62	51.67	124	0.34	49	40.83	147	0.42
5.	Credit	11	9.17	11	0.03	94	78.33	188	0.52	15	12.50	45	0.12
6.	Marketing	29	24.17	29	0.08	56	46.77	112	0.31	35	29.16	105	0.29
7.	Knowledge	25	20.83	25	0.07	65	54.17	130	0.36	30	25.00	90	0.25
8.	Attitude towards group	45	37.50	45	0.12	50	41.67	100	0.28	25	20.83	75	0.21
9.	Adoption	29	24.17	29	0.08	61	50.83	122	0.34	30	25.00	60	0.17
10.	Credit	30	25.00	30	0.08	43	35.83	86	0.24	47	39.17	141	0.39

N - Number; P - Per cent; I.S - Index score and I - Index.

Area

The study revealed that only two-fifth of the women SHG member possessed high level of area (40.00 per cent) after being a member of the group. This might be due to the following reasons. The members had already possessed adequate area for cultivation and another supporting reason was the non-availability of leased land. Moreover, nearly one-third of the members of selected SHGs had non-agriculture as their secondary occupation.

Production

It could be observed from Table 1, that a majority (70.00 per cent) of the respondents had medium level of production. Such a medium level of production increase might be mainly due to the adoption of recommended paddy practices. Thus increase in production might have resulted with increased yield parameter, thereby ultimately increasing the production.

Income

More than half of the respondents fell under medium level of income (51.66 per cent). The reason for majority of them to belong to medium level income might be due to the adoption of recommended paddy practices and high yielding varieties and adoption of diversified farming system.

Information

It could be observed from Table 1, that a little more than half (51.67 per cent) of the women members had medium level information utilization behaviour. This might be due to the following reasons. Members of all the group had undergone trainings and had resorted to collective activities with constant association of NGOs and TNCDW. In addition to these factors, dedication by NGO officials and their follow up might have contributed more towards this finding. The reports of Vipinkumar (1998) are in line with the present investigation on the information utilization behaviour of the respondents.

Credit

A majority of the respondents had medium level of credit utilization (78.33 per cent). Their traditional nature of prompt repayment of loans, efficient planning and appropriate utilization of credit might have facilitated the members of SHG to have better access to credit. The flexibility of credit provisions and relatively faster sanctioning of loans were also the other reasons for the obtained results.

Marketing

As much as 46.77 per cent of women belonged to medium level of marketing behaviour. About half of the

SHG members had maximum marketing activities because of the well developed marketing system through the farmers market by the collective action of all the members.

Knowledge

A majority of the respondents belonged to medium level of knowledge (54.17 per cent) category on paddy cultivation practices. The reasons behind such a high level of knowledge towards the various cultivation aspects were high level of literacy, young age, sustained extension activities, high level of mass media exposure, positive attitude towards group activity and the existence of strengthened leadership among the group.

Attitude towards group

A little above two-fifth (41.67 per cent) of the women had medium level of attitude towards group activities. Rotation of leadership, better co-operation among the members and all supporting staff may be the factors leading to favourable attitude towards group activities. The result is in agreement with the results of Vipinkumar (1998).

Adoption

Nearly half of the SHG members fell under medium level of adoption (50.83 per cent) of various cultivation practices in paddy with an adoption index of 0.59. It could be observed that the knowledge level of the members of SHG was also found to be high. Hence, this would have resulted with high adoption level. The other reasons behind such a high level of adoption may be contributed to efficient use of extension methods, achievement oriented farm women members, skill oriented training programme provided by NGOs and collective activities performed by the members of the group.

Asset Creation

Nearly two-fifth (39.17 per cent) of the women members had high level of asset creation. As the income level of almost 50.00 per cent of the members was found to be under medium level, It is possible to increase their assets proportionately with their additional interest from savings. The findings of this study are in line with that of Yogananda (1999).

Overall socio-economic impact

The relevant data regarding the overall socio-economic impact index are presented in Table 2.

Table 2: Distribution of SHG members according to their overall socio-economic impact index

Dimensions	Actual impact score	Max. impact score	Index
Area	232	360	0.64*
Production	236	360	0.64*
Income	258	360	0.71**
Information	280	360	0.78**
Credit	244	360	0.67**
Marketing	246	360	0.68**
Knowledge	245	360	0.68**
Attitude	220	360	0.61*
Adoption	211	360	0.59*
Asset creation	257	360	0.71**
Total	**2429**	**3600**	**0.67**

*Indicate below average score; **Indicate above average score.

It is obvious from Table 2 that out of the ten dimensions studied for assessing the total impact, income (0.71), information (0.78), credit (0.67), marketing (0.68), knowledge (0.68) and asset creation (0.71) were found to be above the average socio-economic index among the SHGs members. Information index was found to be the highest among all the dimensions. The remaining dimensions viz., area (0.64), production (0.69), attitude (0.61) and adoption were (0.59) found to be below the average socio-economic impact Index.

The SHG members impact on income, information, credit, marketing, knowledge and asset creation were found to be above average the socio-economic index category. The members have shown a considerable reduction in cultivation expenditure through group activity, women were getting ample opportunities to interact with other members of the group to share mutual experiences and practices and to share their knowledge in the field situations. Besides, due to the group members thrift and savings behaviour and with adequate amount of credit, women were making better profit through collective marketing and had also improved the bargaining power by collective action through SHGs.

The SHGs members overall socio-economic impact on area, production, attitude and adoption was found to be below the average socio-economic index category. Lack

of achievement made in terms of adoption of fertilizers, need based pest management practices, organic manure and advanced production practices would be the probable reasons for their low impact on these dimensions.

CONCLUSION

Among the ten dimensions considered for calculating the overall impact index, it was inferred that only six dimensions viz., income, information, credit, marketing, knowledge and asset creation were found to be high compared to the other dimensions. Hence, efforts to improve other dimensions uniformly among SHG members should be taken up to improve production by proven technology intervention and also to bring uncultivated area under cultivation. Situation of women taking credit to repay old loans should be prevented. Improved marketing and further activities venturing into agro-processing and change in the extension strategies to make women utilize different information sources are also needed.

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Research Note

Work Environment of the Veterinary Surgeons

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Veterinary surgeons of the Animal Husbandry Department (AHD), of Kerala play a crucial role as extension functionaries in the new development model of Panchayati Raj, now called as Kerala Development Project (KDP) in the state.The veterinary surgeons are now increasingly in the mainstream rural development process with lot of responsibility and accountability. A contributive work environment is a significant prerequisite to their effectiveness and is much essential for inculcating the right attitude towards work as well as to work organization. The new development model namely Panchayati Raj should not falter because of a group of extension functionaries' trusted over their work environment. Therefore study was conducted among the veterinary surgeons of Thrissur district of Kerala to understand their work environment in animal husbandry extension and to explore, the relationship, if any, existing between the perception of the selected environmental factors and their commitment to Panchayati Raj.

METHODOLOGY

The study was conducted among the veterinary surgeons of the Animal Husbandry Department and working in Thrissur district of Kerala, who were carrying out extension activities under Panchayati Raj or Kerala Development Project .Mailed questionnaire were sent to all 142 veterinary surgeons working in Thrissur district. Out of 142, 103 veterinary surgeons responded to the questionnaires. In order to measure the veterinary surgeons commitment to Panchayati Raj, the scale developed by Porter et al (1974) was used with verbal modification. Delinious Hodge's cumulative method, mean, rank, standard deviation and correlation were done for further statistical analysis.

RESULTS AND DISCUSSION

The results (Table 1) revealed that majority of the respondents' general dissatisfaction with prevailing work environment to perform extension work as less than one-third of them were only fully satisfied with the work environment. Administrative Reforms Committee of Government of India (GOI), as early as 1969, mentioned about the importance of providing the right type of work environment to staff of technical services for full blossoming of their initiative and constructive abilities. Besides some of the earlier studies pertaining to work environment of animal husbandry extension personnel brought to light the prevalence of either a somewhat satisfactory or not satisfactory working condition that was congruent with the findings of the present study. For instance, Sharma and Prasad (1972) reported general dissatisfaction of the animal husbandry extension officers of Rajasthan regarding most of the work environment dimensions that were studied. Similarly, Rajkamal and Prabhakaran (1985) and Manjunatha (1998) who studied respectively the veterinary surgeons in general and exclusively lady veterinary surgeons of the Animal Husbandry Department, Kerala, reported similar results.

The data presented in Table 1 further indicated that out of ten dimensions of work environment studied inter personal and client relation was ranked first, where as sharing of responsibility and risk taking the last. It was

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revealed that the organization did not have the culture of sharing responsibility and risk taking even as nurturing good interpersonal and client relation. Had the incumbents sufficiently imbibed the values of collaboration and achievement motivation they would have increasingly shared responsibility and shouldered risk respectively. In fact, all the dimensions except inter personal and client relation were lesser satisfied ones considering the decisive cut off point score, which was fixed as 66.66 per cent. Therefore, the situation must improve in all such cases. A better work environment regarding inter personal and client relation was also reported by Sharma and Prasad (1972), Reddy (1976) and Manjunatha (1998) who studied animal husbandry extension officers, Village Level worker and Lady Veterinary surgeons respectively.

The study also showed that 64.08 per cent of the respondents perceived commitment to Panchayati Raj as somewhat satisfactory whereas 13.59 per cent as not satisfactory. The situation was generally undesirable and must change since the rest 22.33 per cent of respondents studied only reported their commitment to Panchayati Raj to be satisfactory. Given this situation, it is anybody's guess what could be the level of moral and motivation of this important extension functionary. According to Buchanan (1974), organizational commitment is in fact the willingness of the employee to exert high level of efforts on behalf of the organization and strong desire to stay with the organization. Therefore, in the present situation, willingness of respondents to exert the high levels of efforts in carrying out extension activities under Panchayati Raj could not be said certainly.

