Evaluation of Mango Hybrids for Kymore Plateau of Madhya Pradesh

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Abstract

An experiment was conducted to evaluate selected mango hybrids for Kymore plateau region of Madhya Pradesh. The check variety Langra gave the maximum vegetative growth parameters, while the hybrid Swarn Jahangir and Ratna gave the minimum. Hybrid Amrapali attained the earliest flowering (14th February) and fruit setting (6th March). Floral malformation was highest (66.1%) in hybrid Neeleshan, while it was lowest (15.0%) in Amrapali. Hybrid Neelgoa recorded maximum fruit drop (66.8) followed by Langra, while it was minimum (26.9%) in Amrapali. Amrapali and Mallika produced significantly higher number of fruits and fruit yield per tree over the check variety Langra. However, the fruit weight of Mallika was significantly higher (302.6 g) over all the varieties under study except Neeleshan.

Mango (*Mangifera indica* L) is one of the most important commercial fruits of India. India continues to be the largest mango producing country of the world. The total production is about 10.64 million tonnes in India. The area under cultivation of mango in Madhya Pradesh is 7098 ha whereas in Rewa division of Madhya Pradesh it occupies 4321 ha (Anonymous, 2003). Production is an adjustment between heredity and environment and the latter includes cultural practices as well. An ideal mango cultivar should have characters like precocious, dwarf, regular and prolific in bearing, early flowering and fruit setting, attractive fruit colour and size, resistant to major diseases and other biotic-abiotic stresses. Considering the above facts and the bright scope of high yielding hybrids of mango, an attempt has been made to identify them for Kymore plateau of Madhya Pradesh.

Methodology

A study was carried out at the Fruit Research Station, Kuthulia, JNKVV campus, Rewa (M.P.) during 2002-03. The orchard soil was sandy clay, loam and more than two meter deep. The soil pH was 7.2, electrical conductivity 0.34 dsm^{-1}, organic carbon 4.2 kg^{-1}, available N, P_2O_5 and K_2O 214, 9.15, 364 kg ha^{-1}, respectively. The sixteen years old plants of Amrapali, Mallika, Ratna, Prabhashankar, Mahmood Bahar, Neelgoa, Neeluddin, Swarn Jahangir, A.U. Rumani, Bombay Green and Langra as check variety were selected as the control cultivars. Total eight plants of each hybrid were planted in four replications i.e. two plants per replication. Planting was done in randomized block design at 10 m x 10 m distance. The observations were recorded with respect to vegetative growth characters, flowering behaviour, malformation, fruit drop and yield of fruits.

Result and Discussion

Vegetative growth

The growth characters differed significantly amongst the hybrids and control cultivars of mango (Table 1). The control cultivar Langra gave maximum tree height (5.59 m), circumference of root stock and scion (83.25 cm and 78.38 cm, respectively), spread (7.75 m E-W and 7.76 m N-S) and volume of the tree (226.93 m^3). Regarding above characters Langra was followed by Mallika. Thus Langra and hybrid Mallika appeared vigorus after sixteen years of plantation. On the other hand, significantly lower growth characters were observed in SwarnJahangir and Ratna hybrids (Table 1). The variation in growth characters amongst the mango hybrids could be due to variation in genetic make up under the present set of environmental conditions and edephic condition. Similar results have also been reported by Sharma *et al.* (1998) and Suryanaraina *et al.* (1998).

Flowering behavior

Among all the hybrids and control varieties, Amrapali showed the earliest panicle emergence (29th January), start of flowering (14th January), full bloom (1st March) and fruit setting (6th March). This was closely followed by Mallika with fruit setting up to 10 March (Table 2). Ratna hybrid showed fruit setting as late or up to 22 March. The variation in flowering behaviour may be attributed to the genetic characters and the climatic condition. Variation in panicle emergence and flowering behaviour in mango hybrids were also reported by Sharma *et al* (1998).

Floral malformation

Amrapali and langra recorded significantly lower malformation over all other remaining varieties 15.0 to 15.28% (Table 2). This was equally followed by Prabhashankar (17.0%). On other hand, Neeleshan, Neelgoa, and Ratna were affected in a higher range (55.8 to 66.1%). The variation in the incidence of malformation amongst the hybrids and control cultivars may be related to the genetic characters and the climate conditions. Such results were also reported by Kumar *et al.* (1996).

Fruit drop

Fruit drop is an important character governing total productivity of mango crop. The minimum fruit drop

Table 1: Vegetative growth characters of the mango varieties

S. No.	Treatment	Height per tree(m)	Canopy height per tree(m)	Circumference		Spread per tree		Volume per tree (m^3)
				Root stock (cm)	Scion (cm)	E-W (m)	N-S (m)	
1	Amrapali	5.00	4.17	65.00	56.50	5.37	5.65	101.54
2	Mallika	5.22	4.45	78.75	67.50	6.07	5.88	127.19
3	Ratna	2.79	2.15	41.50	36.88	2.99	2.69	13.96
4	Prabhashankar	4.69	4.10	74.00	66.50	5.35	5.35	96.98
5	Mahmood bahar	4.98	4.22	77.25	71.38	5.93	5.87	116.56
6	Neelgoa	3.62	2.85	51.00	42.13	3.42	3.40	26.46
7	Neeleshan	3.91	3.22	57.88	47.38	3.95	3.92	41.30
8	Neeluddin	4.13	3.36	65.75	56.38	4.98	5.00	67.62
9	Swarn Jahangir	2.00	1.58	42.00	37.50	2.90	2.85	10.22
10	A.U.Rumani	3.18	2.66	49.00	43.75	3.61	3.66	27.86
11	Bombay green	4.77	4.04	74.38	66.75	6.01	5.86	119.67
12	Langra	5.59	4.76	88.25	78.38	7.75	7.76	226.93
	S.Em	0.15	0.17	3.73	2.75	0.26	0.23	12.67
	C.D. at 5 %	0.45	0.50	10.73	7.91	0.75	0.67	36.49

Table 2: Flowering behaviou, malformation, fruit drop and yield parameter of mango varieties

S. No.	Varieties	Date of panicle emergence	Date of start of flowering	Date of full bloom	Date of fruit setting	Malfor-mation (%)	Fruit drop (%)	Average No. of fruit/tree	Average yield/ tree (kg)	Average wt./fruit (g)
1.	Amrapali	29J	14F	1M	6M	15.0	26.9	383.8	69.78	182.90
2.	Mallika	31J	22F	3M	10M	36.4	56.3	214.1	64.68	302.67
3.	Ratna	13J	3F	15M	22M	55.8	45.0	11.2	1.57	140.82
4.	Prabhashankar	8J	26F	8M	13M	17.0	39.9	280.1	54.37	195.04
5.	Mahmood bahar	7J	26F	7M	16M	29.2	41.0	263.5	50.04	190.58
6.	Neelgoa	8J	28F	13M	19M	57.9	66.8	98.0	23.73	244.51
7.	Neeleshan	8J	1F	10M	19M	66.1	48.2	137.3	40.46	297.87
8.	Neeluddin	14J	6F	14M	20M	36.0	37.0	212.1	41.47	194.96
9.	Swarn Jahangir	29J	22F	8M	15M	25.0	-	-	-	-
10.	A.U. Rumani	30J	24F	6M	14M	35.2	64.1	12.5	2.30	187.61
11.	Bombay green	7J	28F	8M	16M	44.4	43.7	169.7	32.43	192.28
12.	Langra	3J	25F	7M	17M	15.2	65.2	127.2	35.05	276.78
	SEm±					3.25	2.65	30.0	5.98	4.07
	CD at 5%					9.34	7.66	86.8	17.26	11.77

4in Amrapali (26.9) resulted in the highest yield, while the reverse was true in case of Neelgoa (Table3). The A.U. Rumani and Langra also showed similar trend. The fruit drop is associated with the arrangement of stalk with the fruit and the late formation of abscission layer. The variations in the fruit drop of mango varieties were also noted by Jana and Sharangi (1998).

Yield

Amrapali and Mallika produced significantly higher number of fruits and fruits yield per tree over the control cultivar Langra (Table). However, the average fruit weight of Mallika was significantly higher (302.67g) over all the varieties under test except Neeleshan. The hybrids Ratna and A.V. Rumani attained almost the lowest number yield and weight of fruits amongst all the mango cultivars except in Amrapali for its weight per fruit.

Conclusion

The evaluation of mango hybrids with reference to Kymore plateau of M.P. revealed that hangra gave the maximum vegetative growth. While Amarpali had the earliest flowering and fruit setting it also had the lowest floral malformation along with minimum fruit drop. Besides these characteristics Amarpali and Mallika produced more fruit yield per tree and Neelshan variety had the maximum fruit weight.

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Assessment of Information Need of Dairy Owners in Maharashtra

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Abstract

In the competitive age of the 21st century, the 'information' is becoming the source of energy. Today the extension information regarding various operations in agriculture and animal husbandry has been viewed as an important input for the production process. The present paper focuses on assessment of information needs of dairy owners in Indian state Maharashtra. Through a pilot study 40 dairy owners were interviewed for their information need on various animal husbandry practices, which revealed 'Animal health management' as important aspect on which they need information. Further to know the specific information needs on 'Animal health management' 120 dairy owners were interviewed. The study showed that, animal diseases and disorders like Mastitis, Babesiosis, Milk fever, Foot & mouth disease, Hemorrhagic Septicemia, Anthrax, Ketosis, Theileriosis, Anoestrous, Repeat Breeding, etc. are of prime concern for these dairy owners.

Information is the most important factor necessary for the development of the individual, society and the nation. Today new and latest information is needed for the continuous development of the individual. The better set up and avenues for information delivery are demands of future development in any sector. Livestock is a major component of Indian rural economy and animal husbandry extension information is one of the important inputs needed at the village level. The past efforts for information dissemination are mainly supply driven rather than demand driven. The scientists from the research station decide the agenda, which is often based upon their limited exposure to real problems faced by farmers. The involvement of the extension personnel and farmers in the above process is limited and passive. On other hand, the information need of livestock owners varies from individual to individual. For example, information need of crossbred rearing dairy owners may be related to only health management aspect because crossbreds are more prone to diseases. But the dairy owners, who rears buffalo; their information need may not be the same since buffaloes are naturally resistant to common health problems. So there is need to fulfill the individual information needs. Researchers have shown that vets and para-vets are the main sources of information about animal health, and that livestock owners lack basic knowledge of common livestock diseases and husbandry practices (Ramkumar, 2003).

There is a lot of information available in text books, journals and research stations, but many times it is not given in local language and therefore cannot be useful even to literate farmers; what to speak about the illiterates. Moreover, scientific information available in such text books and journals is a mere "data" for the farmers and not the "information". The State Departments of Animal Husbandry are the main source of information on livestock production, but in many state there is inadequacy of these staff and have huge workload.

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In such situation it is very difficult to fulfill the information needs of every clientele effectively. The limitation of time and resources also restricts the quantum of knowledge to be transferred.

One way to overcome all these problems is assessment of information needs of end users before dissemination. Once the information needs are identified, then it can be delivered through appropriate methods. The present study aims at assessment of information needs of dairy owners in Maharashtra.

Methodology

The present study was conducted in the two district of Maharashtra state, namely Pune and Ahmednagar. Theses were selected purposively since these districts are among highest milk producing centers in the State. To understand the broad area of information needs of dairy owners, a pilot study was conducted in which 40 of dairy owners were selected randomly and interviewed.

To study the specific information needs on 'Animal Health Management' a random sampling procedure was followed and from each district two blocks namely Shirur and Daund from Pune district and Rahuri and Parner from Ahmednagar district were selected. Further from each block, two villages were selected and finally from each village 15 dairy owners were selected randomly making final sample size of 120 respondents.

Results and Discussion

Information needs on animal husbandry

The pilot study revealed that, most of the livestock owners (80 %) reported 'Animal Health Management' as important aspect on which they need information (Phand 2008). (Table 1) It is obvious because as per 17th Livestock Census – 2003, (http://mahavet.mah.nic.in/html%20files/1-Dist-Cb-Male.html) among total livestock population in Maharashtra, 38 % of crossbred population are concentrated in these two districts which are more prone to the diseases. For the convenience, data of Pune and Ahmednagar districts have been referred as D1 & D2 respectively.

Table 1: Distribution of respondent according to information needs on animal husbandry

Information need	D1 (n=20)	D2 (n=20)	Total (N=40)
Animal Health Management	19	13	32(80.0)
Breeding Tips	6	9	15(37.5)
Livestock Feeding Management	8	5	13(32.5)
Fodder Production	6	2	8(20.0)
Formulation of Balanced Ration	11	7	18(45.0)
Hygienic Milk Production	2	5	7(17.5)
Livestock Product Processing	4	2	6(15.0)
Care of Pregnant Animals	4	3	7(17.5)
Newborn/Calf Management	7	4	11(27.5)
Marketing of Livestock and Livestock products	2	3	5(12.5)

Figures in paentheses indicate percentages

Animal health management information needs

The information needs of each respondent regarding the various aspects of animal health management i.e. animal diseases and disorders prevalent in the study area was analyzed after discussion with respondent on following aspect of animal diseases such as; symptoms, tentative diagnosis of particular disease, first aid measures and prevention of disease at his (respondent's) level.

Information needs on common bacterial diseases

Table 2 clearly indicates the information needs of respondent on bacterial diseases. Among the bacterial diseases, Mastitis stood first with 95.0 percent of respondent need information, followed by the Hemorrhagic Septicemia (89.17%), Anthrax (84.17%), Tetanus (69.17%) and Black Quarter (59.17%).

It can be concluded from the above observation that, prevalence of the Mastitis is very common and may be attributed to large population of crossbreds in study area, which are more prone to this particular disease due their high milk yield (Phand, 2008). Singh *et al.* (1997) estimated economic losses in dairy cattle due to

mastitis in India were Rs. 1607.2 crores which included Rs. 889.51 crores for cows and Rs. 717.69 crores for buffaloes. Similarly, the diseases like Anthrax, Hemorrhagic Septicemia, Black Quarter and Tetanus are of acute in nature and leads to sudden death of animal causing heavy economic losses to dairy owners. Though the prevention of such diseases is possible through vaccination but due to many reasons sometimes vaccination fails therefore respondent may need information on these diseases. It is a general observation that these diseases are prevalent throughout the India and study area is also reflecting the similar trend as since 2004-05 state faced 28 outbreaks of Hemorrhagic Septicemia, 25 Black Quarter and 2 of Anthrax disease. (Disease Investigation Centre (DIS), Pune 2006)

Information needs on common viral diseases

Among the common viral diseases Foot and Mouth Disease got the preference (Table 3) as 90.00 percent respondent need information on this disease. The preference of respondent can be justified on ground of communicable nature of the disease and sudden drop in milk production, which is very difficult to regain even after recovery of disease. Moreover, Foot and Mouth Disease is worldwide problem in cattle herds and in the study area also 60 outbreaks were reported since 2004-05. (Disease Investigation Centre (DIS), Pune 2006) Krishna 2000 reported that, economic losses due to FMD, were Rs. 15,000 - 20,000 million per year.

Information needs on common protozoan diseases

Babesiosis and Theileriosis was the common protozoan diseases identified in the study area, which is understandable on the basis of large crossbred population. Moreover, these diseases occur only in crossbred cattle. Table 4 brings to light that the demand of information on above diseases was found more in Ahmednagar district (100.00%) than in Pune (86.67%) which is obvious due to more crossbred population. (Phand 2008). In aggregate, 93.33 percent and 80.83 percent respondents were asked information on Babesiosis and Theileriosis disease respectively.

Information needs on common deficiency disorders

Milk fever and Ketosis was common deficiency disorders recognized in study area. These disorders are related to high milk production trait of crossbreds. Table 5 shows 96.67 percent respondent in Ahmednagar district and 88.33 percent in Pune district who need information on Milk Fever. Similar pattern of difference was observed in case of Ketosis (95.00 % & 71.67%) which is once again accountable to difference in crossbred population in two districts, as only crossbreds are susceptible to above disorders. Collectively 92.50 & 83.33 percent respondent required information on Milk Fever and Ketosis respectively.

Information needs on common digestive disorders

Table 6 clearly indicates that, among the digestive disorders Bloat (67.50%) was found first choice of respondent for information in both the districts. It occurs very commonly in field condition due to various reasons and sometimes may be fatal to animals therefore dairy owners were interested to know about the disease.

Information needs on common reproductive disorders

In general reproductive disorders are major problem in dairy animals causing heavy economic losses to the owners. This problem occurs more commonly in case of buffaloes than crossbreds. The major reproductive disorders identified in study area were Anestrous (49.17%), Retention of placenta (49.17%) and Repeat breeding (45.17 %) on which respondent look for information.

Table 7 clearly reveals that there was considerable difference observed in two districts for the information preference of respondent on Anestrous (8.33%) and Repeat breeding (11.67%), for which more buffalo population in Pune district is responsible. Retention of placenta is also a common post parturition problem found in field condition causing secondary complications and hence respondent had given their choice (Phand, 2008).

Table 2: Distribution of respondent according to information needs on common bacterial diseases

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed
Anthrax	7(11.6)	53(88.3)	0(0.0)	6(10.0)	48(80.0)	6(10.0)	13(10.8)	101(84.2)	6(5.0)
Hemorrhagic Septicemia	2(3.3)	58(96.7)	0(0.0)	11(18.3)	49(81.7)	0(0.0)	13(10.8)	107(89.2)	0(0.0)
Brucellosis	16(26.7)	7(11.7)	37(61.7)	11(18.3)	21(35.0)	28(46.7)	27(22.5)	28(23.3)	65(54.2)
Tuberculosis	12(20.0)	2(3.3)	46(76.7)	6(10.0)	8(13.3)	46(76.7)	18(15.0)	10(8.3)	92(76.7)
Leptospirosis	15(25.0)	0(0.0)	45(75.0)	9(15.0)	8(13.3)	43(71.7)	24(20.0)	8(6.7)	88(73.3)
Black Quarter	25(41.7)	32(53.3)	3(5.0)	12(20.0)	39(65.0)	9(15.0)	37(30.8)	71(59.2)	12(10.0)
Tetanus	14(23.3)	41(68.3)	5(8.3)	18(30.0)	42(70.0)	0(0.0)	32(26.7)	83(69.2)	5(4.2)
Mastitis	2(3.3)	58(96.7)	0(0.0)	2(3.3)	56(93.3)	2(3.3)	4(3.3)	114(95.0)	2(1.7)
Salmonellosis	13(21.7)	3(5.0)	44(73.3)	8(13.3)	12(20.0)	40(66.7)	21(17.5)	15(12.5)	84(70.0)
Colibacillosis	10(16.7)	3(5.0)	47(78.3)	10(16.7)	7(11.7)	43(71.7)	20(16.7)	10(8.3)	90(75.0)

Figures in parenthesis indicate percentage

Table 3: Distribution of respondent according to information needs on common viral diseases

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	**Most** Needed	Least Needed
Foot & mouth disease	4(6.7)	56(93.3)	0(0.0)	8(13.3)	52(86.7)	0(0.0)	12(10.0)	108(90.0)	0(0.0)
Blue tongue	9(15.0)	14(23.3)	37(61.7)	9(15.0)	17(28.3)	34(56.7)	18(15.0)	31(25.8)	71(59.2)
Diarrhea	6(10.0)	3(5.0)	51(85.0)	4(6.7)	5(8.3)	51(85.0)	10(8.3)	8(6.7)	102(85.0)
Rabies	14(23.3)	4(6.7)	42(70.0)	11(18.3)	9(15.0)	40(66.7)	25(20.8)	13(10.8)	82(68.3)

Figures in parenthesis indicate percentage

Table 4: Distribution of respondent according to information needs on common protozoan diseases

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed
Babesiosis	8(13.3)	52(86.7)	0(0.0)	0(0.0)	60(100.0)	0(0.0)	8(6.7)	112(93.3)	0(0.0)
Theileriosis	16(26.7)	44(73.3)	0(0.0)	7(11.7)	53(88.3)	0(0.0)	23(19.2)	97(80.8)	0(0.0)
Trypanosomiasis	12(20.0)	9(15.0)	39(65.0)	7(11.7)	14(23.3)	39(65.0)	19(15.8)	23(19.2)	78(65.0)

Figures in parenthesis indicate percentage

Table 5: Distribution of respondent according to information needs on common deficiency disorders

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed
Milk fever	5(8.3)	53(88.3)	2(3.3)	2(3.3)	58(96.7)	0(0.0)	7(5.8)	111(92.5)	2(1.7)
Ketosis	8(13.3)	43(71.7)	9(15.0)	3(5.0)	57(95.0)	0(0.0)	11(9.2)	100(83.3)	9(7.5)
Osteomalacia	14(23.3)	10(16.7)	36(60.0)	14(23.3)	17(28.3)	29(48.3)	28(23.3)	27(22.5)	65(54.2)
Haemoglobinuria	6(10.0)	6(10.0)	48(80.0)	16(26.7)	9(15.0)	35(58.3)	22(18.3)	15(12.5)	83(69.2)

Figures in parenthesis indicate percentage

Table 6: Distribution of respondent according to information needs on common digestive disorders

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed
Gastritis	15(25.0)	9(15.0)	36(60.0)	15(25.0)	13(21.7)	32(53.3)	30(25.0)	22(18.3)	68(56.7)
Enteritis	6(10.0)	6(10.0)	48(80.0)	6(10.0)	9(15.0)	45(75.0)	12(10.0)	15(12.5)	93(77.5)
Bloat	15(25.0)	40(66.7)	5(8.3)	16(26.7)	41(68.3)	3(5.0)	31(25.8)	81(67.5)	8(6.7)

Figures in parenthesis indicate percentage

Table 7: Distribution of respondent according to information needs on common reproductive disorders

Diseases	D 1 (n=60)			D 2 (n=60)			Total (N=120)		
	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed	Needed	Most Needed	Least Needed
Anoestrous	16(26.7)	32(53.3)	12(20.0)	16(26.7)	27(45.0)	17(28.3)	32(26.7)	59(49.2)	29(24.2)
Dystokia	18(30.0)	29(48.3)	13(21.7)	24(40.0)	20(33.3)	16(26.7)	42(35.0)	49(40.8)	29(24.2)
Infertility	22(36.7)	28(46.7)	10(16.7)	27(45.0)	19(31.7)	14(23.3)	49(40.8)	47(39.2)	24(20.0)
Abortion	5(8.3)	26(43.3)	29(48.3)	20(33.3)	19(31.7)	21(35.0)	25(20.8)	45(37.5)	50(41.7)
Retention of placenta	18(30.0)	27(45.0)	15(25.0)	13(21.7)	32(53.3)	15(25.0)	31(25.8)	59(49.2)	30(25.0)
Repeat breeding	10(16.7)	31(51.7)	19(31.7)	10(16.7)	24(40.0)	26(43.3)	20(16.7)	55(45.8)	45(37.5)

Figures in parenthesis indicate percentage

Animal health management information needs

The data of two districts (Pune and Ahmednagar) from Table 2 to 7 is summarized below to calculate the overall preferences of respondent for information on various animal diseases and disorders in the study area.

Table 8: Animal health management information needs

Diseases	Total (N=120) %	Rank
Mastitis	95.0	I
Babesiosis	93.3	II
Milk fever	92.5	III
Foot & mouth disease	90.0	IV
Hemorrhagic Septicemia	89.2	V
Anthrax	84.2	VI
Ketosis	83.3	VII
Theileriosis	80.8	VIII
Tetanus	69.2	IX
Bloat	67.5	X
Black Quarter	59.2	XI
Anoestrous	49.2	XII
Repeat Breeding	49.2	XII
Retention of Placenta	45.8	XIII

Conclusion

The present study highlights the information need of the dairy owners in Maharashtra state. The findings of the study reveal the information needs on animal health aspect, particularly animal diseases and disorders. More than 80 percent respondent asked for the information on diseases such as; Mastitis, Babesiosis, Milk fever, Foot & Mouth disease, Hemorrhagic Septicemia, Anthrax, Ketosis and Theileriosis. Similarly, more than 50 percent have demanded information on Tetanus, Bloat and Black Quarter. While, more than 45 percent respondent needs information on animal reproductive disorders like Anoestrous, Repeat breeding and Retention of placenta. The results of this study are expected to facilitate development of 'content' of extension information on animal health management. By knowing the need and preferences of the end users, the extension agency can focus on particular aspect and respond better to his client. With the critical analysis of the finding of the research, the extension agency can also identify the other 'information need'. As the diseases like, Mastitis, Babesiosis, Milk fever and Foot & Mouth disease got top preference of respondent for information. It shows ultimately the need of information on the topics like Housing and sanitation management, Parasites control, Vaccination Schedule, Balanced diet etc. Thus, it can be concluded that, while designing and developing the extension information, 'needs' of the end users should be given prime importance. This will help to restrict the quantum of information content and save the time, money and resources.

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Production and Consumption Status of Cows Milk in Terai and Hilly Region of Uttaranchal

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Abstract

India is the largest milk producing country in the world with the current production of nearly 88.7 million tonnes of milk annually. Six villages on the outskirts of the township block of Rudrapur in Udham Singh Nagar district in the Terai and another six villages in the Bhimtal block of the Nainital district in the Hills were selected purposely. In the selection process, it was assumed that these villages had dairy farms and the township was easily accessible to the dairy farms, a condition that would increase the chances of these dairy farms to be linked with the market. It was also assumed that majority of the adult people consumed milk through tea. Considerably large quantities of milk was used in tea (use of coffee in rural areas, unlike in the cities, is extremely rare) which indicated the importance of this beverage in the mountain and plain. The study found that there was great potential of milk production in Terai villages as compared to villages in the hills.

There has been a quantum increase in milk production after fifties in the last century. India produced 17.00 million tonnes of milk in 1951. This figure rose to 20 million tonnes in 1960, 23.2 million tonnes in 1973, 54 million tonnes in 1990 and 86 million tonnes in 2000 (Hemalatha and Reddy 2001). This indicates that milk production has increased five times during later half of the last century.

India is the largest milk producing country in the world with the current production of nearly 88.7 million tonnes of milk annually (Kadirvel, 2002). As a result, India has currently surpassed all other countries in the world in milk production with its share of 16 per cent of the total milk produced worldwide, and producing far more milk than USA (71 million tonnes) and Russia (41 million tonnes). This is one of the most significant achievements in dairy production enterprise after our country got independence. Milk production has been growing at an average rate of five per cent per annum. Accordingly, the per capita availability has also increased considerably from 112 g in the year 1970 to 216 g in 2001. Actually, per capita availability of milk is far away from the recommendations of of Indian Council of Medical Research (ICMR), which are 300 g for the pre school children, 250 g for school children of 7-12 years boys and 13-18 years girls, 200 g for adult and additional 125 g milk for expected mothers of the vegetarian population. Similarly, the recommendations of milk for meat eaters are 200 g for children and 160 g for adult. Study was, therefore, undertaken to ascertain the production and consumption status of cow milk in Uttaranchal state.

Methodology

Six villages on the outskirts of the township block of Rudrapur in Udham Singh Nagar district in the Terai and another six villages in the Bhimtal block of the Nainital district in the Hills in the state of Uttarakhand were selected purposively. In the selection process, it

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was ensured that these villages had dairy farms and the township was easily accessible to the dairy farms, a condition that would increase the chances of these dairy farms to be linked with the market.

The selected villages in the Terai area (Udham Singh Nagar) were: Lalpur, Maharajpur, Kishanpur, Chukti, Deoria and Narayanpur; and in the Hill areas (Nainital) were: Sangurigaon, Naul, Bijrauli, Silauti, Chunauti and Pandeygaon. Rudrapur in the Terai and Bhimtal in the Hills are the main market places for the selected villages to purchase essential commodities and sell surplus produce, including milk.

Average milk production per day was calculated by average milk production of the total milking animals of the villages per day. Annual milk production was calculated by multiplying all the dairy animals in lactation stage by their average lactation yield. Lactation period was different for different milch animals. It was 300, 305, 190 days for crossbred cows, buffaloes and goats respectively.

Consumed milk was calculated from the whole milk which was consumed by a family in different ways, e.g., as fresh whole milk or through tea/ coffee and butter, ghee, paneer, sweets etc. The remaining milk that was not consumed was marketed. Marketing of milk through different marketing channels – producer–consumer, producer–cooperative–consumer, and producer–middleman was also noted down.

Result and Discussion

Milk production of dairy animals has been given in Table 1. In the case of *desi* cows, Lalpur village recorded highest milk production (4.50±0.14 litres per day) followed by Narayanpur (4.49±0.10 litre per day) in the Terai area villages. Village Deoria recorded only 0.96±0.06 litres per day. In Hill area villages, Bijrauli recorded highest milk production (1.56±0.10 litres per

Table 1: Milk production of different animals (litre/day)

Village	Desi cow		Crossbred cow	
	Milking animal	Milk production	Milking animal	Milk production
Terai				
Lalpur	1.88±0.13	4.50±0.14	1.72±0.14	6.54±0.61
Maharajpur	1.84±0.16	4.14±0.15	1.80±0.13	7.72±0.38
Kishanpur	1.68±0.09	4.19±0.09	1.69±0.16	8.20±0.53
Chukti	1.56±0.11	4.41±0.13	1.56±0.09	7.26±0.31
Deoria	1.28±0.09	3.90±0.13	1.32±0.11	6.46±0.42
Narayanpur	1.44±0.10	4.49±0.10	1.40±0.08	7.30±0.40
Overall	1.66±0.11	4.27±0.14	1.68±0.11	7.24±0.37
Hills				
Sanguri	1.48±0.10	1.50±0.10	1.30±0.12	2.06±0.65
Naul	1.64±0.14	1.42±0.09	1.50±0.09	2.41±0.16
Bijrauli	1.20±0.10	1.56±0.10	1.21±0.08	2.44±0.13
Silauti	1.28±0.09	1.22±0.08	1.20±0.08	1.98±0.11
Chunauti	1.32±0.09	0.96±0.06	1.54±0.10	2.85±0.19
Pandeygaon	1.21±0.08	1.14±0.09	1.10±0.10	2.61±0.12
Overall	1.35±0.10	1.30±0.08	1.31±0.09	2.39±0.22

Note: Milking animals per farm are based on the average of sample families.

day) followed by Sanguri (1.50±0.10 litres per day), while Chunauti village recorded an average of mere 3.90±0.13 litres per day. Milk production at a dairy farm in the Hills, thus, is considerably less than at a dairy farm in Terai area, which is attributable to greater potential of milk production per head in a Terai village than in a Hill village.

In case of crossbred cattle, a dairy farm at Kishanpur had highest milk production (8.20±0.53 litres per day) followed by the one in Maharajpur village of Terai (7.72±0.38 litres per day). In case of Hill areas, a dairy farm in Chunauti recorded largest milk production (2.85±0.19 litres per day) followed by the one in Pandeygaon (2.61±0.12 liter/day). Again, a crossbred cow in Terai area produced more milk than in the Hills, which was due to better care and other favourable factors available in the former agro-ecological zone.

The milk production in the Terai area villages was higher than in the Hill area villages. This was attributable to a number of factors, such as lack of nutritive feeds and fodders and different feeding management in Hills areas apart from lower potential of milk production of Hill breeds compared to those being reared in the Terai area. Poverty of Hill farmers also deprived them of basic facilities required for better maintenance and production of dairy animals.

It was also noticed that the milk production of cows was poor in summer than in rainy and winter seasons of the year. Verma and Hussain (1988) and Mishra *et al.* (1999) earlier brought to the fore the fact that milk yield and air temperature were negatively correlated and that high temperature depressed appetite and hence reduced milk production. Singh (2000) reported similar findings relating to seasonal variation in milk production.

Farm category-wise milk production has been presented in Table 2. Large farmers of the Terai area villages had higher milk production (4.50±0.13 litres per day) compared to small and medium farmers, and in Hill area villages milk production at a dairy farm of large farmers was 1.25±0.10 litres per day, on an average, from *desi* cows.

The large farmers produced more milk (6.50±0.40 litres per day) of crossbred cows compared to other categories of the farmers. Again large farmers of the Hills had higher amount of milk production (2.50±0.13 litres per day) compared to their small and medium counterparts.

It is, thus, revealed from Table 2 that large farmers in both the study areas were capable of producing more milk than the medium and the small category farmers. It was attributable to better resources with large farmers which helped them feed and care for

Table 2: Milk production of dairy animals (litre/day)

Village	*Desi* cow		Crossbred cow	
	Milking animal	Milk production	Milking animal	Milk production
Terai				
Small	1.12±0.10	3.86±0.12	1.40±0.08	4.98±0.36
Medium	1.82±0.10	4.11±0.11	1.55±0.09	5.68±0.33
Large	1.56±0.09	4.50±0.13	1.74±0.13	6.50±0.40
Hills				
Small	1.00±0.00	0.85±0.05	1.06±0.08	1.85±0.10
Medium	1.25±0.09	1.00±0.08	1.12±0.08	2.00±0.12
Large	1.50±0.12	1.25±0.10	1.40±0.09	2.50±0.13

the animals better than the other ones, contributing to higher milk production. As given in Table 3, an average of 56.28 and 51.00 per cent of the total milk produced was sold in Terai and Hill area villages, respectively. In other words, 43.72 and 49.00 per cent of the produced milk was retained at home in these two areas, respectively. In Narayanpur village of Terai area, 50.04 per cent and in Bijrauli village in the Hills as much as 52.75 per cent of the total milk was retained at home. In the study areas, these two villages retained highest amount of milk in their respective agro-ecological zones, for use at home.

It is interesting to note that small farmers participated in milk marketing more than their medium and large counterparts. In Terai area, for instance, small farmers marketed larger proportion (64.00 per cent) of the milk than the medium (56.11 per cent) and large farmers (48.68 per cent). In the Hill villages, small farmers sold 59.65 per cent of the milk compared to the medium and large farmers, who sold 51.26 per cent and 46.62 per cent milk, respectively (Table 3). The small farmers depend on dairy farming for cash earnings so critical for family affairs more than the other categories of farmers. Large farmers might have other avenues of income and thus are in a better position to use more milk for family consumption. Dairy farming is more closely associated with a family's livelihood. Small farmers therefore would make better use of its products that would be more supportive of their livelihoods. They would not hesitate cutting family supplies of milk leading to comparatively low consumption rate of family members for the want of hard cash, for they have limited options for earning. Dairying, therefore, is more critical for livelihoods of small farmers.