The coefficient of determination (R^2) of the regression equation was 19 per cent (Table 2) this indicated that 19 per cent of the total variability in commitment to Panchayati Raj Institution could be attributed to the ten dimensions of work environment studied. Moreover, it was shown that the dimensions 'services and supplies' and 'work distribution and team work' were more important and decisive ones as the correlation between each one of them and commitment to Panchayati Raj was positive and significant. This meant that commitment could be improved comparatively much easier by improving upon the dimensions 'services and supplies' as well as 'work distribution and team work'.

Table 1: Dimension wise perception of work environment

(n = 103)

Sl.No.	Dimensions	Std. mean score	Std. per cent mean score	Rank	Standard deviation
1.	Policies	1.94	64.67	II	2.21
2.	Communication	1.82	60.67	VI	2.33
3.	Guidance and supervision	1.82	60.67	V	2.13
4.	Services and supplies	1.58	52.67	DC	2.62
5.	Interpersonal and client relation	2.53	84.38	I	1.78
6.	Peoples' participation and local leadership	1.85	61.67	IV	1.82
7.	Work distribution and team work	1.78	59.33	VII	2.31
8.	Decision making and autonomy	1.91	63.37	III	1.74
9.	Responsibility and risk taking	1.91	63.37	X	1.61
10.	Planning and execution	1.62	54.00	VIII	2.08

Table 2: Multiple linear regression analysis of commitment to Panchayati Raj and work environment

(n = 103)

Sl. No.	Dimensions	Regression coefficeint	Standard error	t-value
1.	Policies	0.123	0.234	0.525
2.	Communication	0.487	0.312	1.562
3.	Guidance and supervision	-0.907	0.415	-2.182
4.	Services and supplies	0.571	0.253	2.259*
5.	Inter personal and client relation	-0.046	0.335	-0.131
6.	Peoples' participation and local leadership	0.252	0.373	0.677
7.	Work distribution and team work	0.252	0.373	0.677
8.	Decision making and autonomy	-0.078	0.427	-0.183
9.	Responsibility and risk taking	-0.913	0.465	1.962
10.	Planning and execution	0.267	0.320	0.835

CONCLUSION

In view of the findings of the study it could be said that the work environment of an important extension functionary as the veterinary surgeons must improve drastically in the larger interest of the stakeholders, especially the livestock farming community. The new development model of Panchayati Raj should not falter because of a group of extension functionaries discontented with work environment.

Indian Journal of Extension Education

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Research Note

Cotton Production in Punjab — Reasons for Decline

Deepak Dhand, S. K. Saini and D. S. Ladher*

Cotton is the most important natural fibre in the world. It is usually termed as white gold as it is the key raw material for the Textile Industry. India being a major cotton producing country has about 23 per cent of its area under cotton and contributes about 10 per cent of cotton production in the world (Singh and Sihag 1996). Cotton is an important cash crop of Punjab and it is ranked next to rice both in area and production. Punjab ranked first in cotton productivity in entire country till 1991. During 1997-98 area under cotton was 619 thousand hectares and total production was only 751 thousand bales in Punjab (Anonymous 1999). There are many possible reasons and factors responsible for the fast decline in cotton production. Amongst these, the bollworm complex is the most important factor limiting the successful cultivation of cotton.

In present situation cotton growers of Punjab are facing serious problems due to abnormal weather conditions, rapid increase in the population of American bollworm, waterlogging, attack of leaf curl virus, etc. The yield of cotton has reduced to one fourth in the last few years. Under these circumstances, cotton is on the verge of replacement in cropping pattern of the state but there is no alternative for cotton in south western districts of the state. Keeping this in mind the present study was undertaken with the following specific objectives.

1. To find out the reasons of decline in cotton production as perceived by the scientists and extension personnels.

2. To know the opinion of the cotton growers regarding suggestions given by the experts for improving cotton production.

METHODOLOGY

The study was conducted in Muktsar, Mansa and Faridkot districts of Punjab in 1999-2000, as the maximum decline in cotton production was observed in these areas. Two blocks from each district and two villages from each block were selected randomy. A list of cotton growers of 12 selected villages was prepared and a sample of 150 cotton growers were selected proportionately to the number of total cotton growers in each selected village. In addition to the cotton growers, 30 scientists of Punjab Agricultural University and extension personnel of State Department of Agriculture associated with the research and extension work of cotton cultivation were also the respondents of the study. A questionnaire was developed to collect the information from the scientists and extension personnel. The Interview schedule was developed to collect the data form the selected cotton growers.

RESULTS AND DISCUSSION

Reasons of decline in cotton production as perceived by the scientists and extension personnel

The perusal of data presented in Table 1 indicated that majority of the scientists and extension personnel (96.67%) perceived increased number and severity of insect-pests as one of the reason of decline in cotton production in Punjab. The other reasons of decline were incidences of bollworm complex, wide spread attack of cotton leaf curl virus, unfavaourable weather conditions, indiscriminate and excessive use of insecticides, development of resistance in insect-pests to different insecticides, attack of large number of sap sucking insects, non-adoption of recommended agronomic practices, rising

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underground water table, lack of extension contacts, non-adoption of efficient spray technology, lack of credit or indebtedness, elimination of natural enemy complex, poor soil health and lack of ideal plant type and mushrooming of varieties in the field.

Suggestions to overcome the decline in cotton production

As indicated in Table 2 majority of the scientists and extension personnel suggested that high yielding and disease resistant varieties should be sown, recommended agronomic practices should be followed, recommended doses of different insecticides/pesticides should be used timely and alternately, picking and marketing of cotton should be in time. Other suggestions given by the scientists and extension personnel were, more-emphasis should be given to strengthen non-chemical methods of pest control as component of IPM, seeds should be purchased from the authorised agencies and timely irrigation schedule should be followed and efficient spray technology should be adopted.

Table 1: Distribution of the scientists and extension personnel according to the reasons of decline in cotton production (n = 30)

	Reasons*	Frequency	%
i)	Increased number and severity of insect-pests	29	96.67
ii)	Wide spread attack of cotton leaf curl virus disease	28	93.33
iii)	Development of the bollworm complex, which includes pink bollworm, spotted bollworm and the American bollworm	28	93.33
iv)	Unfavourable weather conditions to cotton crop	27	90.00
v)	Indiscriminate and excessive use of insecticides	26	86.67
vi)	Development of resistance in insect-pests to different insecticides	25	83.33
vii)	Attack of large number of sap sucking insects like jassid, whitefly, aphid, thrips and mite	24	80.00
viii)	Non-adoption of recommended agronomic practices	24	80.00
ix)	Rising underground water table	23	76.67
x)	Lack of extension contacts	23	76.67
xi)	Non-adoption of efficient spray technology/schedule	21	70.00
xii)	Lack of credit or indebtedness	21	70.00
xiii)	Elimination of natural enemy complex	20	66.67
xiv)	Poor soil health	20	66.67
xv)	Lack of ideal plant type and mushrooming of varieties in the field	18	60.00

Table 2: Distribution of the scientists and extension personnel according to the suggestions given to overcome the decline in cotton production (n = 30)

	Suggestions*	Frequency	%
1.	High yielding and disease resistant varieties should be sown	27	90.00
2.	Recommended agronomic practices should be adopted	25	83.33
3.	Timely and alternate use of different insecticides/ pesticides as per recommended doses	25	83.33
4.	Picking and marketing of cotton should be in time	24	80.00
5.	More-emphasis should be given to strengthen non-chemical methods of pest control as component of IPM	23	76.67
6.	Seeds should be purchased from the authorised agencies	21	70.00
7.	Timely irrigation schedule should be followed	20	66.67
8.	Efficient spray technology should be adopted	18	60.00

*Multiple response.

Table 3: Distribution of the farmer respondents according to the opinion given by them regarding suggestions given by the experts for improving cotton cultivation

S.	Suggestions	Know		Disagree		*Reasons for disagreeing	F	%
		F	%	F	%			
1.	Seeds of high yielding varieties should be sown	84	56.00	46	54.76	a) Non-availability of high yielding varieties seed	32	69.57
						b) Lack of credit so have to sow dealers choice seeds	34	73.91
2	Disease resistant varieties should be preferred	78	52.00	46	58.97	a) Non-availability of disease resistant variety seeds	30	65.22
						b) High cost of these varieties	28	60.87
						c) Some of these varieties give less yield	25	54.35
3.	Timely sowing (as recommended)	110	73.33	56	50.91	a) Unfavourable weather conditions at the recommended time of sowing	42	75.00
						b) Non-availability of seed drill and other implements required for land preparation for timely sowing	38	67.86
4.	Seeds should be purchased from authorised agency	102	68	68	66.67	a) Non-availability of required quantity of seeds at authorised agencies	34	50.00
						b) Late availability at these sources	25	36.76
5.	More-emphasis should be given to strengthen non-chemical methods of pest control as components of IPM	64	42.67	52	81.25	a) Lack of credit to adopt non-chemical methods of IPM	24	46.15
						b) Effect is slower as compared to chemical methods	28	53.85
						c) Non availability of the material required for methods of IPM	31	59.62
6.	Use of only recommended insecticides/ pesticides as per recommended doses	84	56.00	58	69.05	a) Non-availability of the recommended chemicals	30	51.72
						b) High cost of the recommended chemicals	32	55.17
						c) Lack of credit to purchase recommended chemicals and recommended doses	31	53.45
7.	More extension contacts	107	71.33	70	65.42	a) Non-availability of ADO	40	57.14
						b) Shortage of time	38	54.28
						c) Distant headquarter of ADO	32	45.71
8.	Following timely irrigation schedule	100	66.67	54	54.00	a) Shortage of electricity during critical stages of irrigation	27	50.00
						b) Low voltage problem and no fixed time of electricity supply	26	48.15
9.	Use of organic manure	94	62.67	68	72.34	a) Organic manure leads to more termite problems	57	83.82
						b) Fully rotten organic manure is not available	39	57.35
						c) More weed problem	36	52.94
10.	Timely picking of cotton	112	74.67	60	53.57	a) Non-availability of skilled labour at the time of picking	24	40.00
						b) Costly labour	29	48.33

*Multiple Response.

Opinion given by the cotton growers regarding suggestions given by the experts for improving cotton cultivation

As indicated in Table 3, majority of the respondents (56 %) knew about the suggestion that seed of high yielding varieties should be sown. Out of them 54.76 per cent disagreed due to non-availability and high cost of high yielding varieties seeds and lack of credit. A further look at the Table 3 indicate that 52 per cent of the respondents knew that disease resistant varieties should be sown. Out of them majority of the respondents (58.97%) disagreed due to non-availability and high cost of disease resistant variety seeds and less yield of some varieties. About 73.33 per cent of the respondents knew recommended time of sowing should be followed while 50.91 per cent of them disagreed due to unfavourable weather conditions at the recommended time of sowing.

It has been found that 68 per cent of the respondents knew that seeds should be purchased from authorised agencies while 66.67 per cent of them disagreed because of non-availability, late availability of required quantity seeds and lack of credit to purchase seed from these agencies. The suggestion that more-emphasis should be given to strengthen non-chemical methods of pest control as components of IPM was known to 42.67 per cent of the respondents while 81.25 per cent of them disagreed due to lack of credit, slower effect and nonavailability of the material required for methods of IPM.

The data presented in Table 3 indicated that only 56 per cent of the respondents knew that recommended insecticides/pesticides should be used as per recommended doses while 69.05 per cent of them disagreed due to nonavailability of recommended chemicals, high cost and lack of credit to purchase recommended chemicals and recommended doses. The suggestion that more extension contacts should be there was known to 71.33 per cent of the respondents while 65.42 per cent of them disagreed due to non-availability of ADO, shortage of time and distant headquarter of ADO.

About 67 per cent of the respondents knew that the timely irrigation schedule should be followed while 54 per cent of them disagreed due to shortage of electricity during critical stages of irrigation, problem of low voltage and no fixed time of electricity supply.

The data in Table 3 further indicate that 62.67 per cent of the respondents knew that organic manure should be used but 72.34 per cent of them disagreed because organic manure leads to more termite problem, non-availability of fully rotten organic manure and more weed problem due to organic manure. About 75 per cent of the respondents knew that timely picking should be followed but 53.57 per cent of them disagreed due to non-availability by skilled labour and costly labour at the time of picking.

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Research Note

Technology Matrix for Rice Growers

S. K. Kher[1], R. B. Patel[2] and P. S. Slathia[3]

How much effective is our technology? How much efficient is our extension system are some of the questions asked to solve the problems of farm production and productivity. To be specific, technologies generated at research centre generally cannot be applied as such to the complex, diverse socio-economic and agro ecological situations of the whole farming community. Use of new or improved inputs and adoption of technology in agriculture are important in increasing farm productivity. In India a lot of change has been observed in the farming system through various programmes, however the progress is not yet to be desired level of satisfaction. Farmers have to encounter various types of problems in gathering knowledge for adoption of the recommended technologies. These problems need to be identified and assessed accordingly tailored for its refinement and dissemination. As such, a study on developing a technology matrix for rice growers have been undertaken with the objective to identify major problems for non-adoption of improved farm technology by farmers and to develop a technology matrix for bridging the adoption gap.

METHODOLOGY

The present study was carried out in two agro-climatic zones of South Gujarat. A multistage random sampling techniques were employed for the selection of the villages and respondents. Four talukas from each zone were selected purposely keeping in view, the total area under paddy. Out of these eight talukas, sixteen villages were selected randomly. A list of paddy growers from these sixteen villages was obtained from the concerned agriculture officer and 80 contact and 80 non-contact farmers were selected randomly from these villages thus making a total of 160 farmers as sample for the study. The data were collected personally with the help of a well structured schedule.

RESULTS AND DISCUSSION

The problems in the non-adoption of improved paddy technology were identified on the basis of farmers experience with the important factors that act as a drag in pulling the level of adoption. The mean frequency values of problems for non-adoption was calculated and considered as dividing line for the grouping into major and minor problems. The problems receiving frequency value more than the mean frequency value was considered as major problems and rest is minor problems for non-adoption of improved paddy cultivation technology. If we look on to Table 1, it is evident that the major problems having frequency value more than the frequency value of 68 were lack of labour at the time of trans planting (86.25%), lack of awareness about use of weedicide (57.50%), decaying of seedlings due to excessive rains and water logging (53.13%), use of excessive fertilizer (46.87%), lack of knowledge about insect pest control (45.00%), problems of finance (44.37%) and lack of persuasion and conviction in adoption of improved paddy cultivation technology (43.12%). The decaying of seedling may be due to the fact that south Gujarat is a rain fed zone (1450 mm/annum) and due to excessive rains and less facilities of drainage there may be water logging in the paddy field. Lack of labour at the time of transplanting may be due to availability of less family labour and therefore increasing the dependence of hired labour for

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transplanting. During the study, it was found that farmers had a wrong notion that excessive use of fertilizer can improve the crop yield and was followed on group basis. Lack of knowledge on various plant protection and weed control may be due to the fact that majority of the farmers were confined to personal localite information sources. Lack of labour at the time of transplanting and lack of persuasion and conviction in adoption of improved cultivation technology were ranked first and seventh respectively.

Technology matrix for bridging the adoption gap

Based on the major problems identified through the survey method of the selected villages a technology matrix was developed which could help in reducing the gap between the recommended and farmers practices on different operations in paddy cultivation technology on the basis of participatory discussion between farmers, extension personnel and scientists. Technology intervention were sorted out from the available technology options and a detailed technology matrix have been suggested in the Table 2.

As is evident from the Table 2 in majority of the problems the nature of intervention suggested is demonstrations. This may be due to the fact that demonstration build confidence of both the extension worker and the farmer in the utility as well as feasibility of a recommended practice and gives extra assurance to the extension worker that the recommendation is practical and furnishes local proof of its advantages. Similarly, lack of labour and drudgery at the time of transplanting is becoming an alarming problem in the study area. To overcome the problem the technical option suggested is change in the method of manual transplanting by developing a mechanical paddy transplanter thereby increasing the time and manual efficiency and reducing drudgery. Sowing of sprouted seeds can be useful if drum seeding is popularized in the area. The knowledge level of farmers regarding use of plant protection measures and weedicide can be increased if we follow the technical option of training the farmers from time to time and at different stages of crop growth. Any programme can be called as successful if its execution is carried as per the plan and at right time. A best type of local leader and extension worker who can shoulder the responsibility and multiply efforts of all the agencies should be selected. At research level a scientist in the university having a good research base should have direct contact with the field so as to get first hand knowledge of farmer's problem which he would have otherwise overlooked. Therefore, in the present study all the three agencies viz. Farmers', extension personnel and research worker has been suggested as agency for executing the interventions. Presence of a useful monitoring agency to keep track of activities or progress towards objectives is important. As it is evident from the table in majority of the problems, subject matter specialists have been assigned the work of monitoring agency. They have an important role in the formulation of production, recommendation and conducing on farm trials besides an important link between research and extension.

CONCLUSION

Technology development is a continuous process and the farmers shall continue to face many problems in accepting a technology. The problems should be analyzed, needs and priorities identified and based on these needs a suitable strategy can be developed by offering certain intervention for bridging the gap under different situations and locations.

Table 1: Major problems in non-adoption of paddy cultivation technology as perceived by farmers

(n = 160)

S.No.	Problems	Number	%	Rank
1	2	3	4	5
1.	Decaying of seedling due to excessive rains and water logging	85	53.12	III
2.	Lack of labour at the time of transplanting	138	86.25	I
3.	Use of excessive fertilizer	75	46.87	IV
4.	Lack of persuation and conviction in adoption of improved cultivation technology	69	43.12	VII
5.	Lack of knowledge about insect pest control	72	45.00	V
6.	Lack of awareness about use of weedicide	92	57.50	II
7.	Problem of finance	71	44.37	VI

Table 2: Technology matrix for reducing the adoption gap

S.No.	Problem	Nature of intervention	Time	Executing Agency	Monitoring Agency
1	2	3	4	5	6
1.	Decaying of Seedlings due to excessive rains and water logging	• Method demonstrations on drainage of excessive water in nursery as well as in main paddy field	Pre-season and during the preparation of nursery and transplanting pre-seasonal. Pre and during the period of nursery sowing	SMS in coordition with scientists and farmers	SMS
		• Method demonstration in preparation of seed bed		SMS in coordination with scientists and farmers	SMS
		• Special training programme for raising seedling and selection and preparation of seed bed		FTC's KVK's	Training Organisers
2.	Lack of labour	• Changing method of planting Cooperative labour approach	Priority basis Prior to start of operation	SMS in coordination with scientists and farmers	Scientists and SMS's
		• Demonstration on sowing of sprouted seeds in puddle plots through drum seeding	Pre-sowing	Farmers and cooperative organizations SMS in coordination with scientists and farmers	Office bearer of cooperative organization SMS and scientists
3.	Use of excessive fertilizer	• Result demonstration on recommended fertilizer dose and use of bio-fertilizer	Pre-or during the season	SMS in coordination with with scientists and farmers	SMS's
		• Special training programme on fertilizer and bio-fertilizer management in paddy crop	Prior to the beginning of active growth period	FTC's KVK's SSK's	Training Organisers
		• Visit of farmers to result demonstration/adaptive trials	During critical stages of fertilizer application in paddy crop		
		• Explaining cost benefit ratio of paddy crop through field days	At the time of evaluation stage of demonstration	SMS in coordination with scientists	SMS
4.	Lack of persuation and conviction in adoption of improved cultivation technology	• Visit of farmers to result demonstration/adaptive trials by organizing demonstrations days	Conducting and evaluation stage of demonstration (before harvesting paddy crop)	SMS in coordination with scientists/ village leaders	SMS