The milk consumed in rural areas is the non-purchased and almost entirely home-produced and, obviously, the fresh whole milk (FWM). On an average, 19.63 per cent of the milk produced in the Terai villages was consumed as FWM, which ranged from 13.38 per cent in Chukti to 28.65 per cent in Narayanpur. In Hill

Table 3: Milk utilization pattern (per cent) in the villages of study areas

Village	Fresh whole milk (per cent)	Used in tea/coffee (per cent)	Other dairy products (per cent)	Sale (per cent)
Terai				
Lalpur	20.05	9.05	15.65	55.25
Maharajpur	16.66	10.11	14.23	59.00
Kishanpur	23.28	6.58	11.87	58.24
Chukti	13.38	9.87	16.54	60.21
Deoria	15.75	11.00	18.25	55.00
Narayanpur	28.65	8.74	12.65	49.96
Overall	19.63	9.23	14.87	56.28
Hills				
Sanguri	24.72	10.24	14.02	51.02
Naul	26.33	10.47	13.95	49.25
Bijrauli	30.33	9.58	12.84	47.25
Silauti	24.92	10.56	14.52	50.00
Chunauti	17.11	11.25	15.22	56.42
Pandeygaon	21.04	11.98	14.87	52.11
Overall	24.08	10.68	14.24	51.00

villages, comparatively greater proportion of milk (24.08 per cent) was consumed as FWM, which ranged from 17.11 per cent in village Chunauti to 30.33 per cent in village Bijrauli (Table 3).

Proportion of the fresh wheat milk directly consumed was more than the milk used as tea. Some 9.23 per cent of the milk in Terai region and 10.68 per cent in Hill areas was consumed through tea or coffee (use of coffee was rare, of course). These figures in the context of Hill areas contrast sharply the earlier reports (Singh, 2000; Bohra, 2003) that say that large chunk of milk retained at home was consumed through tea. This might be due to the fact that the earlier reports were based on the study of middle mountains towards the interior of the Central Himalayas where temperate climate prompts residents to consume more tea, rather than in the lower Hills covered in the present study where subtropical climate with hot temperature during summer months reduces people's frequency of tea drinking. Since the information in milk consumption was collected during summer and rainy season when tea consumption is less than in winter season, this might be another reason of such consumption pattern in Hill areas.

As could be expected from milk marketing pattern by different categories of dairy farmers, large farmers utilized more FWM compared to medium and small farmers. In Terai area, for example, the large farmers consumed 23.87 per cent milk compared to their medium and small farmers who consumed 16.65 and 11.77 per cent FWM respectively. In Hill areas the pattern was also alike; the large farmers consuming more proportion (28.02 per cent) of FWM than the medium (24.64 per cent) and small farmers (17.35 per cent). They did so because they retained higher proportion of the produced milk at home. Whereas, there was almost negligible difference in the proportion of milk consumed through tea by different categories of farmers in Hill areas, in the Terai area medium farmers consumed more milk through tea than the small and large farmers (Table 4).

It was also experienced that majority of the adult people consumed milk through tea. Considerably large quantities of milk to be used in tea (use of coffee in rural areas, unlike in the cities, is extremely rare) indicated the importance of this beverage in mountain and plain society. Tea without milk is seldom thought of.

As much as 14.87 per cent of the total milk in the Terai area and 14.24 per cent in Hill areas was consumed through other dairy products, such as curd, buttermilk, butter, ghee, paneer, khoya, etc. There was almost non-significant difference amongs different categories of farmers with respect to the conversion of milk into milk products in respective areas. Terai farmers, nevertheless, consumed higher amount of milk by-products than those of the Hill areas (Table 4).

Table 4: Milk utilization pattern in different categories of households in the study areas (per cent)

Village	Fresh whole milk (per cent)	Used in tea/coffee (per cent)	Other dairy products (per cent)	Sale (per cent)
Terai				
Small	11.77	8.59	15.64	64.00
Medium	16.65	12.01	15.23	56.11
Large	23.87	10.56	16.89	48.68
Hills				
Small	17.35	11.00	12.00	59.65
Medium	24.64	11.45	12.65	51.26
Large	28.02	11.95	13.41	46.62

Looking at the milk consumption pattern at dairy farms of Terai and Hills, we found that per capita consumption values per farm were quite satisfactory. Per capita daily consumption status at the dairy farms was in excess of the ICMR recommendations, i.e. 250 ml per person per day (Singh, 2000) in the Terai villages and almost equal to this figure in the Hill villages. A dairy farm in the vicinity of market place is especially prompted by the milk marketing facilities (Singh, 2000), but more production of milk also prompts family members for its higher consumption, as is evident from this study.

Processing of milk not to be consumed directly at home was different than at a dairy processing plant. First of all, the milk was converted into curd. The curd then was churned using a traditional wooden churning instrument and the butter separated, which was later on refined into ghee.

About half of the butter was consumed and the remaining was refined into ghee at all dairy farms. Almost entire ghee produced at a dairy farm was consumed. Practice of selling ghee was more in Terai and rare in the Hills. Market-oriented dairy farms did not rely on ghee selling to any considerable extent. No other dairy products, like *paneer* (cheese), etc. were sold in the market.

Conclusion

Hence to conclude it was seen that the milk production in the Terai area villages was higher than in the Hill area villages. It is interesting to note that small farmers participated in milk marketing more than their medium and large counterparts. Proportion of the fresh wheat milk directly consumed was more than the milk used as tea. Large farmers utilized more FWM compared to medium and small farmers. Practice of selling ghee was more in Terai. The study found that there was greater potential of milk production in Terai villages as compared to villages in Hills.

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Constraints and Suggestions Regarding the Technological Gap in Potato Production Technology in Uttar Pradesh

Vinod Prakash

Abstract

The two districts of Uttar Pradesh (UP) namely, Kannauj and Etawah were selected purposively for the present investigation. These are the main potato growing districts in UP. From each village, 25 potato growers were selected randomly. Eight important constraints responsible for the varying magnitude of gap were identified. The constraints aranged in descending order of severity (highest to lowest) were lack of knowledge, lack of technical help, lack of extension contact, high cost of resources, complexity of practices, non-availability of inputs and non-profitability of practices. Average technological gaps were observed for 16 practices of improved potato cultivation. The highest mean technological gap was found 100.00 per cent in case of true potato seed followed by intercropping, seed treatment, plant protection measures, intercultural operations, improved varieties, weed control, manure and fertilizers application, water management, seed rate, crop rotation, harvesting, method of sowing, time of sowing, time of manuring and fertilizers and selection of soil type and preparation

In potato production, Kannouj district has the highest producing area but in respect of average production has 8th place in Uttar Pradesh. Potato production of district Etawah is 157797 q/ha and average production is 249.60 q/ha. District Etawah suffered yield losses of three to four percent of sometime thirty to forty per cent due to early/ late blight of potato in some area. There is a wide gap among districts Kannouj and Etawah, Farrukhabad, other high yielding districts and research stations. This is mainly due to the lack of technical know-how, inputs availability on time and skill efficiency of potato growers. It has also been observed that even if the farmers have the technical knowledge, they restrict the adoption as they are unskilled in utilization of technology in the fields.

In early years, True Potato Seed (TPS) had been developed for rising commercial crop. This technology provides healthy planting materials at low cost and can supplement the availability of quality seed. There is no need to change seed every year like traditional seed. Only 10 kg TPS is sufficient for 1 ha, but, in traditional seed 250 quintals is required for 1 ha. Some of the major problems identified by Pandit *et al.* (2003) in West Bengal were lack of good quality seed, irrigation problem, insufficient finance, unremunerative market price for the produce insufficient storage space and malpractices by traders. Hence, this study was undertaken to analyze the constraints regarding the technological gap in potato production in Uttar radish.

Methodology

The two districts, namely, Kannauj and Etawah were selected purposively for the present investigation. These are the main potato growing districts in U.P. From each village. 25 potato growers were selected on random

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basis. Thus, 50 respondents from each block and 100 respondents from each district were sampled for investigation through proportionate random sampling technique. Investigator himself collected data with the help of pre-tested interview schedule.

Results and Discussion

Table 1 indicates a set of eight important constraints responsible for the varying magnitude of gap. The constraints indicated in descending order (highest to lowest) were lack of knowledge, lack of technical help, lack of extension contact, high cost of resources, complexity of practices, non-availability of inputs and non-profitability of practices.

Average technological gaps were computed for 16 practices of potato cultivation. The highest mean technological gap was found 100.00 per cent in case of true potato seed followed by intercropping, seed treatment, plant protection measures, intercultural operations, improved varieties, weed control, manure and fertilizers application, water management, seed rate, crop rotation, harvesting, method of sowing, time of sowing, time of manuring and fertilizers and selection of soil type and preparation i.e. 89.37 per cent, 62.72 per cent, 39.55 per cent, 38.37 per cent, 37.54 per cent, 35.25 per cent, 31.24 per cent, 28.06 per cent, 24.51 per cent, 23.83 per cent, 23.27 per cent, 22.59 per cent, 19.82 per cent, 15.67 per cent and 13.43 per cent, respectively. It is clear from the above result that the highest technological gap was found in case of true potato seed due to lack of knowledge, lack of technical help and lack of extension contact similar study observed by Sharma and Sharma (2003). Practice wise constraints were also identified in potato cultivation and are being described in order of importance on the basis of magnitude of gap in Table 2. similar study observed by Kumar (1997).

Table 1: Constraints to technological gap between recommended and adoption package of practices of potato crop

S. No.	Potato production technology	Gap %	Lack of knowl-edge	Lack of tech-nical	Lack of extens-ion contact	Complexity of practices	Non availa-bility of inputs	High cost of resour-ces	Non profita-bility of prac-tices
1	Selection of soil type and preparation	13.43	27	25	30	20	38	48	-
2	Improved varieties	37.54	65	50	47	-	58	62	-
3	True potato seed (T.P.S.)	100.00	200	200	200	-	-	-	-
4	Seed rate	24.51	38	43	45	-	-	-	-
5	Seed treatment	62.72	89	92	77	60	-	97	-
6	Time of sowing	19.82	29	30	43	30	57	28	-
7	Method of sowing	22.59	52	69	58	72	-	49	-
8	Manures and fertilizers application	31.24	57	53	63	-	-	109	-
9	Water management	28.06	68	60	-	-	-	73	-
10	Intercultural operations	38.37	50	45	-	-	-	-	-
11	Weed control	35.25	78	67	70	64	30	99	-
12	Time of manuring and fertilizers	15.67	22	-	-	-	-	-	-
13	Plant production measures	39.55	110	117	100	106	18	110	
14	Crop rotation	23.83	44	37	26	21	-	-	65
15	Intercropping	89.37	139	127	115	98	-	-	80
16	Harvesting	23.27	32	30	-	-	-	64	-
	Average score		68.75	65.31	54.62	29.44	12.56	46.18	9.06
	Rank		I	II	III	V	VI	IV	VII

Table 2: Constraints responsible for technological gaps in descending order among total sampled farmers

S.No.	Practices	Constraints responsible for technologicalgap in descending order
1	True potato seed (T.P.S.)	Lack of knowledge, lack of technical help, lack of extension contact.
2	Intercropping	Lack of knowledge, lack of technical help, lack of extension contact, complexity of practices and non- profitability of practices.
3	Seed treatment	High cost of resources, lack of technical help, lack of knowledge, lack of extension contact and complexity of practices.
4	Plant protection measures	Lack of technical help, lack of knowledge and high cost of resources, complexity of practices, lack of extension contact and non-availability of inputs.
5	Intercultural operations	Lack of knowledge and lack of technical help.
6	Improved varieties	Lack of knowledge, high cost of resources, non-availability of inputs, lack of technical help and lack of extension contact.
7	Weed control	High cost of resources, lack of knowledge, lack of technical help, lack of extension contact, complexity of practices and non availability of inputs.
8	Manures and fertilizers application	High cost of resources, lack of extension contact, lack of knowledge and lack of technical help.
9	Water management	High cost of resources, lack of knowledge and lack of technical help.
10	Seed rate	Lack of extension contact, lack of technical help and lack of knowledge.
11	Crop rotation	Non profitability of practices, lack of knowledge, lack of technical help, lack of extension contact and complexity of practices.
12	Harvesting	High cost of resources, lack of knowledge and lack of technical help.
13	Method of sowing	Complexity of practices, lack of technical help, lack of extension contact, lack of knowledge and high cost of resources.
14	Time of sowing	Non-availability of inputs, lack of extension contact, lack of technical help, complexity of practices, lack of knowledge and high cost of resources.
15	Time of manuring and fertilizers	Lack of knowledge.
16	Selection of soil type and preparation	High cost of resources, non-availability of inputs, lack of extension contact, lack of knowledge, lack of technical help and complexity of practices.

Conclusion

Hence, the following suggestions were made on the basis of the findings of the present investigation. The state department of agriculture should ensure the timely and adequate supply of inputs viz., fertilizers, quality seed and plant protection measures so that farmers can apply recommended inputs to increase the production of crops. Government should provide the facilities for soil testing at different places in the district. Adequate training on potato technology for increasing the knowledge level of the farmers mainly on dose and methods of fertilizers and chemicals etc. should be ensured. Lack of knowledge about different packages of practices, non-availability of plant protection chemicals, no availability of pure seed treatment chemicals, non-availability of latest varieties, high cost of fertilizers / seeds / plant protection chemicals / weedicide, more incidence of pest and diseases were observed as major constraint to adopt the recommended practices of potato production technology. These constraints may be overcome by the respective extension and administrative personnel to facilitate the frequent diffusion and adoption of innovative technologies to bridge up the technological gap existing therein potato grower's community.

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Constraints Perceived by Farmers in Watershed Development Projects

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Abstract

The study was undertaken to analyze the constraints perceived by farmers in Bunga and Sukhomajri watershed development projects in Shivalik foothill regions of Haryana. Constraints perceived by the watershed respondents in smooth functioning of projects were grouped into four broad areas viz., general constraints, economic constraints, organizational constraints and communication constraints. Low level of awareness regarding project benefits, local political interference, irregularity in payment of wages, lack of economic motivation, decisions made at higher level without consulting people, lack of demonstration and lack of collective action were the main constraints perceived by the farmers as serious to most serious in implementation of watershed development projects.

Integrated watershed management is now the accepted strategy for area development in the country. Watershed programmes as a strategy for overall development of rain fed areas was initiated during the period of 1975 to 1983 with launching of three pilot projects financed by the World Bank and International Development Association to develop agriculture in regions where assured irrigation sources did not exist. Integrated watershed development programme as a movement for overall development of agriculture in the country has been operationalized since the Seventh Five-year Plan (1987-92). The Sukhomajri integrated watershed development project in Haryana was India's first experiment in micro-watershed development. This project was started in May, 1975 by Central Soil and Water Conservation Research and Training Center (CSWCRTI), Chandigarh Centre and funded by Ford Foundation, New Delhi. Encouraged with the success of this pilot project, ICAR was assigned 47 model watershed development projects in different agro climatic zones of the country. One of these model watershed development projects was Bunga watershed in the Shivalik foothills of Haryana. The planning and designing of the project was done by CSWCRTI, Chandigarh Centre and was implemented by Department of Agriculture, Haryana. This project envisaged improving the production of arable and non-arable lands, feed and fodder for animals and socio-economic and environmental conditions in watershed area. The watershed beneficiary face some hurdles in the form of constraints and limitations in implementing the project. The achievements of the watershed management projects might have been much higher if these constraints were removed. This study was thus designed to identify the constraints perceived by farmers in watershed development projects.

Methodology

The study was conducted in Shivalik foothills region of Haryana. Sukhomajri and Bunga watershed development projects were selected purposively because they are the oldest and model watershed development projects in Haryana implemented by Central Soil and Water Conservation Research and

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Training Centre (CSWCRTI). From each selected village, 40 farmers were selected through simple random procedure. In all, 80 respondents were selected for the study. An inventory of constraints was developed to measure the general, economic, organizational and communication constraints that the participants perceived in the process of watershed development projects. The responses were obtained on three point scale as 'very serious' 'serious' and 'not so serious' and scores were given as 3, 2 and 1, respectively. On the basis of mean score, they were ranked from high to low.

Results and Discussion

Constraints or impediments perceived by the watershed respondents in smooth functioning of projects were grouped into four broad areas viz., general constraints, economic constraints, organizational constraints and communication constraints. The results are presented in Table 1.

General constraints

An examination of the data presented in Table 1 indicates that general constraints, namely, 'no clear

Table 1: Constraints perceived by the respondents in watershed development projects

S. No.	Constraints	RESPONSE CATEGORY VS (3)*	S (2)	NSS (1)	Weighted frequency score	Mean score	Rank order
A.	**General Constraints**						
1.	No clear understanding of project objectives	28 (84)	35 (70)	17 (17)	171	2.13	I
2.	Low level of awareness regarding benefits of projects	23 (69)	27 (54)	30 (30)	153	1.91	II
3.	Local political interference	17 (51)	22 (44)	41 (41)	136	1.70	III
4.	Lack of faith in project officials	5 (15)	12 (24)	53 (53)	92	1.15	IV
B.	**Economic constraints**						
1.	Irregularity in payment of labour/wages	32 (96)	40 (80)	08 (08)	184	2.30	I
2.	Lack of economic motivation	21 (63)	24 (48)	35 (35)	146	1.82	II
3.	Non availability of funds at proper time	15 (45)	22 (44)	43 (43)	132	1.65	III
4.	Lack of proper utilization of funds	-	31 (62)	49 (49)	111	1.38	IV
5.	Conflicts between projects staff and people over wages	-	12 (24)	68 (68)	92	1.15	V
C.	**Organizational constraints**						
1.	Decisions made at higher level without consulting people	23 (69)	36 (72)	21 (21)	162	2.02	I
2.	Insufficient staff to carry out the project successfully	18 (54)	33 (66)	29 (29)	149	1.86	II
3.	Lack of encouragement for goods	13 (39)	28 (56)	39 (39)	134	1.67	III
4.	Lack of co-operation from higher authority staff	8 (24)	24 (48)	48 (48)	120	1.50	IV
5.	Lack of proper monitoring and follow up of the project	-	18 (36)	62 (62)	98	1.22	V
6.	Interruption in the routine functioning of project due to transfer of concerned staff	-	07 (14)	73 (73)	87	1.08	VI
D.	**Communication constraints**						
1.	Lack of demonstration/ training	29 (87)	30 (60)	21 (21)	168	2.10	I
2.	Lack of provision of regular meetings.	18 (57)	34 (68)	27 (27)	152	1.90	II
3.	Lack of collective action	12 (36)	30 (60)	38 (38)	134	1.67	III
4.	Lack of interest in learning new skills by farmers	02 (06)	11 (22)	67 (67)	95	1.18	IV
5.	Lack of effective communication between project staff and rural people	-	3 (6)	77 (77)	86	1.07	V

*VS = Very serious, S = Serious, NSS = Not so serious

understanding of project objectives' ranked first with mean score 2.13. Majority of the respondents perceived it as most serious constraint. 'Low level of awareness regarding project benefits' among people was ranked second constraint with mean score 1.91. About 62.00 per cent respondents perceived it very serious to serious constraint in watershed projects. Most of the respondents did not know about its long-term impact. 'Local political interference' in the project was ranked third constraint with mean score of 1.70. About 50.00 per cent respondents considered it most serious to serious constraint and remaining 50.00 per cent considered it not so serious constraint faced by them during the project period. 'Lack of faith in project officials' was not so serious constraint as perceived by the respondents. Hardikar (1998) reported similar kinds of barriers experienced by beneficiaries in implementation of Integrated Rural Development Programmes. Dhyani *et al*. (1997) also observed similar constraints in Fakot watershed.

Economic constraints

Data presented in Table 1 regarding farmer's perception of economic constraints in the process of watershed development projects show that 'irregularity in payment of wages' was ranked first with mean score of 2.30. About 50.00 per cent watershed farmers perceived it as serious constraint during the watershed implementation, 40.00 per cent respondents considered it as most serious and remaining 10.00 per cent considered it as not so serious constraint in watershed development. It was also reported similar constraints among the DWACRA beneficiaries. 'Lack of economic motivation' was ranked second with mean score of 1.82. About one fourth (25.00%) of the respondents perceived it as very serious constraint, 30.00 per cent of them perceived it as serious constraint and 45.00 per cent considered it as not so serious constraint. 'Non availability of funds at proper time' was ranked third constraint in watershed development with mean score of 1.65. About 48.00 per cent respondents perceived it as very serious to serious problem. However, about 52.00 per cent of respondents considered as not so serious problem in watershed development. 'Lack of proper utilization of funds' and 'conflicts between project staff and people over wages' were the two other constraints which were moderately faced by the respondents. Bhandari (1996), Dhyani *et al*. (1997) and Solanki (2001) also reported similar economic constraints in their studies.

Organizational constraints

The data contained in Table 1 regarding respondent's perception about organizational constraints in watershed development projects reveal that 'decisions made at higher level without consulting people' ranked first with mean score of 2.02. 'Insufficient staff to carry out the project successfully' was ranked second with mean score of 1.86. Lack of encouragement was ranked as the third constraint with mean score of 1.67. Upadhay and Intodia (1995) identified similar constraints in effective implementation of integrated watershed technology. 'Lack of cooperation from higher staff', 'lack of proper monitoring and follow up of the project' and 'interruption in the routine functioning of the project due to transfer of concerned staff' were the other problems faced by the watershed farmers. Solanki (2001) reported similar types of problems in his study.

Communicational constraints

Regarding respondent's perception about communicational constraints data show that 'lack of demonstration/training' was ranked first with mean score of 2.10. 'Lack of provision of regular meetings' was ranked second with mean score of 1.90. 'Lack of collective action' was ranked third with mean score of 1.67. Two other constraints, namely, 'lack of interest in learning new skills by farmers' and 'lack of effective communication between project staff and rural people' were ranked as fourth and fifth with mean score 1.18 and 1.07, respectively. 'Lack of practical training' and 'poor communication' as serious constraints were also reported by Swarnkar *et al*. (1993).

On the basis of above discussion regarding constraints in the process of watershed development

projects, it may be concluded that low level of awareness regarding project benefits, local political interferences, irregularity in payment of wages, lack of economic motivation, decisions made at higher level without consulting people, lack of demonstration/training and lack of collective action were the main constraints perceived by the respondents as 'most serious' to 'serious' in the process of watershed development projects.

Conclusion

The results of the study pertaining to constraints in implementation of watershed projects indicates that low level of awareness regarding project benefits, local political interference, irregularity in payment of wages, lack of economic motivation, decisions made at higher level without consulting people, lack of demonstration and lack of collective action were the main constraints perceived by the respondents as 'serious' to 'most serious' constraints in implication of watershed development projects. Therefore, it is suggested that watershed development project implementation agencies and department should make efforts to remove these impediments. The achievements may increase manifolds in future watershed management projects if these constraints are minimized.

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An Assessment of Animal Husbandry Training Programme for Rural Youths

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Abstract

The study was conducted to assess the effectiveness of animal husbandry training programme of Krishi Vigyan Kendras in the selected states of India. A total of 120 rural youths who had underwent training in KVK, NDRI, Karnal Haryana and KVK, IVRI, Bareilly, U.P. constituted the sample. The findings of the study revealed that majority of the rural youths owned the dairy stock having medium level of milk productivity ranging from 93.33 to 366.11 lt/animal/ month. An increasing trend in the milk productivity was observed after the training programme. For nearly three-fourth of rural youths from both the KVKs, dairying had generated a medium level of annual net income ranging from Rs. 6691.25 to 16111.43 before the start of training. However, after the training programme their annual net income increased to the range of Rs.5069.11 to 24244.19 and most of them were in medium level of annual income. More than three-fourth of rural youths, combindly from both KVKs, had generated a family employment in the range of 332.81 to 625.29 minutes/day before the start of training programme of KVKs. However, after the training programme 73.50 per cent rural youths from both the KVKs had employment generation of medium level ranging from 352.64 to 656.08 minutes/day.

Animal husbandry in India is an essential component of agriculture and plays a significant role in rural economy by providing gainful employment particularly to small and marginal farmers and agricultural labourers, thereby, helping them to raise their economic status. It also provides essential animal proteins for human diet, through milk, meat and eggs, fibers and animal dung which is used as a source of energy through direct burning/bio-gas or as a farm-yard manure. Thus, programmes of animal husbandry are of special significance for uplifting the rural poor.

Training and development is the fastest growing profession all over the world, India is no exception.Training is assuming increasing importance as a crucial input for development in all walks of life. It is basically the development of human resources that holds back socio-economic or politico-cultural transformation of any society and every where. According to Lynton and Pareek (1967) "Training is process by which the desired knowledge, attitude, skill and ideas are inculcated fasten and reinforced in an organism". Training has been considered as an essential component for appropriate human resource development in order to meet new challenges. There has been a tremendous expansion of the training institutions and related infrastructure, however, the methodology followed has lagged far behind.

The Institute based Krishi Vigyan Kendras (KVKs) at IVRI, Bareilly and NDRI, Karnal are regularly organising need based, skill oriented vocational training programmes to the practicing farmers, farm women, rural youths and extension personnel. Taking

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the advantage of location of these KVKs, Nehru Yuva Kendra in their respective areas are sending rural youth for getting animal husbandry training from these KVKs, which in turn are expected to take up dairying, animal husbandry as a profession. These training programmes have helped them to a great extent in improving their socio-economic status and enhancing production and productivity in livestock enterprise. As many potential rural youth are interested to take up animal husbandry as a vocation, they look forward such KVKs which cater to their needs to maximum extent. It was, therefore, thought appropriate to study the effectiveness of animal husbandry training programmes of KVKs for rural youths mainly in terms of gain in milk productivity, income and employment generation.

Methodology

The study was conducted in two purposively selected Institute based Krishi Vigyan Kendras of Indian Veterinary Research Institute, Bareilly and National Dairy Research Institute, Karnal, Haryana. All the rural youths who were called and sent by Nehru yuva Kendra of above two district for the training on scientific dairy farming by these two KVKs constituted the sample size. However, only 60 rural youths from each KVKs were taken purposively for the purpose of the study. Thus, the total of 120 rural youths were selected for the investigation. A structured interview schedule, prepared by searching relevant literature was utilized for data collection. Milk productivity, income and employment generation were the research variables.

Milk productivity was measured using the milk yield index developed. According to him, milk yield index represents the yield of all dairy animals on a dairy farm of respondent compared with the average milk yield of the region. Before calculating the milk yield index for a particular respondent, the average milk yield of dariy animals in the region was determined. Then, by dividing the milk yield of a dairy animal (cow and buffalo) by the average milk yield of the region, a percentage figure is obtained which when multiplied by 100 gave the index number for the individual dairy animal. For the purpose of the present study four type of milch animals of the study area s i.e. crossbred cow, deshi cow, improved buffalo and desi buffalo were taken into consideration.

Annual Net Income from Animal Husbandry refers to the net income, in rupees, of the rural youth from various sources of livestock enterprise during the reference calendar year 1995-96 as reported by the rural youths on recall basis at the time of study. It was determined after knowing the market value of major products like, milk, milk-products utilization of products and selling of animals and others, if any. The aggregate of all products in the year gave the gross family income from animal husbandry. After calculating the gross income inputs like cost of fodder, concentrates, veterinary charges labour charges and others, if any, were deleted from gross family income and net annual income was obtained. On the basis of annual net income, the respondents were categorized into three levels viz., high, medium and low as given in case of milk productivity.

Similarly, employment from Animal Husbandry to the overall employment of the household workers including wife, son, mother, father, brother and sisters etc. in livestock enterprises measured in terms of minutes per day (duration). It was calculated by considering all the major activities of animal husbandry enterprises : cleaning of sheds, feeding and watering, bathing, milking, grazing, health care selling of products, dung cake making, chaffing and other activities. Men, Women and Children who were engaged in these activities were converted into man equivalents. On the basis of employment, the households were categorised into three levels viz. high (Mean+ SD), medium (Mean± SD) and low (Mean-SD).

Results and Discussion

Productivity of milch animals

A perusal of Table 1 showed the distribution of rural youths as per the productivity level of their milch animals. It is evident from the data shown in Table 1 that before training majority of rural youths of both KVKs (73.50%) had a medium level of productivity from their milch animals owned milch while 14.52 per cent had

Table 1: Distribution of rural youths according to the change in productivity of milch animals due to training

Sl. No.	Level of productivity of milch animal (index)	No. of rural youths		
		KVK, NDRI (n = 60)	KVK, IVRI (n = 57)	Total (N=117)
1.	**Before Training**			
	Low (< 93.33)	2(2.33)	12(21.05)	14(11.96)
	Medium (93.33-366.11)	41(68.33)	45(78.94)	86(73.50)
	High (> 366.11)	17(28.33)	--	17(14.52)
	Mean ± SE	**305.27±18.31**	**150.21±8.73**	**229.72±17.52**
2.	**After training**			
	Low (< 107.76)	1(1.67)	11(19.29)	12(10.25)
	Medium (107.76-429.72)	43(71.67)	46(80.71)	89(76.06)
	High (> 429.72)	16(26.67)	-	16(13.67)
	Mean±S.E.	**345.38±22.22**	**169.83±9.55**	**268.74±21.33**

Calculated 't' = 5.93 (1-2) highly significant at 1% level.
Figures in parentheses indicate percentages.

Table 2: Distribution of rural youths according to their net annual income from animal husbandry

Sl. No.	Annual net income (in Rs.)	No. of rural youths		
		KVK, NDRI (n = 60)	KVK, IVRI (n = 57)	Total (N=117)
1.	**Before Training**			
	Low (< 6691.25)	4(6.67)	9(15.78)	13(11.11)
	Medium (6691.25-16111.43)	40(66.67)	47(82.52)	87(74.35)
	High (>16111.43)	16(26.67)	1(1.75)	17(14.52)
	Mean ±S.E.	**13581.11±635.59**	**8985.75±430.63**	**11401.34 ±608.07**
2.	**After training**			
	Low (< 5069.11)	-	2(3.50)	2(1.70)
	Medium (5069.11-24244.19)	53 (88.33)	53(92.98)	106(90.59)
	High (>24244.19)	7(11.67)	2(3.50)	9(7.69)
	Mean±S.E.	**18123.81±1494.63**	**4441.35±588.27**	**14656.65±1269.90**

Calculated 't' = 1.20 (1-2) NS,
Figures in parentheses indicate percentages

high and 11.96 per cent had low level of milk productivity. Table 1 further indicated that from among the rural youths who had low level of productivity were 21.05 per cent who attended training at KVK, IVRI. However, 28.33 per cent rural youths of KVK, NDRI animals with high level of milk productivity even before training.

On the other hand, data presented in the Table 1 revealed that after training, majority of rural youths of both KVKs (76.06%) had a medium level of milk productivity followed by 13.67 and 10.25 per cent rural youths who had high and low level of milk productivity, respectively. Table 1 further showed that in the KVK under NDRI, 26.67 per cent of rural youths had high level (> 429.27) of milk productivity, whereas, none had high level of milk productivity in the KVK of IVRI. Calculated 't' value was found to be significant which indicated that rural youths of both KVKs differed in respect to increase in milk productivity and probably it was increased significantly due to the training intervention. These finding are in conformity as reported by Fulzele (1986).

Annual net income from animal husbandry

The frequency distribution of rural youths as per their annual net income from animal husbandry is presented in Table 2. A perusal of data clearly revealed that for nearly three-fourth of rural youths from both KVKs, dairying had generated a medium level of annual net income ranging from Rs.6691.25 to 16111.43 per annum before the start of training programme of KVK. A total of 11.11 per cent rural youths accrued an annual net income of less than Rs.6691.25 and a little more (14.52%) rural youths had accrued annual net income of more than Rs.16111.43 from dairy farming.

On the other hand, data presented in Table 2 clearly showed that an overwhelming number of rural youths, combinely from both KVKs (90.59%) had medium level of annual net income ranging from Rs.5069.11 to 24244.19 per annum after the training programme followed by 7.69 per cent who had annual net income of more than Rs.24244.19 from dairy farming.

Further, a close perusal of Table 2 revealed that relatively more number of rural youths from KVK, IVRI had medium level of net annual income than their counterparts from KVK, NDRI. None of the rural youths from KVK, NDRI was in low income slab. However, very few rural youths (3.50%) from KVK, IVRI were in low as well as high income slab. Calculated 't' value was found to be non-significant and indicated that there was not much difference before and after the training programme of KVK. Similar findings were also reported by Gill and Sandhu (1981).

Family employment generation from animal husbandry

Employment generation to rural youths from animal husbandry was calculated on standard man days (mts/day) basis and frequency distribution of rural youths based on their employment generation is presented in the Table 3. A perusal of Table 3 showed that little more than three fourth of rural youths combinedly from both KVKs had generated a family employment of 332.81 to 625.29 minutes per day before the training programme of KVK.

The high level of employment was generated (625.29 minutes/day) by 13.67 per cent of rural youths, combined of both KVKs whereas, 10.25 per cent rural youths were in low level of employment generation from dairy farming before the start of training programme of KVK. Further, perusal of Table 3 reveals that rural youths from KVK, NDRI were relatively more in numbers (83.33%) with medium level of employment generation as compared to their counterparts from KVK, IVRI (68.43%). Similarly, there were more number of rural youths from KVK, NDRI (16.67%) with high level of employment generation before start of training programme than their counterparts from KVK, IVRI (10.52%). None from KVK, NDRI was in low level category of employment generation from dairy farming, however, 21.05 per cent from KVK, IVRI were in this level of employment generation.