5.	Lack of knowledge about insect pests	• Messages regarding control of insect pest and diseases through mass media	Before and during the various stages of crop growth	SMS in coordination with scientists/ village leaders	SMS
		• Use of result demonstration adaptive trials Frequent visits of VEW	Pre and during sowing season		
		• Skills oriented training for identification of pest and disease pertaining to paddy crop	Pre and during post sowing	FTC's KVK's SSK's	Training Organisers
6.	Lack of knowledge about use of weedicide	• Transfer of weed management technology through mass media exposure	Prior to sowing of paddy crop	SMS in coordination with scientists	SMS
		• Organising demonstration and demonstration days for paddy growers	During growing season and evaluation stage	SMS in coordination with scientists and farmers	SMS
		• Organising special training programme on weed management technology for paddy growers	Pre and post season	FTC's KVK's	Training Organisers
		• Working out comparative economics of weed management	Pre and post season	Scientists	Scientists
7.	Problem of finance	• Linkage with cooperatives banks and other credit agencies		Farmers cooperative and farmers organization, NGO's	Office bearer cooperative organization
		• Availability of loans at minimum interest		Nationalised Banks	NGOs

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Research Note

Perceived Constraints of Dairy Extension System

Ram Singh Suman[1] and Ram Chand[2]

The study focused on determination of constraints in the functions of the functionaries. These constraints have been studied from the angle of state level as well as district level functionaries of state department of animal husbandry and dairy federation/unions. In behavioural researches, these were difficulties in conceptualizing the constraints as variable because they did not lend themselves easily to observations. Adoption behaviour and acceptance of practices of innovations suffered from vague and contradictory formulation to such an extent that there was little consensus concerning the adoption and acceptance of such segments of technologies, their degree, directionality and the problem of their measurement. Constraints exist primarily in terms of how they are defined and conceived in organization. Constraints are projections of collective sentiments rather than simple mirrors of objective conditions. According to some authors, there exists interaction among the different constraints. It is argued that many constraints exist simultaneously in several stage of development and patterns of progressive from one stage to another depending upon the time, place and other sets of conditions.

METHODOLOGY

The study was conducted in all 25 states of India. One district was selected randomly from each state, so, that the total number of districts included in the study were twenty-five. Selection of respondent was done from state level functionaries of Animal Husbandry and Dairying and Dairy Federation/Union. Two respondents from each organization at district and state level were selected for interview. So, there were a total of two hundred respondents representing 25 states. Two hundred questionnaires were mailed to the functionaries. Total perception score of the every constraint as given by the respondents was worked out and then they were categorized accordingly. The constraint, which, obtained highest score than others, was most effective and those which obtained least score than others was least effective in own category.

RESULTS AND DISCUSSION

Two hundred questionnaires were mailed to the functionaries and 47 per cent were obtained by the researcher. It was the actual score of the individual perception of the constraints that an extension system of the country was facing. It was gratifying to note that six constraints were found in dairy extension. The 'technical' and 'socio-religious' constraints were most effective. 'Marketing' and 'communicational' constraints were least effective in dairy extension systems.

The study revealed (Table 1) that lack of technical expertise was ranked first among the technical constraints. The inadequate training of stockman for evaluation of semen was the ranked second. Inadequate follow-up of Artificial Insemination cases next in order of importance with the mean value was 1.42 and 0.494 SD. It was followed by susceptibility in crossbred animal. The lack of progeny tested bull was ranked fifth with mean value 1.40 with 0.489 S.D. The poor conception rate of Artificial Insemination in buffaloes was ranked eighth, followed by use of poor quality of roughages for feeding cattle. Finally the inadequate knowledge of field staff in providing guidance to the farmers on cheap scientific housing of animal was ranked last. The mean value was 1.34 with 0.474 SD.

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Table 1: Constraints in Dairy Extension Systems

S.No.	Constraints	Mean	S.D.	Rank
A.	**Technical**			
1.	Lack of technical expertise	1.44	0.497	I
2.	Inadequate training of stockman for evaluation of semen	1.43	0.495	II
3.	Inadequate follow up of Artificial Insemination	1.42	0.494	III
4.	Susceptibility in crossbred animals	1.42	0.493	IV
5.	Lack of progeny tested bulls	1.41	0.493	V
6.	No preservation of fodder during fresh semen	1.40	0.489	VI
7.	Practice of single insemination against the recommendation of double insemination	1.39	0.489	VII
8.	Poor conception rate of Artificial Insemination in buffaloes	1.38	0.485	VIII
9.	Use of poor quality of roughages for feeding cattle	1.35	0.478	IX
10.	Inadequate knowledge of field staff in providing guidance to the farmers on cheap scientific housing of animal	1.34	0.474	X
B.	**Socio-Religious**			
1.	Poor involvement of members in decision making	1.40	0.490	I
2.	Lack of motivation among members	1.40	0.490	I
3.	Caste conflict	1.40	0.489	II
4.	Absence of loyalty of members	1.40	0.489	II
5.	Domination of privileged section	1.37	0.481	III
6.	Farmers faith in quacks	1.34	0.474	IV
7.	Poor knowledge of farmers regarding the facilities available at the society	1.34	0.474	IV
8.	Faction among members of the executive committee	1.33	0.473	V
C.	**Administrative**			
1.	Financial shortage for programme execution	1.42	0.494	I
2.	Lack of trust between supervisors and superiors	1.40	0.490	II
3.	Non-involvement of supervisors in decision making	1.39	0.489	III
4.	Favouritism and nepotism in administration	1.39	0.488	III
5.	Irresponsible supervisory staff	1.38	0.486	IV
6.	Delay in working by supervisors	1.37	0.484	V
7.	Frequent transfer of staff	1.36	0.481	VI
8.	Lack of proper rapport between management committee and others	1.32	0.467	VII
D.	**Marketing**			
1.	Non availability of surplus milk with the farmers	1.40	0.489	I
2.	Non trustworthiness of executive committee	1.39	0.488	II
3.	Presence of milk vendors	1.39	0.488	II
4.	Incompetancy of field supervisors to persuade farmers for selling milk	1.39	0.488	II

5. Untimely payment done by the union to the society	1.38	0.485	III
6. Advanced payment done by the milk vendors	1.33	0.471	IV
7. Ease of selling milk to the milk vendors by the members	1.30	0.461	V
E. Communicational			
1. Untimeliness of communication in the department	1.42	0.493	I
2. Lack of upward and horizontal communication	1.39	0.488	II
3. Lack of communication skills	1.36	0.482	III
4. Lack of community approach for effective participation in society affairs	1.36	0.482	III
5. No proper guidance and directions to give information to subordinates	1.35	0.479	IV
F. Miscellaneous			
1. Lack of irrigation facility in the area	1.43	0.496	I
2. Lack of members faith in cattle development programme as a measure to improve economy	1.43	0.496	I
3. No expenditure on development activities	1.43	0.496	I
4. Lack of audio-visual aids for educating the members on cooperative programme	1.37	0.485	II
5. Less number of member in society	1.37	0.485	II
6. Lack of functional literacy among members	1.34	0.474	IV
7. Nearness of the society to urban areas	1.33	0.473	V
8. Due to seasonal variation, members get higher price from milk venders in summers	1.30	0.460	V

The poor involvement of members in decision making and lack of motivation among members was first ranked jointly as indicated in socio-religious constraints. The mean value was 1.40 with 0.490 SD. Caste conflict was the second ranked with absence of loyalty of members in social-religious constraints followed by domination of privileged section, farmers faith in quacks and the poor knowledge of farmers regarding the facilities available at the society. The faction among members of the execution committee was ranked last.

Financial shortage for programme execution was ranked first followed by lack of trust between supervisors and superiors. Non involvement of supervisors in decision making and favouritism and nepotism in administration jointly ranked third, irresponsible supervisory staff was ranked fourth. The lack of proper rapport between management committee and others was ranked last in administrative constraints.

The investigation further showed that non availability of surplus milk with the farmers was ranked first in marketing constraints. The mean value was 1.40 with 0.489 SD was found to be most serious constraints followed by non trustworthiness of execution committee (mean v 1.39 and 0.488 SD). The presence of milk vendors serious constraints followed by incompetancy of supervisors to persuade farmers for selling milk. Unti payment done by the union to the society and adva payment done by the milk vendors were ranked third fourth respectively.