Further, Table 3 clearly revealed that majority of rural youths from both KVKs (73.50%) had employment generation of medium level between 352.64

Table 3: Distribution of rural youths according to their family employment generation from animal husbandry

Sl. No.	Level of family employment generation (mts/day)	No. of rural youths		
		KVK, NDRI (n = 60)	KVK, IVRI (n = 57)	Total (N=117)
1.	**Before training**			
	Low (< 332.81)	--	12(21.05)	12(10.25)
	Medium (332.81-625.29)	50(83.33)	39(68.43)	89(76.06)
	High (> 625.29)	10(16.67)	6(10.52)	16(13.67)
	Mean ± SE	**547.20±15.18**	**415.06±17.13**	**479.05±18.879**
2.	**After training**			
	Low (< 352.64)	--	15(26.31)	15(12.82)
	Medium (352.64-656.08)	50(83.33)	36(63.15)	86(73.50)
	High (>656.08)	10(16.67)	6(10.52)	16(13.67)
	Mean ± SE	**584.89±14.60**	**426.80±17.25**	**504.36±20.095**

Calculated 't' = 9.34 (1-2) highly significant at 1% level of significance
Figures in parenthesis indicate percentages

to 656.08 minutes per day, followed by 13.67% and 12.82% per cent who had generated employment of high and low level of more than 656.08 and less than 352.64 minutes per day after the training programme of KVK, respectively. Relatively more number of rural youths from KVK, NDRI had medium and high level of employment generation (83.33 and 16.67%, respectively) than their counterparts from KVK, IVRI (63.15 and 10.52%, respectively). However, none was there in KVK, NDRI with low level of employment generation, however, little more than one-fourth of rural youths from KVK, IVRI were with low level of employment generation. Calculated 't' value indicated that there was significant difference in employment generation before and after the training programmes of KVK.

Conclusions

An increasing trend in the milk productivity was observed after the training programme. Relatively more number of rural youths from both the KVKs had medium level of milk productivity after the training (71.67% and 80.71% from KVK, NDRI and KVK, IVRI, respectively). However, rural youths from these KVKs differed significantly in respect of milk productivity. None from KVK, IVRI was found to have high level of milk productivity either before or after the training programme.

After the training programme, their annual net income had been in the range of Rs.5069.11 to 24244.19 and most of them were in medium level of annual income. Overall, the animal husbandry training programme meant for rural youths had very positive impact on the enhancement of milk productivity, income and employment of rural youths.

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Communication and Collaboration between Dairying Research and Extension Personnel Operating Under Different Linkage Systems in the State of Haryana

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Abstract

The present study was conducted with two research systems (NDRI, Karnal and HAU, Hisar) and three extension systems viz., NDRI, HAU and state department of animal husbandry (SDAH) in the state of Haryana with twofold objectives to ascertain the status of communication and collaboration (C&C) between research personnel and extension personnel engaged in dairying R&E, and to identify the factors effecting the same. Findings of the study revealed that majority of the sampled R&E personnel had nil to moderate extent of C&C between them. The status was found better when research and extension operated from same organisation. Further, research personnel from HAU outperformed NDRI regarding their extent of C&C with extension personnel both within the organisation as well as with SDAH. The factors significantly predicting the extent of C&C between them were identified as the cadre of the personnel (9.78%), their educational qualification (18.22%) and job satisfaction (20.00%).

The success or failure of research and development as a catalyst to the economic development of any State or Nation depends by and large on how well Research and Extension (R&E) have Communication and Collaboration (C&C) with each other. This is equally true in case of dairy development. In order to strengthen the process of design and delivery of more appropriate technologies, the need for strong and reciprocal interaction between R&E was greatly recognized since way back (Jain, 1970; Azad, 1975). Later at the global forum, Rolling (1989) and Kaimowitz (1990) also unequivocally appreciated and advocated for such mutual interaction. Therefore, designing any strategy for ensuring the effective link between R&E, the ground reality of the existing status between them ought to be worked out. Empirically, in the field of dairying, there are few works available in India (Reddy, 1984; Malik,1993; Bharati, 1993; Singh, 1994; Gupta, 1998). However, these efforts could not be claimed as comprehensive because different linkage systems in all the existing research and development organizations/departments were not investigated thoroughly. Hence, in order to bridge the above information-gap, the present investigation was carried out with following specific objectives: - (i) To ascertain the status of communication and collaboration between dairying R&E (ii) To identify the factors predicting the extent of C&C between R&E

Methodology

The present investigation was carried out in the state of Haryana. The said state was selected purposively

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because of the remarkable performance of the state as far as dairy development in India is concerned. From the selected state, both the research systems (NDRI, Karnal and HAU, Hisar) and three extension systems/ departments (NDRI, HAU and SDAH) were taken for the study. The study was designed in such a way that the extent of C&C between R&E could be ascertained in different linkage systems i.e. when both research and extension operated from the same organisation (system - 1) and when both were separately placed (system - 2). Therefore, 32 research personnel involved in applied/ adaptive animal and dairy researches, and 47 extension personnel engaged in transfer of dairy production technologies were sampled from selected R&E organisations/departments. The research variable communication and collaboration between R&E personnel was operationalised and measured as the extent to which these personnel were using channels/ media to interact with one another, and also as the degree of their joint involvement in formulation and execution of on-station and field research and extension activities. Hence, a questionnaire containing 10 such activity items was devised and administered to the sampled personnel. Their response was taken on four- point continuum of ' Always, Sometimes, Rare and Never ' and accordingly the scores of 3, 2, 1 and 0 respectively were accorded. Based on the response, Extent of C&C (EOCC) (in %) between R&E was worked out. These values were utilised to categorise the respondents in absent, weak, moderate and strong linkage categories, using mean and standard deviation. Furhter, coefficient of variation (CV), zero-order correlation, multiple and stepwise regression analyses were done to draw meaningful conclusions.

Results and Discussion

Under the following sub-heads, findings of the present study have been presented and discussed.

Extent of communication and collaboration between research and extension

The sampled research and extension personnel operating from different linkage systems were distributed according to their extent of C&C between them. The findings as contained in Table 1 show that under the linkage system-1, majority (59.67%) of the sampled personnel had absent (30.64%) to weak (29.03%) EOCC. Little above one-third of them was in moderate EOCC category and as low as about 5 percent of the respondents showed strong EOCC. Institution-wise, more percentage of the R&E personnel from NDRI was in absent to weak category as compared to their counterpart in HAU. Therefore, it could be derived that there was relatively better extent of communication and collaboration between research and extension for dairy development in HAU than that of NDRI. Average EOCC were 21.13 and 26.21 percent with corresponding CV of 110.10 percent and 72.40 percent in NDRI and HAU respectively. Very high value of CV helped to interpret that there was greater variation among research and extension regarding their participation in the C&C related activities. On pooled basis, in system-1, EOCC was computed about 24 percent (CV=92.91%). Relatively poor status of EOCC between R&E in HAU as compared to NDRI may be because of the presence of more number of structural linkage mechanisms in HAU and poor performance of the existing mechanism in NDRI.

Further in linkage system-2, it could be perused from the same table that about 73 percent of R&E personnel from NDRI and SDAH expressed absent C&C between them followed by 27 percent of them who were in weak interaction category. The average EOCC between NDRI and SDAH was computed as low as 3.5 percent with very high CV (127.49%). It means very few personnel from these two organisations interacted with one-another and that too rarely. On the other hand, it was found that more number of R&E personnel from HAU and SDAH were in moderate (35.48%) and strong (16.12%) category than absent or weak. Also, the average EOCC was computed to 17.12 percent (CV= 99.70%). The plausible explanation for better extent of C&C between HAU and SDAH as compare to NDRI and SDAH was because that dairying

Table 1: Frequency distribution of the sampled research and extension personnel selected from different linkage systems based on the extent of communication and collaboration between them.

Selected Linkage Systems	Selected research and extension (R&E) organisations and sampled personnel	Extent of communication and collaboration (EOCC)				Average EOCC (%)
		Absent (0)	Weak (less than 4.42)	Moderate (4.42 to 22.12)	Strong (Above 22.12)	
Research and extension in same organisation (System–1)	a) Within NDRI (n=32)	12(37.50)	10(31.25)	10(31.25)	-	21.13(110.10)
	b) Within HAU (n =30)	7(23.33)	8(26.67)	12(40.00)	3(10.00)	26.21(72.40)
	Pooled (N = 62)	19(30.64)	18(29.03)	22(35.49)	3(4.84)	23.77(92.91)
Research and extension in separate organisations (System–2)	a.) Between NDRI and SADH (n=33)	24(72.73)	9(27.27)	-	-	3.51(127.49)
	b.) Between HAU and SDAH (n =31)	11(35.53)	4(12.12)	11(35.48)	5(16.12)	17.12(99.70)
	Pooled (N = 64)	35(54.69)	13(20.31)	11(17.19)	5(7.81)	9.84(144.46)

Figures in parentheses indicate percentages
Figures in parentheses in last column indicate coefficient of variation (CV)

Table 2: Factors effecting the extent of communication and collaboration between research and extension personnel

S.No.	Variables	Zero order correlation coefficient (r-values)	Multiple regression coefficients		Results of step-wise regression		
			b-values	t-values	b-values	t-values	Relative contribution (%)
1.	Cadre	0.4012*	7.3219	1.8435*	5.0121	2.2607**	9.78
2.	Age	-0.4013*	-0.2058	0.3070	-	-	-
3.	Educational qualification	0.5431*	0.8131	2.4080**	5.9408	3.0900*	18.22
4.	Professional experiences	0.3225*	0.3160	0.4929	-	-	-
5.	Training received	0.0941	1.1280	0.9171	-	-	-
6.	Attitude	0.0231	0.6675	1.3210	-	-	-
7.	Family background	-0.1417	-0.1001	0.1411	-	-	-
8.	Achievement motivation	0.1001	0.5221	0.6472	-	-	-
9.	Value orientation	0.0050	-0.4964	0.6431	-	-	-
10.	Job satisfaction	0.2250*	0.6550	2.5234**	0.7201	3.4469*	20.00
11.	Morale	0.0015	0.1492	0.4581	-	-	-
12.	Perception of management	0.0815	0.0559	0.1665	-	-	-
13.	External environment	0.0341	-0.0870	0.0865	-	-	-
14.	Organisational climate	0.0144	0.0765	0.0389	-	-	-
	R–Square values		0.50 (4.25* at 15 and 62 d.f.)		0.48 (15.60* at 3 and 75 d. f.)		

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

and animal husbandry being the state subject, therefore, state level research and extension departments were mandated for frequent interaction between them. Contrary to it, NDRI is having national base, broader mandate and objectives, therefore, lesser interaction with state functionaries could be easily explained.

From the above findings, it could be implied that irrespective of the linkage systems and the R&E organisations, the scenario of communication and collaboration between research and extension in the process of technology development, dissemination and feedback was highly discouraging. The situation was still poor when research and extension operated from separate departments. Very high value of CV in the response of the sampled personnel further indicated that only limited number of them participated in the activities related to C&C and that too, either sometimes or rarely. Very poor extent of functional interaction between R&E in animal husbandry and dairying was also reported by Singh (1994) and Gupta (1998) and they attributed such poor status to the non-existence of the proper structural mechanism and the poor performance of the existing mechanism. However, findings get support from the works of Bourgeosis 1989), Kessaba (1989), Pineiro (1989) and Antholt (1990) who also reported linkage system-1 performing better than system-2.

Factors determining extent of communication and collaboration between R&E

In order to identify such factors, some of the personal, psychological and organisational variables related to the sampled personnel were identified, measured and subjected for the inferential statistics. Findings as contained in the Table 2 reveal that cadre, educational qualification and professional experiences of the personnel showed very high and positively significant (at 1 percent level) association with their EOCC. Age was found to have high and negatively significant (at 1 percent level) co-variation with EOCC, where as job satisfaction of the personnel was positively and significantly (at 5 percent level) related with their extent of mutual EOCC. This led to infer that only high cadre personnel with high qualification and more job experiences were given priority in the management of communication and collaboration related activities. Also, if better job satisfaction of the concerned personnel is guaranteed, better extent of communication and collaboration among them could be ensured.

On multiple regression analysis, three variables namely, cadre, educational qualification and job satisfaction of R&E personnel were found to have positive and significant (at 5 percent level) prediction on the extent of C&C between them. Remaining variables showed non-significant effect. Altogether, 14 variables predicted 50 percent in the variation of the extent of C&C between R&E. It means that the remaining 50 percent variation could be attributed to the factor(s) other than the selected variables. Indirectly, it gives hints on the organisational mandate and modus operandi of the interaction between research and extension. In other words, non-existence of the appropriate and adequate structural mechanism and the poor performance of the existing structural arrangements are disclosed. Further, on step-wise regression analyses, three variables retained in the final model with overall contribution of 48 percent, thereby, indicating little significance of the remaining variables. The highest contribution was made by job satisfaction (20.00%) followed by educational qualification (18.22%) and cadre (9.78%) of the personnel.

Conclusions

The findings of the present investigation revealed poor extent of communication and collaboration between research and extension personnel engaged in dairy development in the state of Haryana. Irrespective of the organisations and linkage systems, the situation was highly discouraging. Analyses revealed that only top level research and extension personnel were involved in mutual C&C. Under the prevailing circumstances, therefore, following implications could be recommended for the concerned R&E managers. The organisational goals/mandate as well as the existing structural linkage mechanism should be further refined and sharpened.

Middle as well as lower level R&E personnel ought to be involved in the process of planning, implementing, monitoring and evaluation of collaborative activities between them. The communication and collaboration between R&E should be in-built in the organisation rather than occasional or personal or chance factor. In nutshell, the existing scenario required to be modified and improved upon in such a way that there could be maximum communication and collaboration between R&E personnel which, in turn, could lead to the design and dissemination of more appropriate technologies for the sustainable dairy development.

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Participatory Agro-ecosystem Analysis of Selected Villages in District Jhunjhunu of Rajasthan

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Abstract

Having all the essential and enriched ingredients, Participatory Rural Appraisal (PRA) is quite a suitable approach for the people to take active part in formulating and implementing people based development projects. PRA was carried out by a multi-disciplinary team of scientists in villages Pipli of Chirawa Tehsil of Jhunjhunu district of Rajasthan and it was found that it was useful in analysing the agro-ecological situation of the area for designing of suitable interventions.

Participatory approach can be defined as a systematic flexible process of collectively analyzing and learning with rural people the micro farming social and economic situation and available resources. Participatory Rural Appraisal (PRA) is a family of approaches and methods which enable researcher/development workers and rural people to analyze the micro-agro ecological situation and share the information and knowledge for developing plan of action for sustainable socio-economic growth through higher productivity and income from farming. The underlying feature is that it can be practiced among all types of people- men or women, educated or uneducated, younger or elder etc. A variety of methods of PRA have been designed in such a manner as to make the people participate collectively and interestingly and keep the atmosphere lively through out the exercise. PRA approach brings facts and figures into practically captivating pictorial/ visual representation in a manner everyone can understand. It is comparatively less time and resource consuming than survey and other traditional methods for understanding rural realities.

The emerging challenges confronting Indian Agriculture includes the declining productivity, profitability and sustainability. This could be achieved if the development projects are designed on the basis of critical assessment of micro-agro- ecological situation, socio-economic conditions and the available technologies. In addition there is need to identify the problems faced by farmers, prioritize them and plan for their solution keeping in view their resources through research and farmers' active involvement. In this regard, PRA is one of the most effective tools which can be utilized to understand the technology adoption profile of the farming community and to get first hand information about the needs, resources available, priorities, problems and prospects of the faming community. This helps to understand the technology dissemination process, rural development activities, existing linkage mechanism among research, training and extension, credit and input supply systems etc. (Jones, 1995).

A Participatory Rural Appraisal was conducted to initiate an action research programme on "Prospects of new growth areas for application of agricultural technologies in different agro-eco regions" in Semi-arid agro-eco region - Jhunjhunu and Churu Districts of Rajasthan. The study was conducted to analyse the agro-eco-situation and diagnose its agricultural problems and prospects for their solution with reference to local

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resource base, agro-ecology and socio-economic conditions of farmers/farm women in the adopted villages.

Methodology

PRA was carried out by a multi-disciplinary team of scientists in villages Pipli of Chirawa Tehsil of Jhunjhunu district of Rajasthan. The village is located approximately 20 kms away from Pilani on Delhi-Pilani road in semi-arid area. The team visited in group to collect first hand informations. The data were collected in groups so that whole group participated to generate correct information which involves t*riangulations* among villagers.

On the spot visualization- On different aspects of village like resource base, population, crops and cropping systems practiced, animal husbandry practices etc.

Personal and group interview- Semi-structured interviews were conducted in an informal manner to collect information on rural life, livelihood, input analysis, general information of the village, mobility and institutional linkages.

Time line- In time line villagers provided an historical account of how different aspects of village life have changed over the years.

Mapping- The maps like social map, agro-ecological map, transect, technological map were drawn with active participation and help of villagers as key informants to know the use of agro-ecological and social resources, social stratification, technology adoption by farmers in the village.

Venn diagram- Venn diagram was used to study extent of relationships and importance of institutions/individuals with village people. It also reflected the kind and extent of communication between village people and the development agencies of governmental, non-governmental and private organisations in providing services, information and technologies.

Problem Analysis

Agro-ecosystem analysis helped in identifying major farming related problems through problem cause analysis. The agro-ecological problems in the village were identified, analyzed (Mettrick, 1993) and ranked on the basis of various criteria identified by the farmers and the intensity of yield loss (Sabarathnam and Vennila, 1996). The identified problems were ranked on the basis of intensity and extent of impact on crop productivity and sustainability or on cost of production. There was an in-depth analysis of the most important problem in the form of constraints. Objectives tree was constructed after focused group discussion with key stakeholders.

Results and Discussion

The existing agricultural situations of the village were analyzed utilizing PRA tools with special reference to local agro-ecology, technology adoption, existing farming systems, production system, social structure, rural soci-economic parameters and farmers needs. The details of some PRA tools and technique used are discussed to get an overall idea of the agro-ecological and socio-economic conditions of the village.

Transect- Participatory transect walks systematically involved walking with the villagers across the village area and discussing about village natural resources such as quality and type of soil, land use, cropping system followed, major trees of economic importance, agricultural problems, micro-agro-ecological situation and other factors related to farming. A walk from one extreme of the village to another helped in getting deeper insight of different aspects of rural life, farming situation, natural resources such as soils, trees, crop, topography, availability and use of water, crop rotation, livestock and micro-ecological conditions as presented in the table below.

Social profile: Pipli village has a total population of 5,500 people with about 700 households. Among various castes are *Jats* comprising about 60 percent of the total population and rest of the population is of

Brahmins, Khati, Dhanak and Scheduled Castes (*Nai, Kumhars*, Black Smith, Sweeper etc.) almost in equal number. The main occupation of inhabitants is agriculture and about 80 percent of the village population is engaged in agriculture. Those who are in service are in army or teachers in schools and drivers in roadways. About 10 percent of the households are landless. Joint family system is prevalent in majority of the households. Since last 30 years, most of the families have moved their households from village to their farms with installation of tubewells and electrification in the village. One Primary Health Centre, Panchayat Ghar, four Anganwadi and separate primary school for both boys and girls exist in the village. Co-operation exist among the villagers. The literacy level among males is 80-85 percent while it is 60 percent among females. Among younger generation almost all boys and girls are now going to school.

Resource Information- The resource map of Pipli village was drawn by village youth based on information given by elders of the village . The village has about 18,000 bighas land under cultivation. Bajra, *lobia*, moong, guar, cotton, moth bean and ground nut are major kharif crops whereas wheat, barley, mustard, gram, onion and fenugreek are major rabi crops. During summer season families having tubewell grow bajra as green fodder on about 1000 sq m area and also grow some vegetables for domestic consumption. The commonly found trees in village were Khejri, Peepal, *Babul, Ker, Neem, Kikar, Ruhera, Seesham, Ardu, Ber, Belpatra, Drum Sticks, Amaltas* and Citrus. Orobanchae weed was projected as the major problem in mustard crop. This weed is nonchlorophyllous plant which cannot produce its own food. The weed is a totally dependent on mustard plant for its nutrition resulting in huge yield losses to mustard crop. The weed has attained a status of major problem in the area during last seven years. Other farm related problems which came out through PRA are pod borer in gram, weed in wheat and onion, limited availability of irrigation due to poor power supply in rabi season. Weed emerged as one of the major problem in almost all crops followed by viral diseases in green gram and cowpea. Due to sandy soil, symptoms of nutritional deficiency are observed in almost all crops. Non availability of high yielding variety seeds and quality input also came out to be the constraints in crop production. Termite is a serious problem in almost all crops largely due to use of undecomposed manures. The soil is mostly sandy with low water holding capacity and lacks organic matter. Major source of irrigation are

Table 1: Attributes village Pipli collected through transect walks

Attributes	Particulars of the village	
Topography (Undulated)	Upland	Lowland
Soil Type	Sandy to sandy loam	Loam in few low lying areas
Crops	Bajra, cluster bean, green gram/cowpea, moth bean(rainfed), ground nut, cotton	Wheat, mustard, Methi, Barley, gram, carrot and onion
Trees	Khejri, Peepal, Babul, Ker, Neem, Kikar, Rohera(dessert teak), Jal, ber	Khejri, Peepal, Babul, Ker, Neem, Kikar, Rohera(dessert teak), Jal
Livestock	Buffalo, Cow, Camel, Sheep., Goat	Buffalo, Cow, Camel, Sheep., Goat
Primary land Use	Crops, Livestock, Houses	Crops, Livestock, Houses
Irrigation	Tube well and sprinkler	Tube well and sprinkler

tube wells. However the water table is very low. Water availability is limited and water level is below 250 feet deep. Farmers have to go for 400-500 feet deep for bore well. The only method of irrigation followed by the farmers is sprinklers because there is mostly undulated with sandy soils.. One State owned tube well and water tank is also there in the village to provide drinking water for humans as well to livestock population. The village has three ponds and pasture land for grazing animals.

Farm implements like sprinklers, power tillers, tractors, threshers, levelers, chaff-cutters etc were available with villagers along with traditional implements such as *desi* plough, sickle, spade, kasola etc. Villagers are rearing buffaloes, cows, goats, sheep and camels. On an average each household has 2-7 animals. Milk is mostly consumed by majority of families for household use. However, very few families are selling the surplus milk. Those who do not sell milk prepare and sell ghee to meet the concentrate feed cost of animals. Another source of income is through sale of milch animals at time of financial need. Majority (about 90 percent) are buffaloes in comparison to cows. Camels are used for ploughing.

Agro -ecology

The village represents a semi-arid climate where temperature ranges from 0° C (Min) in winters to 48 ° C during summers (Max). The average annual rainfall is below 500 mm. The ground water table is at depth of 250 ft. The principal weed is orobahchae which causes loss from 10 to 90 percent in mustard crop. It is total root parasite. Sometimes farmers are compelled for change with another crop due to heavy loss. Out of 800 households majority i.e., about 500 household are small farmers having land size less than 2 ha and only 40 households are medium to big farmers having more than 2 ha land, about 200 families have land size ranging from 2-5 ha.

Time line-

It provided a summary overview of the key historical events in a community in relation to their socio-economic relevance for the present situation. The time line for different activities as projected by key informants is given below in Table 2.

Table 2: Chronological historical mile stones of village Chirawa, District Jhunjhunu (Rajasthan)

S.No	Year	Event
1.	About 400 years ago	Village was established
2.	1945-46	Cholera epidemic
3	1945	Road constructed
4.	1947	Primary School established
5.	1950	Post Office opened in village
6.	1952-53	Hoemorrhagic sapticaemia epidemic of cattle
7.	1959	Middle School established
8	1960	First Cycle
9.	1966	Electrification of village , First tube well, First Male Graduate, First Radio, Electric Mill, Electric Chaff cutter
10	1967	Cultivation of wheat started
11	1970	Secondary School established Tank for providing drinking water constructed
12	1979	Public health centre opened
13	1980	First girl graduated
14	1981-82	First T.V
15	1984	First Tractor
14	1987	Use of Chemical fertilizer and pesticides started
15	1990	First Motorcycle
16	1997	First Car
17	2000	First Mobile phone
18	2002	First Bio-gas plant
19	2005	Senior secondary School established

Venn Diagram-

The venn diagram prepared with the help of key informants revealed that for this village schools, power house, post office, Primary Health Centre, Co-operative

society of Rajasthan and water tanks are important and located in the village. Banks are also important for the villagers but they are situated at a distance of more than 10 kms from the village. Agricultural Market (mandi) and Veterinary hospital are least contributing to villagers and are also situated at distance of 5 kms from the village.

Problem identification for research prioritization under semi-arid agro-ecosystem

Rank based quotient (RBQ) technique was used to identify the top most researchable problem of the area under study. Randomly identified 30 farmers participated in the exercise to rank the identified problem by them. A total of five ranks were taken up. The problems identified in the study area are listed below:

1. Orobanchae weed problem in Mustard
2. Termite in all crops sown in the area.
3. Low productivity of milch animals.
4. Repeat breeding anoestrus in buffaloes Endo and ecto parasites
5. Infestation of pod borer (*Helicoverpa armigera*) in Gram Crop.
6. Poor water holding capacity and fertility of soil in the area.
7. Very low seed replacement rate
8. Lack of knowledge about balanced use of plant nutrients.
9. High Buffalo calf mortality
10. Frequent occurrence of leaf curl viral disease in solanaceous vegetable crops.
11. Damping off in vegetable seedlings

$$RBQ = \frac{E\ fi(n+1-i)x100}{N \times n}$$

Where, i = Concerned ranks (1 to 5)
N = Total number of farmers (30)
n = Number of rank
fi = Frequency (Number of farmers reporting that particular problem)

Table 3: Ranking of identified problems

S. No	Identified Problems	RBQ	Avg % loss	Area (ace)/ animals	VBI	Rank
1	The Orobanchae weed problem in Mustard	99.30	100	118	11,71,740	I
2	Termite in all crops sown in the area.	94.00	60	200	11,28,000	II
3	Low productivity of milch animals	94.67	30	263	7,46,946.3	III
4	Repeat breeding anoestrus in buffaloes Endo and ecto parasites	68.67	60	120	4,94,424	IV
5	High Buffalo calf mortality	24.67	10	150	37,005	IX
6	Infestation of pod borer *(Helicoverpa armigera*) in Gram Crop	62.60	30	180	3,38,040	V
7	Poor water holding capacity and fertility of soil in the area	64.00	15	188	1,80,480	VI
8	Very low seed replacement rate	76.67	10	113	86,637.1	VII
9	Lack of knowledge about balanced use of plant nutrients	28.00	60	30	50,400	VIII
10	Occurrence of leaf curl viral disease in solanaceous vegetable crops	28.00	60	20	33,600	X
11	Damping off in vegetable seedlings	28.67	20	56	32,110.4	XI

Once the RBQ are found out for each problem, the top most researchable issue in the village is identified by calculating the value based index for each RBQ

Value based Index (VBI) = RBQ x Avg loss experienced x area of crops/animals

The problem with the maximum value based index is identified as top most researchable problem

Major thrust areas identified for research

The participatory rural appraisal of village Pipli in Rajasthan revealed that there are many agricultural problems in the area which farmers are facing. The analyses of the identified problems suggest that there are four thrust areas which require scientific interventions. These are :

1. Management the Orobanchae weed problem in major oil seed crop Mustard
2. Integrated insect pest management in Gram Crop.
3. Control of Termite infestation in all crops sown in the area.
4. Improvement of soil health with increased organic contents and higher water holding capacity.
5. Livestock management through control of endo and ecto parasites and minerals and vitamin feed supplementation.

Orobanche is a root parasite of mustard crop in Rabi season. It grows on the roots/rootlets of host plant. It is nonchlorophyllous plant which cannot synthesize its own food hence it is totally dependent for nutrient on mustard plant resulting in huge loss of its crop yield. It has attained a status of major problem during last seven years in mustard crop. The key informant opined that causes loss from 10 to 90 percent in mustard crop. Many of the farmers were compelled it for changing the mustard crop with another due to heavy losses. As a result the area under mustard crop in this region has decreased to great extent. Farmers are facing huge economic loss due to sowing of alternate crops which are less remunerative in comparison to mustard.

Gram Pod Borer is an insect pest of gram crop in the area which causes loss from 10 to 40 percent and sometimes more. The crop yield decreases and the quality of marketable surplus of gram grain deteriorates which leads to economic loss to the farmers. Infestation of Pod borer is more in case of good crop with vegetative growth, high moisture and temperature which is prevalent due to sprinkler system of irrigation in the area. The result is declining yield and economic returns from gram crop. Accordingly area under gram is progressively decreasing due to uncertainty of economic returns from the crop.

Due to dry climate and low soil moisture at different crop stages termite infestation is a serious pest problem in the operational area. The use of farm yard manure (FYM) without proper composting further increases the termite attack. Left over crop residues in the field also add to the problem of termite infestation which is wide spread at all stages of crops and almost in all the crops. As a result there is loss of grain yield, less vegetative growth, poor grain quality and reduced availability of dry fodder from different crops.

Soil fertility and its water holding capacity in the area is progressively decreasing because farmers mostly use only chemical nitrogenous and phosphoric fertilizers. They are not aware about the use of other essential micro nutrients for their crops.. These micro nutrient fertilizers are not easily available in the area and are costly. Farmers dump the cattle dung and other waste on the ground in open space and therefore, it does not get properly decomposed. Moreover farmers apply FYM by making small heaps in the field during months of April – May and leave it undisturbed for a long time during whole summer. Thus there is loss of nutrients from FYM dumped in the fields due to high temperature and blowing of hot wind. Thus the method of preparation of FYM is faulty and also the method and time of application of FYM is not appropriate for efficient use of its nutrient potential. In most of the fields Bajra- Wheat, Bajra-Mustard crop rotation is the most prevalent crop rotation.. Due to unbalanced use of chemical fertilizers and non use of essential micro nutrient there is progressive

depletion of soil fertility, yields of different crops and also the quality of the crop produce. The beneficial micro flora of the soil has also been reduced because of the crop rotations many times does not include pulse crops. Also farmers do not grow green manuring crops leading to depletion of soil fertility and water holding capacity. Semi decomposed FYM and field crop residues act as attractants and suitable food for termite infestation in the area.

Low productivity of milch animals in the area has been the result of breeding of buffaloes with non-pedigreed bulls. Also the high mortality of buffalo calves in general and male calves in particular results in low selection pressure. The mortality of buffalo calves is mainly due to heavy infestation with ectoparasites and gastro-intestinal parasites. Repeat breeding in buffaloes is mainly due to nutrient deficiencies particularly of vitamins and minerals. Appropriate feeding with balanced concentrate ration and control of ecto and endo-parasites in dairy animals can be helpful remedy of all these problems to a great extent.

Conclusion

PRA proved to be effective useful tool to analyze the agro-eco system of the adopted villages for identification and prioritization of agro-ecological problems of the area. The multidisciplinary team participating in the exercise could efficiently pin point the causes of the problems and thrust areas of research to develop effective scientific interventions. Some of the important researchable issues identified for research in Jhunjhunu Piple in Rajasthan were the ovobanchae weed problem in mustard, termite in all crops and low productivity of milch animals.

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Farmers' Awareness about Improvised Agricultural Technologies Developed by fellow Progressive Farmers: An Empirical Study

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Abstract

Present study was conducted in the purposively sampled Araziline block of Varanasi district in Uttar Pradesh. The improved agricultural technologies developed by the farmers and identified from the pilot study were utilized for assessing the awareness of a sample of so farmers about those technologies. Finding of the study showed that farmers were more aware about innovative method of nursery raising (62.50%), followed by Kudrat-9 variety of wheat (33.75%), Khusbu S-1 variety of rice (37.50%) and Kudrat-3 variety of pigeonpea (22.50%). They were found least aware of innovative farm implements (12.25%) developed by fellow farmers.

Of late, there has been a lot of attention on participatory research and action, albeit rarely have we provided opportunity to those creative farmers who are innovators of sort, apart from being traditional knowledge-holders.

Nevertheless, many of such innovative farmers end up solving their problems in a very creative and innovative manner. However, these innovations remain localized and sometimes even unknown to other farmers even in the same village. Lack of dissemination of such practices, however, cannot be considered as a reflection on the validity of these innovations.

Moreover, creativity is not confined to any place or within any particular group of people. Local people face lot of problems in their day-to-day life, and they try different solutions for a particular problem. These solutions, then get transferred among other farmers. Even if such farmers develop innovations, there is no provision for documentation and further multiplication of those innovations. Further, even the farmers of that locality seem to have very poor awareness about such innovations/new practices/techniques being developed by their fellow progressive/creative farmers.

The present study aims to know the awareness level of farmers about 'Improvised Agricultural Technologies' as developed by their fellow progressive farmers.

Methodology

The present study was conducted in the randomly selected block Araziline of Varanasi district in the state of Uttar Pradesh. Araziline block consists of 227 villages. Out of these, 5 villages namely Tandia, Lachhipur, Milkypur, Todapur & Rakhauna were selected purposively for the study, as in these villages, a sizable number of innovative farmers were residing. For this study, initially some 'improvised agricultural technologies' developed by the progressive farmers (of the locality) at their field-level were selected, the details of which have been given in the Table 1. Subsequently, sixteen farmers from each of these five villages were selected with the presumption that they might be aware about such 'improvised agricultural technologies'. Thus, a total of 80 farmers were identified and contacted for the purpose of knowing the awareness level of improvised agricultural technology developed by the

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progressive farmers of their own locality. The data were collected with the help of informal interpersonal discussion with the respondents as well as by using semi-structured interview-schedule, specially developed for the study. The data were collected only after establishing the proper rapport with the respondents during the months of January- February 2009.