Lack of irrigation facility in the respective area the most serious constraints ranked first in miscellan constraints. The mean value was 1.43 with 0.496 SD. of member's faith in cattle development programme measure for improving economy and no expenditur development activities were also ranked first. The r value was 1.43 and SD 0.495. Lack of audio-visual for educating the members on cooperative programme number of members in society, lack of functional lite among members, nearness of the society to urban area ranked second, third, fourth and fifth, respectively. last rank of the miscellaneous constraints was du seasonal variation, members get higher price from vendors in summer. The mean value was 1.30 with 0 SD.

ian Journal of Extension Education
41, No. 1 & 2, 2005 (113-116)
earch Note

Knowledge and Adoption of Fish Production Technology

Vikram Sharma[1], V. B. Dixit[2] and S. N. Laharia[3]

Fishery plays a very important role in the economic elopment of the nation through employment generation, tribution to food and nutrition security and foreign hange. Since independence, fish production increased n times from 7.52 lakh tonnes to 49.49 lakh tonnes fish export increased 15 times from 19.70 thousand nes to 295.5 thousand tonnes by 1995-96. This sector provides employment to 57.70 lakhs fishermen. ugh Haryana is neither having any sea shore nor any or river system, yet it is also a very progressive state in production as its fish production increased nearly 50 s, from mere 600 tonnes at its formation in 1966-67 to 66 tonnes in 1996-97. Productivity wise, Haryana ranks nd in per hectare fish production (3689 kg/hectare/ r) next only to Punjab. The major break through in the e came through culture fishery as its contribution in 6-67 was only 10.30 per cent of total fish production, le in the last three decades it increased to 74.60 per t of the total fish production.

At the time of creation of the state, only 58 ha water in the shape of village ponds was under fish culture ch has increased more than 100 times. Similarly, total duction through ponds was only 62 tonnes, while it has eased to 22581.40 tonnes in 1996-97. Inspite of these s, there is an enormous scope to increase its production productivity. The preparation of any development tegy needs information about existing level of wledge and adoption. But incidently no scientific data vailable on these aspects. Thus, the present study was ducted to assess the knowledge and adoption of fish duction technologies in Haryana.

METHODOLOGY

All the 19 districts of the state were classified into five categories on the basis of quality of water and one district from each category was randomly selected. Thus, Yamunangar, Karnal, Gurgaon, Hisar and Rohtak were selected for the study. At the second stage, two blocks from each district were selected randomly. Thus, Radour and Jagadhari blocks from Yamuna Nagar, Karnal and Nissang from Karnal, Sohna and Pataudi from Gurgaon, Hisar-I and Hisar-II blocks from Hisar and Lakhan Majra and Kalanour blocks from Rohtak district were selected for study. Thus, 10 blocks from 5 districts were taken for the study. A list of villages having fishery in these blocks was prepared in consultation with the local field staff and out of that list 5 villages from each block were selected randomly. Thus, 58 farmers from 50 villages were selected for study purpose.

Five independent variables viz. Education, family education, caste, material possession and change proneness were measured with the scales developed by Trivedi (1963), Singh and Narwal (1974), Trivedi (1963), Singh and Singh (1970) and Moulik (1969) respectively. For rest of the five variables namely, age, caste, pond size, holding, experience in fish farming and extension contact a schedule was developed which was pretested before administration with similar type of respondents. For measuring attitude of farmers towards fish farming a scale with 16 items was developed using Summated Rating Technique ensuring its reliability as well as content validity.

Knowledge and adoption were the dependent variables which were measured through a scale developed on the basis of package of practices of fish production

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technology recommended by the State Department of Fishery, Government of Haryana. It contained 28 items and the response was obtained on 3 point continuum i.e. fully correct, partially correct and incorrect in case of knowledge, while full adoption, partial adoption and no adoption with regard to adoption. These were assigned the score of 2, 1 and 0 respectively for measuring both the variables. The scores were assigned item-wise and then total scores for each practice were worked out.

RESULTS AND DISCUSSION

Profile of fish farmers

The background information of fish farmers was collected on 11 aspects. The average age of the respondents was 38.15 years. Though their level of education was high but family education status of the respondents was either medium or of low level (73%). Caste-wise most of the respondents belonged to dominant and prestige castes (56%). The average pond size was 2.64 acres. With regard to material possession, more than 81 per cent belonged to middle and lower categories. In case of experience in fish farming maximum number of fish farmers (84.49%) had the experience of about seven years. More than 75 per cent of the respondents had moderate level of change proneness. The level of extension contact of majority was either low or medium. Only 8.63 per cent respondents were ha high extension contact. Almost all of them (95%) had exposure to mass media. Majority of them (80%) h favourable attitude towards fishery.

Mean knowledge score of fish farmers

The distribution of farmers on the basis of the knowledge score obtained on eight major practices of stocking and post-stocking of fish production techno was worked out and is presented in Table 1.

The study revealed that majority of the respon had comparatively low level of knowledge about di management (87.93%) and feeding practices (69.0 This might be probably due to complex natur technology, low level of extension contacts and mass m exposure. About 60 per cent farmers had good knowl of fish species and ratio and harvesting. The study fu revealed that most of the fish farmers possessed me level of knowledge about soil and water manage (72.42%), general pond management (pre-stock (62.08%), water exchange (51.73%) and general management (post-stocking) (72.42%).

On the overall knowledge of fish farmers, it is that 65.25 per cent of the fish farmers had medium lev knowledge whereas 27.58 per cent possessed low lev

Table 1: Mean knowledge score of farmers to different aspects of fish

	Aspects	Knowledge score			Distribution of respondents (%		
		X	% Score	SD	Low	Medium	H
I	**Pre-stocking**						
A	Soil and water management	5.91	42.21	2.10	22.41(0-4)	72.42(5-9)	5.17(1
B.	Fish species ratio	2.81	36.62	0.87	6.89(0-1)	4.15(2)	68.96
C.	General pond management	5.86	70.25	3.4	31.03(0-4)	62.08(5-11)	6.89(1
	Overall pre-stocking	14.58	42.88	5.43	20.68(0-10)	74.15(11-23)	5.17(2
II	**Post stocking**						
A.	Feeding practices	1.17	29.25	0.90	62.06(0-1)	34.50(2)	3.44
B.	General pond management	0.55	27.50	1.29	18.96(0-2)	72.42(3-5)	8.62
C.	Water exchange	3.87	48.37	0.53	46.55(0)	51.73(1)	1.7
D.	Disease management	2.06	14.71	2.06	87.93(0-4)	10.35(5-9)	1.72(1
E.	Harvesting	4.72	78.66	1.16	0.00(1-2)	43.11(3-4)	56.89
	Overall post-stocking	12.37	36.38	3.85	24.13(0-10)	74.15(11-23)	1.72(2
	Overall knowledge	26.95	39.63	9.02	27.58 (0-2)	65.25 (23-45)	5.17(4

Figures in Parentheses are range scores for different variables.

ledge. Only a very few percentage (5.17) of ndents had high level of knowledge. This suggests hery department should take some serious measures e the knowledge level of fish farmers about fish ction technology, particularly about disease ement, feeding practices and water exchange.

adoption scores of fish farmers

The date in table 2 shows that majority of the ndents have comparatively low-level of adoption of e management (96.56%), general pond management ocking) (67.24%) and feeding practices (65.51%). probable reasons for this low level of adoption might plex nature of technology, low level of extension cts and low mass media exposure. It was astonishing erve that 89.65 per cent of the respondents had not the recommended practices of water exchange. might be due to the fact that most of the ponds are al and there is always scarcity of water in these . The study further indicates that most of the fish rs had medium level of adoption of general pond ement (post stocking 94.83%), fish species ratio 15%), harvesting (63.80%) and soil and water ement (65.56%).

On the basis of overall adoption, it is seen that 46.56 per cent of the fish farmers had medium level of adoption whereas 51.72 per cent had low level of adoption. Only a very small percentage (1.72) of the respondents had high level of adoption. The study is in line with the observations of Balasubramaimum and Perumal (1990) who revealed that fish farmers had not been adopting many practices such as testing of water and soil, control of weed fishes, application of manures and fertilizers and supplementary feeds. It suggests that strong measures should be taken by the State Department of Fisheries to increase the adoption of recommended fish production technology particularly about disease management and feeding practices.

Correlation coefficient between farmers' background variables and their knowledge and adoption

The data were subjected to correlation analysis to find out association between farmers' background variables stocking, overall knowledge and adoption. It implies that with the increase in education, extension contact, change proneness, attitude towards fish farming etc. their overall and their knowledge as well as adoption of recommended fish technology and the results are presented in Table 3.

2: Mean adoption score of farmers in different aspects of fish production

Aspects	Adoption score			Distribution of respondents (%)		
	$\bar{X}$	% Score	SD	Low	Medium	High
Pre-stocking						
Soil and water management	3.96	39.60	1.13	27.58(0-3)	65.56(4-7)	3.46(8-10)
Fish species ratio	1.05	26.42	0.47	10.34(0)	74.15(1)	15.51(2)
General pond management	3.17	52.50	2.16	67.24(0-3)	29.32(4-8)	3.44(9-1)
Overall pond management	8.18	34.08	3.11	25.86(0-7)	68.97(8-16)	5.17(17-22)
Post stocking						
Feeding practices	1.12	28.00	0.89	65.51(0-1)	31.05(2)	3.44(3-4)
Water exchange	0.10	5.00	0.30	89.65(0)	10.35(1)	0.00(2)
General pond management	2.60	43.33	0.72	5.17(0-1)	94.83(2-4)	0.00(5-6)
Harvesting	4.15	69.16	1.27	0.00(0-1)	63.80(2-4)	36.20(5-6)
Disease management	1.46	10.43	1.61	96.56(0-4)	1.72(5-9)	1.72(10-14)
Overall post-stocking	9.43	29.46	2.94	75.86(0-10)	24.14(11-21)	0.00 (22-32)
Overall adoption	17.61	31.44	5.72	51.72(0-18)	46.56(19-37)	1.72(38.56)

es in parentheses are range scores for different variables.

Table 3: Correlation coefficient of fish farmers' background variables with their knowledge and adoption lev fish production technology

Background variables	Correlation coefficient					
	Knowledge			Adoption		
	Pre stocking	Post stocking	Overall adoption	Pre stocking	Post stocking	Ove adop
1. Age	0.021	0.045	0.030	-0.023	0.085	0.
2. Education	0.473**	0.410**	0.459**	0.383**	0.376**	0.4
3. Family Education	0.524**	0.450**	0.507**	0.435**	0.427**	0.4
4. Caste	0.370**	0.350**	0.372**	0.297*	0.244	0.
5. Pond size holding (acres)	0.420*	0.358**	0.405**	0.484**	0.397**	0.4
6. Material Possession	0.674**	0.590**	0.656**	0.598**	0.595**	0.
7. Experience in fish farming	0.366**	0.507**	0.435**	0.349**	0.410**	0.
8. Change Proneness	0.743**	0.710**	0.749**	0.665**	0.686**	0.
9. Extension contact	0.506**	0.450**	0.496**	0.516**	0.461**	0.
10. Mass media exposure	0.709**	0.541**	0.656**	0.608**	0.568**	0.
11. Attitude towards fish farming	0.670**	0.610**	0.663**	0.501**	0.551**	0.

*,**Significant at 0.05 and 0.01 level of probability respectively.

Except age all the background variables had significant positive correlation with pre-stocking, post- knowledge as well as adoption of fish production technology is likely to increase. Similar findings have been reported by Ekka (1999) and Kumar (2000).

CONCLUSIONS

The study indicated that majority of the resp had low to medium level of knowledge and ado culture fish production technology. Except age variables selected for the study had positive and si association with the knowledge and adoption farmers. Change proneness, mass media expo experience in fish farming were the most significa determining the knowledge and adoption leve production technology.

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Research Note

Adoption Behaviour of Livestock Farmers

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Livestock play a pivotal role in the country's rural economy. The performance and contribution of livestock in recent decades towards agricultural production is phenomenal. They not only provide livelihood but also offer employment opportunities to the poor and weaker sections of the society. Indian planners and policy makers realised the need to recognise and promote small scale livestock production which is thought to act as a key component of poverty alleviation efforts.

In order to improve the socio-economic status of these farmers by helping them cross over the poverty line, a novel Project namely DANIDA-Pudukkottai Livestock Development Project aided by DANIDA was conceived and launched in Pudukkottai District of Tamil Nadu in the year 1990. A systematic evaluation on scientific lines to understand the impact of the Project in changing the knowledge and behavioural aspect of target farmers is essential which would form a basis for extending this Project to the other target areas. With this ideology in view, an attempt has been made to study the technological impact of the Project with the following objectives

1. To measure the extent of adoption of recommended sheep/goat husbandry practices among participant and non-participant farmers.

2. To ascertain the reasons for non-adoption of recommended practices.

METHODOLOGY

Kulathur taluk of Pudukkottai district was purposively selected for the study as the first phase of the Project was in operation only in this district. The sample size was limited to 200 participants and 100 non-participants considering the time and other resources available for the study. A sample of 10 participant farmers were selected by adopting simple random sampling technique from each of the selected 20 village panchayats. Likewise, 100 non participants farmers were selected from the two village panchayats of non-project area having similar socio-economic status. Thus, in all 300 farmers constituted the sample of the study.

Rogers (1983) defined adoption as the decision to make full use of an innovation as the best course of action available. The term adoption in this study means the use of recommended practices by the respondent. In consultation with the DANIDA - Pudukkottai Livestock Development Project field functionaries, fifteen skill oriented technologies/practices in sheep/goat farming recommended through the programme were identified to study the adoption. The respondents were narrated about these recommended practices and requested to indicate their extent of adoption during the previous years. The respondents who had 'adopted' the recommended practice was given 'two' scores and for those 'not adopted' was given 'zero' score. The extent of adoption of recommended practices for each respondent farmer was measured by using an adoption quotient developed by Sengupta (1967) and adopted by Swaminathan (1986).

Based on the adoption quotient, the respondents were classified into three categories using mean and standard deviation.

RESULTS AND DISCUSSION

The findings on the adoption of recommended practices are presented and discussed in terms of extent and practice wise adoption.

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Extent of adoption of recommended practices (overall adoption)

The study revealed that about 19.00 and 66.00 per cent of the participants were high and medium adopters respectively, whereas only 10.00 and 48.00 per cent of the non-participants were in these categories. The remaining 15.00 per cent of the participants and 42.00 per cent of the non-participants were in the low level of adoption. The significant 't' value reveals that participant and non-participant farmers differed significantly in their adoption level. This indicates that the extent of adoption of practices by beneficiaries was high in the target area than in the control area. The reason is that the Project has created a considerable level of technological impact on the participant farmers due to the utilization of services such as veterinary and extension services rendered by the Project officials. Besides these, increased awareness through mass media exposure and its utilization and contact with extension agents would have certainly increased the level of adoption along with knowledge gain regarding sheep/goat husbandry practices. The non-availability of these services and facilities in the control area would be the main reason for a considerable percentage of low adoption. The findings are in line with the findings of Swaminat (1986) and Ravi (1991).

Thus, the sheep/goat farmers who were selecte the beneficiaries of the Project had increased their leve adoption to a moderately high level, indicatin considerable amount of technological impact on them

Practice wise adoption of recommended practices

Fifteen practices in sheep/goat rearing recommended/demonstrated by DANIDA-PULDEP considered for assessing the adoption by the respon farmers. The data generated in this aspect were anal and presented in Table 1.

It could be seen from Table 1 that of the 15 prac recommended/demonstrated by DANIDA-PULDE sheep/goat rearing, the practices namely selectio purchase of quality animals (76.00 per cent), provisi shelter for animals (57.00 per cent), feeding of colo to new born kids (82.00 per cent), period of grazing (per cent), feeding of crushed prosopis pods and tam seeds (73.00 per cent), feeding of tree leaves in su (80.50 per cent), deworming (72.00 per cent), vacci

Table 1: Practice wise adoption of recommended technologies/ practices in sheep/goat rearing

S.No.	Technologies/practices	Participant farmers (n = 200)				Non-participant farmers (n =	
		Adopter		Non-adopter		Adopter	Non-ado
		No.	%	No.	%	No.	%	No.
1.	Selection and purchase of quality animals	152	76.0	48	24.0	9	9.0	91
2.	Provision of shelter for animals	114	57.0	86	43.0	42	42.0	58
3.	Upgrading	17	8.5	183	91.5	4	4.0	96
4.	Colostrum feeding	164	82.0	36	18.0	12	12.0	88
5.	Ligation and disinfection of naval cord	60	30.0	140	70.0	-	-	100
6.	Practice of weaning	14	7.0	186	93.0	-	-	100
7.	Period of grazing	193	96.5	7	3.5	86	86.0	14
8.	Feeding of crushed prosopis pods and tamarind seeds	146	73.0	94	47.0	14	14.0	86
9.	Feeding of tree leaves in summer	161	80.5	39	19.5	54	54.0	46
10.	Deworming	144	72.0	56	28.0	9	9.0	91
11.	Ectoparasiticide application	51	25.5	149	74.5	4	4.0	96
12.	Castration of ram lambs	12	6.0	188	94.0	-	-	100
13.	Vaccination of sheep/goats	137	68.5	63	31.5	3	3.0	97
14.	Isolation of sick animals	17	8.5	183	91.5	-	-	100
15.	Marketing of ram lambs at 8 months of age	132	66.0	68	34.0	36	36.0	64

of sheep and goats (68.50 per cent) and marketing of ram lambs at 8 months of age (66.00 per cent) were adopted by majority of the participant farmers. The reason attributed to the maximum level of adoption in these technologies/practices might be due to their conviction they had gained in these areas by way of reduction in mortality and enhanced production level.

The adoption level seemed to be poor in the areas of upgrading, ligation and disinfection of naval cord, practice of weaning at 2 months of age, ectoparasiticide application for eradication of ticks and lice, castration of ram lambs at 2 months of age and isolation of sick animals to prevent spread of diseases.

In the case of non-participant farmers, period of grazing and feeding of tree leaves such as *neem, vagai, madanarayanan, subabul, agathi* and *ficus* species were the practices adopted by more than 50 per cent of farmers, while majority of them were non-adopters of almost all the remaining practices in sheep/goat rearing. The reason attributed is due to lack of knowledge and non-availability of suitable inputs. The main reason for majority of the participant farmers in the adopter category when compared to non-participants might be due to the thrust (or) emphasis of the project officials to improve sheep/goat husbandry as a viable enterprise in the project area.

Reasons for non-adoption of recommended practices by the participant farmers

The reasons for non-adoption of various recommended practices were collected, tabulated and presented in Table 2.

From Table 2, it could be observed that with regard to practice of selection and purchase of quality animals, high cost of animals (62.50 per cent) and non-availability of good breeds (37.50 per cent) were the reasons expressed by the farmers for non-adoption of recommended practices. The farmers stated that they were unable to spend money on such quality animals.