Results and Discussion

A total of 37 'Improvised Agricultural Technologies' (as developed by progressive farmers of the locality) were identified in the locale of study. Subsequently, the respondents were asked about such technologies, in order to ascertain their awareness, the results of which have been discussed as below:

Table1: Distribution of respondents according to their awareness about 'Improvised Agricultural Technologies' developed by Progressive Farmers of their locality (N=80)

S. No.	Technology	Awareness among respondents	
		Frequency	Percentage
A	**Variety**		
i)	**Wheat**		
1.	Sheetla-1	8	10.00
2.	Sheetla-2	17	21.25
3.	Devnandan-1	10	12.50
4.	Baba Vishwanath	4	5.00
5.	Ganesha (CSSW-4)	20	25.00
6.	Kudrat-21	15	18.75
7.	Gajraj-7	22	27.50
8.	Kudrat-9	27	33.75
9.	Kudrat-7	15	18.75
10.	Kudrat-11	2	2.50
11.	J.P.-52	13	16.25
12.	J.P.-8661	21	26.25
13.	J.P.-161	20	25.00
14.	J.P.-53	8	10.00
15.	J.P.-209	6	7.50
ii.	**Paddy**		
1	Khushbu-S-1	30	37.50
2	Kudrat-2	5	6.25
3	Kudrat-4	16	20.00
4	Kudrat-5	29	36.25
5	J.P.-52	13	16.25
6	J.P.-72	11	13.75
7	J.P.-73	12	15.00
iii.	**Pigeon pea**		
1	Kudrat-3	18	22.50
2	Chamatkar	11	13.75
3	J.P.-9	10	12.50
4	J.P.-5	17	21.25
5	J.P.-6	9	11.25
iv.	**Mustard**		
1	Kudrat Suryamukhi	20	25.00
2	Kudrat Vandana	3	3.75
3	Kudrat Geeta	8	10.00
4	J.P. Vishwajeet	5	6.25
5	J.P.-2	4	5.00
B	**Nursery**		
1	Rice nursery	50	62.50
2	Tomato nursery	1	1.25
C	**Farm Implement**		
1	Paddy thresher	8	10.00
2	Rice huller	7	8.75
3	Sugar juice extractor	10	12.25

A) Awareness about different varieties of the crops developed by Progressive Farmers of the locality

Wheat varieties

The respondents were having very low level of awareness about different varieties of wheat crop developed by progressive farmers of their locality, as indicated (Table1) by the respective percentage against each (such) wheat-varieties: Sheetla-1(10%), Baba Vishwanath (5%), Kudrat-11 (2.50%), J.P.-53 (10%) , J.P.-209 (7.50%), Devnandan-1 (12.50%), Kudrat-21 (18.75%), Kudrat-7 (18.75%), J.P.-52 (16.25%), Sheetla-2 (21.25%), Ganesha (CSSW-4) (25%), Gajraj-7 (27.50%), J.P.-8661 (26.25%) & J.P.-161 (25%). However, more than one-third of the respondents were found to be aware of "Kudrat-9" developed by their progressive fellow farmers. A similar study had been conducted by Bhuyan *et al.* (1995). They found that the majority of farmers (66.5%) were in the "low awareness" category and only 8 per cent were in the high awareness category.

Paddy varieties

The level of awareness about different paddy varieties developed by the progressive farmers of the locality among the respondents as shown in the table-1 their awareness about paddy varieties like: Kudrat-2 (6.25%), Kudrat-4 (20%), J.P.-52 (16.25%), J.P.-72 (13.75%) & J.P.-73 (15%). However, their awareness about certain other varieties of paddy were found to relatively better viz: Khushbu-S-1 (37.50%) & Kudrat-5 (36.25%). A similar study had been conducted by Jona and Verma (2001). They found that the overall knowledge of rice farmers on recommended plant protection practices was of medium level.

Pigeon pea varieties

The varieties of "Pigeonpea" as developed by the progressive farmers of the area were found to be relatively unknown among the respondents, as is indicated by the less number of people having awareness about such varieties (Table-1) as reflected through percentage of respondents aware about given varieties, viz. Chamatkar (13.75%), J.P.-9 (12.50%), J.P.-6 (11.25%), Kudrat-3 (22.50%) & J.P.-5 (21.25%).

Mustard varieties

The level of awareness about different mustard varieties developed by the progressive farmers of the locality among the respondents (as shown in the Table-1) was found to be very low, as indicated through percentage of respondents (given in parentheses) against such mustard varieties like: Kudrat Vandana (3.75%), Kudrat Geeta (10%), J.P. Vishwajeet (6.25%) J.P.-2 (5%) & Kudrat Suryamukhi (25%).

B) Awareness about different kind of improved nurseries as developed by Progressive Farmers of the locality

The respondents showed a highly contrasting level of awareness about different improved nurseries as developed by progressive farmers of their locality, as indicated by the respective percentage against each of them: Rice nursery (62.50%) & Tomato nursery (1.25%). This finding was really interesting in nature, as it reflected their (respondents') selective preference for a particular crop-based nursery, since it happened to be a rice-belt of the region.

C) Awareness about different kind of improved farm implements as developed by Progressive Farmers of the locality

The "Improved Farm Implements" as developed by the progressive farmers of the area were found to be relatively unknown among the respondents (Table 1), as reflected through percentage of respondents being aware about given implements, viz Paddy thresher (10%), Rice huller (8.75%) & Sugar juice extractor (12.25%). A similar study had been conducted by Vani *et al.* (2005). They found that unawareness about the hazards of excess use of pesticides was expressed by 93 per cent of farmers.

Conclusion

It was heartening to see that some innovative and/or progressive farmers are developing need-based technologies sans assistance of any organization/ government for solving their own problems; albeit, the sad part was that the farmers of the same locality were not having proper awareness about such "Improvised Agricultural Technologies being developed by the progressive farmers of the area. The government, as we all know, spends huge amount of money on research institutions for development of technologies; so, some mechanism could be developed to provide assistance for such innovative and/or progressive farmers vis-à-vis development and commercialization of these locally-developed improvised agricultural and allied technologies.

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Adoption of Contraceptives among Urban School Teachers

Aabha Gupta[1] and Achla Gakkhar[2]

Abstract

The past decade has witnessed a significant shift in the way population and reproductive health problems are conceptualized. There has been a clearer articulation and definition of reproductive health as a concept. The challenge now is to translate this concept into policies and programmes at the national level. During investigation it was found that there is lack of data about Teacher's health status, knowledge and attitude regarding reproductive health – aspects which reveal their dilemmas or social tensions related to sex education. Thus, in view of this concept, the present study was undertaken to bring such salient issues at the forefront and to provide direction to plan certain new strategies and formulate recommendations that would be appropriate step to curb the problems associated with Contraception, HIV/AIDS and STDs.

Reproductive health incorporates various approaches that stresses upon the needs related to the reproductive rights of men and women. It also takes care of the social behaviour and cultural practices of an individual that may ultimately affect reproductive health outcomes. A variety of socio-economic and cultural factors shape the individual's reproductive aspiration and behaviour. According to the World Bank, about one- third of the total disease burden on women, 15 to 44 years of age, in developing countries, is linked to health problems related to pregnancy, child birth, abortion, HIV and reproductive tract infections (RTI).

In comparison to their western counterpart, Indian women have joined professions much later. During the post-independence era, they have come out of four walls of their homes and now they are involved in many kinds of both soft and unconventional jobs. The spread of higher education in women, their growing sense of equality with men and several other socio-economic factors are now responsible for the promising phenomenon. The most preferred profession of Indian women is that of school teaching. A number of writings, conceptual as well research based, are now available on the various aspects of their professional role and role conflicts. However, one important lacuna, so far has been the lack of data about their health status, knowledge and attitude towards reproductive health.

A concerted effort to change societal attitudes, elimination of all forms of biases, prejudices and discrimination, active participation of communication channels in all spheres of life, incorporation of gender perspectives in policies and plans, making the burning issues like AIS, STDs, Family planning 'visible' and being 'heard' at family, regional, national and international platform is very much needed.

Rawal (2009) in his study reported some real eye boggling data of total 1318 HIV patients registered at ART (Anti Retro Viral) centre of Udaipur region by April 2009. Out of which, in Udaipur City itself, there were 276 males, 182 females and 40 child patients.

Thus, keeping in mind the alarming situation a need was felt to identify the knowledge and extent of adoption of contraceptives among female school teachers.

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Methodology

An exploratory study was conducted in Udaipur city of Rajasthan. The sample comprised of female teachers from secondary and higher secondary schools with Government and Private setup. Purposive random sampling method was adopted to select 300 female teachers. A structured questionnaire was developed and personally administered by the researcher. Most of the questions were close ended. Validity and reliability of the developed tools, were established. Percentages, frequencies and mean scores were used for statistical analysis.

Result and Discussion

Level of knowledge about contraceptive

Findings of the Table 1 indicates that majority of the respondents were having average level of knowledge, whereas the categories of women teachers in low and high level of knowledge were 14.0 and 22.0 per cent, respectively. It indicates that since most of the women were educated lot and currently using one or another form of contraceptive measure, thus they were somewhat aware of certain popular methods only.

Table 1: Percentage distribution of respondents according to knowledge regarding contraceptives

N=300

Level of knowledge	Respondents	
	Number	Pecentage
Low	42	14.0
Average	192	64.0
High	66	22.0

Kibert (2003) investigated the reproductive health knowledge, attitude and practice of high school students in Ethiopia. The students had high level of knowledge of contraceptives and where to obtain contraceptive services; however, level of use was low. Some of the reasons given for not using contraceptives includue lack of access to services, carelessness, unplanned sexual intercourse and pressure from sexual partner.

As most of the women were from the middle socio economic status, where choice of family planning is mainly decided by male members, hence the interest of females towards gathering knowledge about various contraceptives might get affected negatively.

Extent of adoption of contraceptives

It is clear from the Table-2 that respondent were moderately active adopters of contraceptives. Once again the high educational background could be one of the major factor responsible for it. The data show that the decision of using any measure / method was either of the husband or it was on mutual basis, but the wish of respondent herself was not given much priority.

Though the table also makes it clear that respondents sometimes only indulge in an open discussion regarding use / adoption of a contraceptive with their husbands, yet husbands rarely seem to force or compel the respondents to make use of a certain contraception method / measure.

Table 2: General nature of respondents using contraceptives

N=300

S. No.	Items	Mean Score
1.	Have ever used any contraceptives	2.53
2.	Have used contraceptive in last 30 days	2.24
3.	Have suggested others about current method being used	1.78
4.	Partner generally agrees to adopt a method / measure	2.11
5.	Person making the decisions regarding adopting a measure	
a.	Husband	2.10
b.	Self	1.36
c.	Both	2.52
d.	Friends / In-laws	1.32

6.	Partner forces to adopt a particular method	1.70
7.	Have an open / healthy discussion with partner regarding contraception	1.98
8.	Purchasing a contraceptive measure is the job of	
a.	Husband	2.82
b.	Self	1.30
c.	Both	1.36

Table 2 further narrates that it was the husband who purchased contraceptive measures from the market. It clearly indicates that in spite of women empowerment, socio-psychological taboos come in the way of females to come forward in the field of male dominating society.

It is evident from the table-3 that easy to use and safety (least side effects) were the two most important factors affecting the selection of any contraceptives whereas partner's preference and effectiveness of a method were given second priority.

Table 3: Factors affecting the selection of contraceptive

N=300

S.No.	Factors	Mean Score
1.	Doctor's advice	1.92
2.	Cost	1.44
3.	Safe (least side effects)	2.38
4.	Very effective	2.27
5.	Easy to use	2.58
6.	Saw advertisement	1.60
7.	Partner prefers it	2.32
8.	Friend / relatives suggested	1.46
9.	Wanted to try it / curiosity	1.44
10.	Allows spontaneity in sex	1.77

Curiosity towards a measure and cost of a contraceptive were the last possible factors to affect the selection of any method / measure. The possible reason might be that since the respondents were literate and mostly belonged to middle group of socio economic status, thus cost (money) might have not been an issue for them. A close observation of Table-4 shows that overall adoption level was highest in case of condoms followed by withdrawal method. The possible reason might be the respondents were literate and were well acquainted with the benefits of this contraceptive as a safe mean to prevent pregnancy and even STDs.

Table 4: Extent of adoption of different contraceptives

N=300

S. No.	Contraceptive methods/ measures	Mean Score
1.	Oral pill	1.67
2.	Copper T / Loop	1.57
3.	Condom	2.43
4.	Contraceptive cream / jelly / foam	1.14
5.	Calendar / Rhythm method	1.57
6.	Withdrawal method	2.10
7.	Lactation amenorrhea	1.24
8.	Hormonal injections	1.06

Secondly, it was not surprised to note that a large number of respondents were using withdrawal method as a mean to prevent pregnancy. This might be because of the fact that many times any contraceptive measure was not available at the time of intercourse. It was no surprise to know that still people do not give preference to hormonal injection. The reason might be that respondents might not be aware of this method or they might have had fear of side effects.

Nay (2003) investigated the variation in contraceptive use among uneducated women across India. The analysis suggested that, while many of the expected socio-economic variables play their part, there were also many a considerable diffusion effects which operated at levels beyond the uneducated women's own circumstances. A significant relation was found with other's use of contraception and other's education. Mass media exposure also emerged as an important diffusion channel.

One of the main reasons for lower adoption of contraceptives in India is the myths that have been built around them. This is primarily due to the lack of correct information on contraceptive methods. Contraceptive behaviour is characterized by four parameters namely, knowledge of contraception, current contraceptive use, future intention to use contraception and desire for additional children. Knowledge of contraception is defined as complete knowledge (awareness) of all the major methods of population stabilisation -sterilization, the IUD, oral pill and condom and the decision on the contraceptive of choice should be based on the right information, and not myths.

Conclusion

There is a need for developing health education programme for masses (using a combination of communication channels) to highlight the importance of reproductive health. Keeping in mind the sexual practices of young married couple, advice on contraception and avoidance of STD by adopting safer practices should be given enough weightage. Verbal information on contraception should be supplemented with some of the written or audio material developed for the clients should be encouraged.

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Information Output Behaviour of Farm Scientists and Constraints faced by them in Transfer of Technology

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Abstract

The study was carried out at PDKV, Akola to assess information output behaviour of farm scientists. It was observed that majority (88.00%) of them have used multimedia for presentations. More than four-fifth (82.00%) of farm scientists had participated in radio farm programme, followed by 63.00 per cent farm scientists who had participated in television programmes. About twelve per cent of farm scientists had never used multimedia, radio and television farm programmes for transfer of technology. It was observed that majority (78.41%) of the farm scientists had 'medium' electronic media use behaviour, while (10.23%) farm scientists had 'high' electronic media use behaviour and (11.36%) had 'low' electronic media use behaviour. It was seen that 'lack of technical support from computer operators/programmers' was major (20.45%) constraint expressed by farm scientists in transfer of technology through multimedia. More than one-sixth (15.91%) farm scientists expressed about 'inadequate latest hardware and software packages' facilities. It was seen that 'lack of time for preparation' (19.51%) and 'less opportunity is given from radio officials as concerned field of specialization' (17.07%) were that major constraints experience by the farm scientists in transfer of technology through radio. It was observed that 'less opportunity is given from television officials as concerned field of specialization' (19.05%) and 'lack of technical support from the artists, photographer etc. in preparing visuals for television programmes' (15.87%) were the major constraints faced by the farm scientists in transfer of technology through television.

Modernization of Indian agriculture greatly depends on creation of farm technology and its dissemination. India is well equipped in agricultural technology, but full use of available technology is not being made in many area of the country. By and large, the results remain unused in laboratories and research to the farmers. Besides this agricultural technology is changing at an increasing rate. Hence, it is necessary to select quick system of communication to keep farmers in the tune with the fast development research technology. As majority of population in our country is engaged and depend on agriculture, we have to assess and make available latest technologies which turns agriculture to be efficient. Mass media play important role in increasing better functioning and creates awareness about new technologies. Amongst electronic media, radio and television has large coverage to cover maximum population and advance electronic media like multimedia has also high potential which serve as electronic exchange and ultimate modern method for transfer of information.

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Methodology

Present study was carried out in the year 2008-09 in the jurisdiction of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, (PDKV) Akola (Maharashtra State). The Research Stations, Krishi Vigyan Kendras and various departments under PDKV, Akola were covered in the study for selection of respondents. The university has been engaged in the threefold activities of research, extension and education. List of all farm scientists working in the jurisdiction of PDKV, Akola in various departments, different research stations and KVK's was obtained. Farm scientists working in the different cadres like Head of Departments, Professors, Associate Professors/Programme Coordinators/Senior scientists and Assistant Professors/Subject Matter Specialists were considered for the study. In all, 100 farm scientists were selected randomly and they responded to the present investigation. The investigation has been designed and planned on 'descriptive and diagnostic design of social research'. Extent of participation, frequency of participation and nature of participation was computed.

Results and Discussion

Information seeking behaviour

From Table 1, it was observed that, majority of farm scientists (73.00 %) were in the 'medium' level of information seeking, followed by 15.00 per cent of farm scientists were in the 'high' category of information seeking and 12.00 per cent of farm scientists had 'low' information seeking in their work place in university from individual sources, group sources and mass media sources.

The above findings get support from the findings of Kumar and Singh (1994), and Mali (2004).

Electronic media use behaviour of farm scientists

Electronic media use behaviour of farm scientists operationalized as the activities of farm scientists in relation to the planning, preparation, implementation, and follow-up of the agricultural programmes on different electronic media viz., multimedia, radio and television.

Table 1: Distribution of farm scientists according to their information seeking behaviour

S. No.	Category	Respondents (n=100)	Percentage
1	Low	12	12.00
2	Medium	73	73.00
3	High	15	15.00

The data in Table 2 reveals that majority (78.41 %) of the farm scientists had 'medium' electronic media use behaviour, followed by 10.23 per cent of farm scientists had 'high' electronic media use behaviour and (11.36 %) farm scientists had low electronic media use behaviour for transfer of technology.