Table 2: Reasons for non-adoption of recommended sheep/goat rearing practices (participant farmers)

S.No.	Recommended practice	Non adopters	Reasons for non-adoption	No.	Per cent
1.	Selection and purchase of quality animals	48	a. High cost	30	62.50
			b. Non availability of good breeds	18	37.50
2.	Provision of shelter for animals	86	a. Over hang in the house is sufficient	21	24.40
			b. Shed construction is costly	65	75.60
3.	Upgrading	183	a. Non-availability quality bucks	19	10.30
			b. Lack of knowledge	164	89.70
4.	Colostrum feeding	36	a. Colostrum feeding will induce diarrhoea	24	66.60
			b. Lack of time	12	33.40
5.	Ligation and disinfection of naval cord	140	a. Not necessary (mother itself will lick)	113	80.70
			b. Lack of knowledge	27	19.30
6.	Practice of weaning	186	a. Lack of knowledge	141	75.80
			b. Kids will feel lonely	45	24.20
7.	Period of grazing	7	a. Lack of knowledge	7	100.00
8.	Feeding of crushed drosopis pods and tamarind seeds	94	a. Lack of knowledge	54	100.00
9.	Feeding of tree leaves in summer	39	a. Lack of knowledge	17	43.50
			b. Time Consuming	22	56.50
10.	Deworming	56	a. Lack of knowledge	47	83.80
			b. Inadequacy of dewormers	9	16.20

11.	Ectoparasiticide application	149	a.Costly method	41	27
			b. Lack of knowledge	64	42
			c. Time consuming	44	29
12.	Castration of ram lambs	188	a. Lack of veterinary services	28	14
			b. Lack of knowledge	160	85
13.	Vaccination of sheep/goats	63	a. Sheep go down in condition	6	9
			b. Lack of knowledge	28	44
			c. Failure of vaccination	29	46
14.	Isolation of sick animals	183	a. Non-availability of isolation space	36	19
			b. Lack of knowledge	147	80
15.	Marketing of ram lambs at 8 months of age	68	a. Lack of knowledge	68	10

With respect to provision of shelter for animals, the participant farmers felt that for few animals the over hang in the house is enough (24.40 per cent) and some of them opined that construction of separated shed for providing shelter to the animals (75.60 per cent) is a costly affair. With regard to upgrading, lack of knowledge about the scientific breeding practices (89.70 per cent) and non-availability of quality bucks/rams (10.30 per cent) were the reason mentioned by most of the non-adopters.

In the case of colostrum feeding the farmers felt that feeding of colostrum immediately after birth will induce diarrhoea and the animal may go down in condition (66.60 per cent). The one-third of the non-adopters of this practice expressed the non-availability of time as the reason for non-adoption as they were engaged in other activities. With regard to the practice, ligation and disinfection of naval cord, the non-adopters felt that the mother itself will lick the umbilical cord and will heal automatically and hence there is no need to cut and ligate the cord. A few of the non-adopters expressed their lack of knowledge in adopting this practice.

In the case of practice of weaning, lack of knowledge was expressed by majority of the respondent farmers. Some of the farmers also opined that weaned animals will feel lonely and isolated. As far as period of grazing is concerned very few has expressed that lack of knowledge as the reason for non-adoption of following the recommended time of grazing.

In the case of feeding of crushed prosopis pods and tamarind seeds, lack of knowledge was the reason expressed by nearly half of the total participant farmers. With regard to the feeding of tree leaves in summer, some of the participant farmers expressed their lack of know in feeding of suitable type of leaves, while the rem felt that this practice is a time consuming affair.

In the case of deworming, lack of knowledg expressed by majority of the non-adopters (83.8 pe while the remaining 16.2 per cent of them state inadequacy of dewormers with the local veterinaria link worker couples as the reason for non-adoption regard to ectoparasiticide application, majority (42. cent) of respondents cited lack of knowledge abo practice for their non-adoption. The remaining 29 27.5 percents of non-adopters felt that the recomm practice is time consuming and is a costly m respectively.

Lack of knowledge was the reason expres majority (85.1 per cent) of non-adopters with resp the practice, castration of ram lambs, followed by veterinary services (9.5 per cent) in their villages to p this operation. With respect to the vaccination of and goats, 46 per cent of the non-adopters expresse experience of failure of vaccination leading to m of sheep/goats as the major reason, followed by knowledge (44.40 per cent) and wrong not deterioration in the condition of animals if vaccinate per cent).

With regard to isolation of sick animals, knowledge (80.30 percent) and non-availability of is space (19.60 per cent) were the reasons cited fo adoption. In the case of marketing of ram lambs at 8 of age, the non-adopters expressed that lack of kno in organized marketing as the reason for non-adop

CONCLUSION

About 66.00 and 19 per cent of the participant farmers were in the medium and high levels of adoption of recommended practices respectively, whereas 48.00 and 42.00 percents of non-participant farmers in the control village were in the medium and low levels of adoption respectively. The extent of adoption of participant farmers was strikingly more than that of the non-participant farmers and there existed significant difference between the two groups.

The recommended / demonstrated practices in sheep/ goat rearing namely selection and purchase of quality animal, provision of shelter for animals, feeding of colostrum for new born kids, period of grazing of animals, feeding of crushed prosopis pods and tamarind seeds, feeding of tree leaves in summer, deworming, vaccination and marketing of ram lambs at 8 months of age were adopted by majority of the participant farmers. Most of the participant farmers were having poor adoption in areas such as upgrading of animals, ligation and disinfection of naval cord, practice of weaning, ectoparasiticide application, castration of ram lambs and isolation of sick animals.

In the case of non-participant farmers, majority of them were non-adopters of various recommended practices except in practices such as period of grazing and feeding of tree leaves in summer. Majority of the participant farmers expressed that the reasons for non-adoption of recommended practices were lack of knowledge, non-availability of inputs, lack of time and lack of veterinary services.

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Research Note

Adoption Gap in Gladiolus Cultiva

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Improved package practices are the products of modern science and technology. New technology is generally not the major problem now-a-days; as most of the countries including India have their own set of bright and enterprising scientists who are capable of finding improved techniques suitable to the local situations. The major problems as it exists today is that of proper and timely dissemination of innovative floricultural package practices among the farmers and adoption by them. All the recommendations may not be adopted fully or adopted to a partial extent due to variety of reasons. In order to bring about a change in the attitude of the cultivators regarding the adoption or non-adoption of latest technology, the research and extension workers engaged in the testing and transfer of technology should know the problems related to technological gap in the use of recommended package of practices so that the farmers can be motivated and advised to adopt these practices for getting good yields and return from flower cultivation. Hence, keeping in view the above facts, this study was conducted to examine the technological gap in the use of improved package of practices for gladiolus growing. The findings may help to give feedback to the scientists to modify the existing practices of the cultivation of gladiolus.

METHODOLOGY

The study was conducted in the districts of Ludhiana, Patiala, Amritsar, Gurdaspur of Punjab state. All the gladiolus growers of these districts were taken as respondents. Data were collected through personal interview in the structured questionnaire. Adoption gap percentage of for each practice was calculated by dividing the number of non-users over the number of total respondents and multiplying it with hundred.

RESULTS AND DISCUSSIONS

The findings related to adopting gap in aspects of gladiolus cultivation such as agr practices, manures and fertilization, plant protect post harvest have been discussed below.

Adoption gap in use of agronomic practices

The study revealed that the recommended agr practices ranged from 3.66 to 87.80 per cent. The varied from 3.66 to 23.17 per cent in case of sun e of soil, use of recommended fungicide and its corms treatment, sowing time and irrigation schedu than fifty per cent of the technological gap wa number of corms per acre, distance between rows and wind break. The highest gap was noticed i wind break followed by distance between co technological gap was present in the treatment of gladiolus.

It could be concluded from the above findi there is a great need to educate the growers a practices of gladiolus having higher technologica

Manures and fertilizers: Under this asp investigation was carried out about use of FYM an fertilizers.

The findings on use of manures and fe indicated that there was 100 per cent adoptio application of dose of potash before planting an followed by the dose of single superphosphate planting (89.78%), dose of urea at 3 leaf and 6 le (97.56%). About 47.00 per cent gap had been re the quantity of farm yard manure. Very little techr

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gap had been recorded in use of FYM and its time of application to gladiolus crop.

It could be concluded from the above findings that the aspects manures and fertilizers use with high technological gap need to be strengthened through training activities for the gladiolus growers.

Plant protection practices

To know the technological gap in the cultivation of gladiolus, various plant protection practices such as disease attack, application of fungicides and their dose were taken in this investigation.

The study revealed that more than 70 per cent of the respondents reported the attack of diseases on their gladiolus crop and these growers expressed 21.71 per cent and 23.38 per cent gap in the use of fungicide and dose of the fungicide to control disease.

It could be concluded that plant protection practices had low technological gap. This might be due to the efficient use of fungicides, as this is a delicate crop.

Post harvest practices

The post harvesting practices in the cultivation of gladiolus play an important role in its success. The practices like stage of harvest and its timing of treatment and storage of corms were included in this study.

The results indicated that the technological gap in the use of most the post harvest practices ranged between 2.44 to 14.28 per cent. The highest gap (37.81%) among post harvest practices was reported in time of irrigation after harvesting of flowers of gladiolus.

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Research Note

Water Saving Technolo
Farmers' Understanding and Adop

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When water becomes scarce, the financial and environmental cost of creating new supplies becomes high, and demand management is the key to managing water. North Gujarat is one of the most water scarce regions in the world in terms of per capita renewable freshwater availability. From the point of farmers, there are three major problems: growing physical scarcity of groundwater; growing demand-supply gap; and depletion of economically accessible groundwater.

Adoption of irrigation devices that help improve the physical efficiency of water use in agriculture is incredibly low in north Gujarat like many other parts of India. Farmers' decision making depends on two important factors: [1] the parameters that the farmers think are economic, and which they think can be affected by saving technologies; and [2] the perceptions farmers have about the physical and economic aspects of the technologies, which are governed by their educational background, knowledge base and exposure. There could be many considerations apart from those which are economic for farmers to go for water saving technologies. They could be either purely physical or financial or social or cultural in nature.

The present study is an attempt to analyze the level of knowledge and awareness farmers have about water saving irrigation devices, including their familiarity with the technologies, and perceptions about the advantages and disadvantages of these technologies; and the range of considerations, including economic, financial, physical, social and cultural, involved in deciding for or against water saving irrigation devices, and to finally arrive at the situations under which farmers would take to modern irrigation devices.

The study was carried out in four talukas of Ban district in north Gujarat.

METHODOLOGY

The study involved collection of primary d farmers using a structured questionnaire. A tota farmers from 30 villages from the four tal Banaskantha district were selected for the study. 36 farmers were from villages in Danta, 30 from 18 from Dantiwada and the rest 38 from Palan sample farmers were selected in such a way t enjoyed access to irrigation, through independent or partnership wells or water purchased from well

RESULTS AND DISCUSSION

The profile of farmers: All the farmers into had agriculture as the primary occupation. Of thes cent had adopted animal husbandry as their se occupation. All of them were found to be members cooperative societies in their respective villag number of operational holdings varied significan one to nine (Table 1) farmers put together account per cent of the sample farmers selected for the su relation was found between total size of operationa and number of holdings. Twenty two farmers had modern irrigation devices, while 20 of them used sprinkler sets, one used drip irrigation and another mini sprinkler.

Very few farmers had independent source and 72 per cent were getting water from jointl wells, of which some were also buying water. The

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in general were found to have low level of formal education. The educational qualification mostly varied from 4th standard to 10th standard. In very few cases, farmers were found to have obtained higher secondary education and few were found to be illiterate. Only 8 per cent of the farmers were found to have educational qualifications equal to graduation and above.

Level of knowledge and awareness about different irrigation device: This was studied by probing into farmers' familiarity with different types of irrigation devices and their perceptions about advantages/ disadvantages of various devices.

Farmers' familiarity with four types of irrigation devices was examined. Out of the 122 farmers interviewed from four Talukas covering 30 villages, only one farmer had heard about sub-surface irrigation system and he had neither used it nor seen it. This is quite understandable when we look at the fact that the system was introduced in Gujarat only a couple of years back. The second system, which was least known in the area was micro sprinkler. Only 24.4 per cent of the farmers had heard about it; 15 per cent had seen it and only one farmer had used. Nearly 89 per cent of the farmers have heard about drip irrigation systems, though much less (32 per cent) had seen it and only a couple of them had used it. Overhead sprinkler was the most popular and most widely known of all the four devices. All the farmers had heard about overhead sprinklers; 98 per cent had seen it and 19 per cent of them have used it.

Farmer's perception about advantages of sprinkler devices and drip systems were examined. The most widely and generally known benefits of sprinkler irrigation systems are water saving[1], yield increase and labour saving in land levelling. But the less known benefits, as found in some of the demonstration plots of sprinkler irrigation system, were less vulnerability to insect and pest attacks, and better environmental conditions for plant physiological processes such as transpiration through soil moisture management. However, to what extent these benefits deserve merit depended to a great extent on the climatic conditions existing in the area in question and the conditions of the farm.

It was found that, all except one farmer perceived water saving as a benefit of sprinkler irrigation. They felt that less water would be required to irrigate with sprinklers as compared to traditional practice. Ninety five per cent of the farmers felt that use of sprinklers can help increase the crop yield, while the rest were unaware of this benefit. Ninety six per cent of the farmers felt that use of sprinklers could help save the labour spent in irrigating crops, while the rest four per cent were unaware of such benefit. Nearly 28 per cent of the farmers felt that labour saving in land levelling was important, while four per cent did not feel so and rest 68 per cent were unaware of such benefit. Only 15 per cent farmers perceived better as an added benefit of sprinkler irrigation, and 5 per cent were aware of advancement in harvest as a benefit.

Regarding Drip Systems, farmers' perception about its advantages were majorly in the form of yield increase of crops. Every respondent, except one, was aware of water saving benefit of drip irrigation. Seventy nine per cent of the farmers interviewed perceived yield increase as a major benefit of drip irrigation, while the rest were not aware of such a benefit. Almost similar trend was found with regard to the issue of labour saving while irrigating the crops. As expected, only three per cent believed that harvest of crop could be advanced through the use of drip irrigation. Interestingly, nearly five per cent believed that the crops would have better resistance to insect attacks if irrigated by drip. Fifteen per cent farmers perceived improved working of soils as an added advantage of drip irrigation.

Farmers' perceptions about disadvantages of different water saving irrigation devices were studied and it was found that they had several misconceptions about pressurized irrigation technology due to lack of exposure to modern methods. Also, the bad experiences of farmers who failed to use these devices properly, got spread through the word of mouth easily. Difficulty in operation was perceived to be an important disadvantage of sprinkler system. The data in Table 1 indicate that 33 per cent of the farmers believed that the system could not be used when the wind peed was high, mainly due to the problem in uniformly distributing water in the field. The reasonably high level of awareness about this issue was quite understandable as many farmers in the area, including some from the sample survey, had experience using overhead sprinklers, which face this problem acutely. Forty two per cent did not agree with this, while 24 per cent were not aware of such problems associated with the use of sprinkler systems. Secondly, nearly 52 per cent believed lack of versatility as a major disadvantage. At the same time, 27 per cent did not agree with this (they believed that it was

[1] Here "water saving" only refers to the reduction in consumptive water use per unit area irrigated without any loss of crop production.

versatile), the rest were not aware of such a limitation. It was found that the major misconception was "versatility of sprinklers".

Interestingly, not a single farmer felt that sprinklers were difficult to operate. Likewise, very small fraction of farmers felt that maintenance was cumbersome. Only three per cent thought that water quality could become a constraint in the usage of sprinklers. Perhaps these were the fact that the most popular version of the sprinklers was overhead sprinkler, which has simple design and was easy to operate. As one can expect, majority of the farmers perceived additional pressure requirement to run the sprinkler as a disadvantage. Nearly 44 per cent felt that using sprinklers could spoil the crop during the time of flowering, while nearly 21 per cent did not agree with this argument. Fourteen per cent felt that use of sprinklers would leave some cropped area dry. Many farmers who used overhead sprinklers had not so encouraging experience as they were not able to achieve good distribution efficiencies in water application, mainly attributed to improper spacing or inadequate pressure at the sprinkler nozzle.

Regarding drip irrigation, only 11 per cent believed that drip systems were not suitable for field crops. Nearly 52 per cent were not even aware of such limitations, while 37 per cent had the wrong perception that it could be used for field crops. Only 17 per cent perceived poor water quality became a constraint for adopting drip irrigation, while more than 57 per cent were not aware and 26 per cent did not even think so. Nearly 2.5 per cent perceived day to day maintenance of drip system to be very cumbersome, while 28 per cent did not think so. It was interesting to note that nearly 80 per cent believed that drip system did not require pressure to run. Majority of the farmers were not aware of the need to adjust the spacing of crop planting (for row crops) for using conventional drip systems.

Reasons to adopt the modern systems: Water saving/reduction in pumping was the most important consideration for 57 per cent farmers for choosing to adopt pressurized irrigation. This was quite understandable given the fact that 72 per cent were partners in tube wells or water buyers (in some parcels) and hence have direct economic incentive to gain from water saving. For instance, it was found that out of the 43 per cent who did not have independent source of irrigation, 22 per cent gave highest consideration to water saving and the rest gave second highest consideration to water saving. For the rest 43 per cent, water saving was the second most important consideration in preferring pressurized irrigation
Yield increase appeared to be the most imp
consideration for 40 per cent. For another 40 per
was the 'second most important consideration. The
of being able to irrigate larger area with same am
water did not seem to be an important considerat
any farmer, though many farmers consider it. It wa
to be the second important consideration for 17 p
For 73 per cent, it was the third important consid
Selling the saved water seems to fourth considera
80 per cent, but received only fourth place in the
priority.

Reasons for non-adoption: About 62 per
the farmers feel finance as a major constraint f
adoption. Nearly 43 per cent of the farmers were
to adopt because of lack of independent source o
This was justifiable, since pressurized irrigation
needed independent well points, unless otherwise
went for extra pump installation. Nearly 32 per ce
farmers feel that there was lack of knowledge ab
to go about installing it. Nearly 24 per cent of the
reported inadequate water pressure as a reason
adoption. About 10 per cent of the farmers felt tha
after-sale services was a problem with irrigation
such as drips and sprinklers.

CONCLUSION

Presence of adequate economic incentive
encourage farmers to go for water saving irrigation
But in the present situation, wherein the margina
using electricity for agricultural pumping is alm
these economic incentives are strong and visible o
the farmers are either water buyers or have to
their irrigation with limited water from tu
partnerships. But in those cases, farmers wo
technical constraints in adopting conventional pre
irrigation devices due to lack of independent so
water. Finance would be a major constraint, as p
by majority of the farmers, especially for the resou
farmers who were buying water. For these farm
pressurized, low cost water saving irrigation devic
the most viable alternatives. For this to happen,
should be made aware of low cost systems that ca
under gravity.

"Yield enhancement" was an incentive for
having independent sources and adequate suppl
for pressurized irrigation systems and for whom

aving" does not offer direct and visible economic roposition. But, this variable was not found strong enough make conventional systems economically viable so that armers go for them, reason being that the additional cost f investing in the system was much higher in relation to e net gain through increased yield. Finance was also a ajor constraint for investment in these systems. Fertilizer as a major input variable that influenced the economics f irrigated farming. This variable can be altered through e use of drip systems thereby improving the economics f irrigated farming. As farmers by and large were not ware of this benefit, this does not appear to be a variable their decision making framework with regard to investing efficient irrigation devices. If the farmers take these factors into their decision making, then perhaps they would even find conventional irrigation systems economically viable and go for it. There was a need to demonstrate the impact of irrigation devices on input use, apart from that on yield and water saving.

Saving in labour spent on land preparation (bund making etc.) was a major advantage of modern irrigation devices and was being perceived by most of the farmers as a benefit of these systems. But, this does not seem to receive adequate consideration when it comes to investment decision making though for 69 per cent farmers. It was the fourth important consideration. This may be owing to availability of surplus labour.

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