Table 2: Electronic media use behaviour of farm scientists

S. No.	Category	Respondents (n=100)	Percentage
1	Low (upto 66.67)	10	11.36
2	Medium (from 66.68 to 83.34)	69	78.41
3	High (83.35 and above)	09	10.23

It could be observed from results that, majority of the farm scientists had medium electronic media use behaviour. It can be concluded from these findings that the farm scientists had satisfactory electronic media use behaviour means that they had performed fairly well in respect of all the parameters of electronic media use behaviour. The findings also make it clear that there is a good scope to improve the electronic media use behaviour. It can be done through systematic efforts of the farm scientists and authorities.

- **Involvement of farm scientists in different electronic media**

It is revealed from Table 3 that majority of (88.00 %) farm scientists used 'multimedia presentation', followed by 82.00 per cent of farm scientists participated

in radio farm programmes and 63.00 per cent participated in television programme, whereas, 12.00 per cent farm scientists did not participate in any electronic media for transfer of technology.

Table 3: Involvement of farm scientists

S. No.	Category	Respondents (n=100)	Percentage*
1	Participation in multimedia presentation	88	88.00
2	Participation in radio programme	82	82.00
3	Participation in television programme	63	63.00
4	No participation	12	12.00

* The sum of percentage is more than 100 due to multiple responses

The present findings are in consonance with the findings of Patel (1972), Reddy and Singh (1997), Abdullah *et al.* (2002) and Mali (2004).

Constraints

Constraints faced by farm scientists in transfer of technology through electronic media

It is seen from Table 4 that 'Lack of technical support from computer operators/programmers' was a major constraint expressed by (20.45%) farm scientists in transfer of technology through multimedia whereas 15.91 per cent of farm scientists expressed 'inadequate latest hardware and software packages'.

In addition to these, the other constraints like 'inadequate computer facilities in preparation' was expressed by 14.77 per cent, 'non availability of required facilities for developing farm based programme' was expressed by 13.64 per cent farm scientists, 'lack of time for preparation ' is a constraint expressed by 11.36 per cent farm scientists. Similarly, 'lack of freedom in decision making with regard to position '(9.10 %), 'non availability of electricity during office time due to load shading' (7.95 %), 'lack of communication from university authority' (2.27 %) and 'inadequate latest literature in the library' (1.14 %) were other constraints faced by the farm scientists.

Table 4: Distribution of farm scientists according to the constraints faced by them in transfer of technology through multimedia

S. No.	Constraints	Number (n=88)	Percentage*
1.	Lack of technical support from computer operator/ programmers	18	20.45
2.	Inadequate latest hardware and software packages	14	15.91
3.	Inadequate computer facilities in preparation	13	14.77
4.	Non availability of required facilities for developing farm based programmes	12	13.64
5.	Lack of time of preparation	10	11.36
6.	Lack of freedom in decision making with regard position	8	9.10
7.	Non availability of electricity during office time due to load shading	7	7.95
8.	Lack of communication from university authority	2	2.27
9.	Inadequate latest literature in the library	1	1.14

Constraints faced by farm scientists through radio

It is observed from Table 5 that, 'lack of time for preparation' (19.51%) and 'Less opportunity is given from radio officials as concerned field of specialization' (17.07%) were the major constraints experienced by the farm scientists in transfer of technology through radio whereas 13.41 per cent of farm scientists expressed about 'practical oriental programmes and research finding not broadcast'. In addition to this constraints identified by the farm scientists were 'inadequate computer facilities with secretarial assistance' (12.20 %), 'lack of freedom in decision making with regards to

position' (9.76 per cent) and very few (7.32 %) expressed 'lack of knowledge in writing script for radio'. A few scientists stated another problem of 'non availability of required facilities for recording field based farm programmes' (4.88 %), 'inadequate latest literature in the library' (2.44 %) and very 'lack of communication from university authority' (1.22 %) expressed as an constraints. However, these problems could be overcome by the concerned farm scientists in consultation with the higher authority and proper communication for getting opportunity with radio station.

Table 5: Distribution of farm scientists according to the constraints faced by them in transfer of technology through radio

S. No.	Constraints	Number (n=88)	Perce-ntage
1.	Inadequate time for preparation	16	19.51
2.	Less opportunity is given from radio officials as concerned filed of specialization	14	17.07
3.	Practical oriental programmes and research finding not broadcasted	11	13.41
4.	Inadequate computer facilities with secretarial assistance	10	12.20
5.	Lack of freedom in decision making with regard to position	8	9.76
6.	Lack of knowledge in writing script for radio	6	7.32
7.	Non availability of required facilities for recording field based farm programmes	4	4.88
8.	Inadequate latest literature in the library	2	2.44
9.	Lack of communication from university authority	1	1.22

Constraints faced by farm scientists in transfer of technology through television

It is observed from Table 6 that 'Less opportunity were given from television officials to telecast as concerned field of specialization' (19.05%) and 'lack of service of the artist, photographer, etc. in the office for preparing visuals for television programmes' (15.87 %) were the major constraints faced by the farm scientists in transfer of technology through television whereas, 14.29 per cent of farm scientists expressed the constraints 'inadequate of knowledge about script writing'.

Table 6: Distribution of farm scientists according to the constraints faced by them in transfer of technology through television

S. No.	Constraints	Number (n=88)	Perce-ntage
1.	Less opportunity is given from television officials to telecast asconcerned field specialization	12	19.05
2.	Lack of services of the artists, photographer, etc. in the office for preparing visuals for television programmes	10	15.87
3.	Inadequate knowledge about script writing	9	14.29
4.	Practical oriented programmes and research findings not properly telecasted	7	11.11
5.	Inadequate computer facilities with secretarial assistance	6	9.52
6.	Lack of freedom in decision making with regards to position	5	7.94
7.	Non availability of require facilities for preparation of CD radio cassette of field based farm programmes	3	4.76
8.	Inadequate latest literature in the library	3	4.76
9.	Lack of communication from university authority	2	3.17

In addition, some other constraints expressed by the farm scientists were 'practical oriented

programmes and research findings telecasted' (11.11 %) and 'inadequate computer facilities with secretarial assistance' (9.52 %).The other constraints face by the farm scientists were 'lack of freedom in decision making with regards to position' (7.94 %) and 'non availability of required facilities for preparation of CD, video cassette of field based farm programme' (4.76 %). Few scientist stated 'Inadequate latest literature in library' (4.76 %) and 'lack of communication from university authority' (3.17 %) However, these constraints could have been overcome by the farm scientists by consultating the higher authorities and proper linke with television station.

Conclusion

Creation of farm technology and its dissemination are equally important for modernization of agriculture. Radio, T.V. and multimedia have great potential in dissemination of farm technology if used efficiently. The study reveals important findings in terms of use of these electronic media and constrains faced by farm scientist in their use which if addressed cautiously could be overcome.

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Relationship of Socio-Personal and Economic Variables with Gain in Knowledge in Nutrition Training Programme

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Abstract

The study investigated the relationship of socio-personal and economic profile of renal women with gain in their knowledge from nutrition training programme in Samastipur district of Bihar. The findings revealed low literacy level of the respondents and declining trend of joint family. Majority of the respondents possessed marginal size of land had 1 to 4 animals under possession and had low income level. The age was observed to have negative association with the acquisition of knowledge in training programme. However, caste, family type, family size, occupation, heave type, possession of animals were not found to have significant correction with given in knowledge.

The present knowledge level of the poor rural women about healthcare, nutrition and hygiene was very poor. Their knowledge about nutrition is very important to achieve nutritional security of the family and nation at large. Poverty hits hardest at the female half of humankind. Women living in a rural area of a developing country are likely to be poorer than men, more vulnerable, own no land, are less educated and in poorer health. A girl may be deprived of schooling and literacy for no other reason than that she is female. Seventy per cent of poor women in India cannot read or write. Illiteracy often excludes people from written knowledge and decision-making. Female schooling can lead to a reduction in poverty by giving women the literacy skills and confidence they need to have. A mother's education often leads to better health and nutrition for her children. Removing gender inequalities is not only morally right; it is good for economic growth and development. One of the best epidemiological findings is that the prevalence and distribution of diseases is strongly influenced by economic factors, Shakuntla and Charman (2000). With the improvement in economic conditions, people are better able to take care of their health problems. Social and educational development also improves the living condition and the health status of the population. Present study was undertaken with the objective to study the socio-personal and economic characteristics of rural women and to find out relationship between these variables with gain in knowledge by nutrition training programme.

Methodology

The present study was undertaken in the Sarairanjan Block of Samastipur District of Bihar State. For the study three villages were selected in Sarairanjan block randomly. Twenty five women participants of nutrition training programme were selected from each selected village. Therefore, a total of 75 respondents were selected. The data were collected with the help of interview schedule. Interview schedule was formulated

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to elicit information about the age, education, caste, types and size of family, occupation, land holdings, livestock possession, income, type of house, social participation and cosmopoliteness.

Results and Discussion

Table 1: Socio-personal and economic profile of the respondents

S. No.	Variables	Frequency	%	Mean	Range
1.	Age group of respondents				
	18-26	44	58.66		
	27-35	23	30.66	31.39	18-45
	36-45	08	10.66		
2.	Education of respondents				
	Illiterate	27	36.00		
	Can read only	08	10.66		
	Can read & write	12	16.00		
	Primary	06	8.00	2.10	
	Middle	07	9.33		
	High School	10	13.33		
	Above metric	05	6.66		
3.	Education of the respondent's husband				
	Illiterate	04	5.33		
	Can read only	00	0.00		
	Can read & write	11	14.66	4.04	
	Primary	13	17.33		
	Middle	15	20.00		
	High School	10	13.33		
	Above metric	22	29.33		
4.	Caste				
	General	30	40.00		
	Backward	42	53.33		
	Schedule Caste	03	46.33		
5.	Type of family				
	Nuclear	14	18.66		
	Joint	30	40.00	7.6	
6.	Size of the family				
	Small (up to 4 members)	14	18.66		
	Medium (5-8 members)	30	40.00	7.6	
	Large (more than 8 members)	31	41.33		
7.	Occupation of respondents				
	Agriculture labourer	03	4.00		
	Caste occupation	02	2.66		
	Business/independent profession	04	5.33		
	Service	03	4.00		
	Housewife	75	100.00		
8.	Occupation of respondent's husband				
	Agricultural labourer	23	30.66		
	Caste Occupation	12	16.00		
	Business/independent profession	11	14.66		
	Farming	29	38.66		
	Service	27	36.00		
9.	Size of land holding				
	Landless	27	36.00		
	Marginal (up to 2.5 acres)	31	41.33	3.39	
	Small (2.5-5.00 acres)	14	18.66		
	Medium (5.1-10.00 acres)	03	4.00		
	Large (more than 10.00 acres)	00	0.00		
10.	Livestock possession				
	No animal	19	25.33		
	1 to 4 animals	53	70.66	1.41	
	5 to 8 animals	03	4.00		
11.	Family income per annum				
	Below poverty line (11,000)	01	1.33		
	Very low (11,0001 to 25,000)	11	14.66		
	Low (25,001 to 50,000)	43	57.44	6026.66	
	Medium (50,001 to 75,000)	13	17.33		
	High (75,001 and above)	07	9.33		
12.	Type of house				
	Katcha	30	40.00		
	Mixed	12	16.00		
	Pucca	33	44.00		
13.	Social participation				
	No membership	31	41.33		
	Members of one organization	32	42.66	0.74	
	Member of more than one organization	12	16.00		
14.	Cosmopoliteness				
	Low	33	44.00		
	Medium	36	48.00	4.33	
	High	06	8.00		

Age

It is clear from the table that a maximum of 58.66 per cent of the respondents were in the age group of 18-26. The lowest percentage of respondents were in the age group of 36-45. Thus, on the while, 90 per cent respondents were not more than 35 years. The table further indicates that mean age of the respondents were 31.69.

Education

Education in rural areas is one of the most important factors, which assesses the success and failure of the implementation of rural development programmes. The Table 1 reveals that 36.00 per cent of the respondents were illiterate, 16.00 per cent respondents could read and write, 13.33 per cent respondents were matriculate followed by 10.66 per cent who could read only, 9.33 per cent and 8.00 per cent respondents who were educated up to middle and primary level respectively. While only 6.66 per cent of them were above matric. Thus, altogether only 20 per cent of the respondents were matriculate and above. The literacy among the respondents was not very encouraging.

Education of the respondents husband

The Table 1 reveals that 29.33 per cent of respondents husband were above matrix, 20.00 per cent were middle level and 17.33 per cent were primary, 14.66 per cent could read and write only, followed by 13.33 per cent and 5.33 per cent respondents husband who were matriculate and illiterate respectively. Thus, altogether 44 per cent of the respondents husbands were matriculate and above. The literacy level among them was also not very encouraging.

Caste

It is clear from the Table 1 that 56.00 per cent belonged to backward caste. (Annexure-I and Annexure-II). 40 per cent of the respondents belonged to general caste. But, representation of other caste is also conspicuous as represented by 4 per cent of schedule caste as the criteria for the selection of respondents was willingness to participation in training. The data reveals that whereas backward caste category women showed much interest in participating in nutrition training, very negligible percentage in schedule caste had felt need for participation in nutritional training. It may be attributed due to low literacy rate among them.

Type of family

Family type is one of the important social factors which affects the type of activity as well as the decision making process in the family. It has been assumed that nuclear family makes decision more quickly and takes more responsibilities and risk as compared to joint family resulting in larger participation of nuclear family in nutrition training programme. Therefore, this variable was also included in the study. Conforming this fact the Table 1 reveals that a majority of 53.33 per cent respondents belonged to nuclear type of family and rest 46.33 per cent had joint family showing the declining trend of joint family system even among rural society.

Size of family

An observation of this Table 1 indicates that 41.33 per cent of the respondents had medium size family i.e. having more than 8 members in the family. While 40.00 per cent had medium and only 18.66 per cent had small family. Hence, it can be inferred that majority of respondents have large and medium size family.

Occupation of the respondents

Occupation of the beneficiaries was considered as an important factor which largely affects the economic condition of the family. It is revealed from the Table 1 that all most all respondents had engagement in their household activities, while 5.33 per cent of them were also engaged in business/independent profession. This was followed by 4.0 per cent who were service holders, 4.0 per cent agricultural labourer and only 2.66 per cent of them in their respective caste occupation.

Occupation of respondent's husband

Occupation of the husband is also one of the major component which affects the economic condition of the family.

It is clear from the Table 1 that 38.66 per cent of the respondents husbands were engaged in farming while 36 per cent of them were service holders. It was followed by 30.66 per cent engaged in agricultural labourer, 16 per cent who had their own business or other independent profession and 14.66 per cent who were engaged in their respective caste occupations.

Size of land holding

Land is used as income generating asset in rural areas. It serves as a base for successful implementation of nutrition training programme, because it provides cushion to respondents in taking risk in participating in new programme. It is observed from the Table 1 that majority of the respondents (41.33 per cent) possessed marginal size of land while 36.00 per cent were landless i.e. they did not have land at all for cultivation. It was followed by 18.66 per cent and 5.33 per cent respondents who were found to be from small and medium farm families respectively. None of the respondents had large size of land holding.

Livestock possession

Possession of animals as a variable was also included in the study. It is evident from the table that majority of the respondents (70.66 per cent) possessed 1 to 4 animals, while 25.33 per cent of them did not possessed any animal like cow, buffalo, goat and hen. Only 4.00 per cent of them possessed 5 to 8 animals. Hence, it can be concluded that most of the beneficiaries were having 1 to 4 animals under their possession.

Family income per annum

The findings reveal that the income of family led to significant influence on socio-economic status of the respondents. It is considered that family income is the most important factor in determining the socio-economic condition of nutrition training of programme beneficiaries. The income of the respondents family ranged from 11,000 to more than 75,001. Maximum percentage of the respondents (57.33 per cent) belonged to low income group followed by 17.33 per cent respondents who belonged to medium income group. 74.66 per cent to very low income group while 9.33 per cent respondents had their annual income Rs. 75,001 and above. Only 1.33 per cent respondents had their annual income up to 11,000.

Hence, it is concluded that more than half of the respondents had income level of Rs. 25,001 to Rs. 50.000 per annum.

Type of house

Type of residential house is one of the major components to judge the socio-economic status of the respondents and their family. From the Table 1 it is clear that 44.00 per cent respondents had pucca type of house followed by 40.00 per cent respondents who had katcha type of house, while only 16.00 per cent respondents had mixed type of house.

Social participation

Participation of respondents had been seen in different organization such as panchayat, co-operative society, youth club, Mahila Mandal and others. The findings revealed that majority of respondents (42.66%) were the members of one organization, 41.33 per cent respondents were not members of any organization and only 16.00 per cent respondents were members of more than one organization. Therefore, it can be said that the amount of social participation among the majority of respondents are only in one organization.

Cosmopoliteness

It refers to the degree of mass media exposure and extension contact of the respondents. Cosmopoliteness is considered as an important factor which largely affects the nutrition training programme. It can be observed from the table that 48.00 and 44.00 per cent respondents had medium and low level of cosmopoliteness score respectively. Only 8.00 per cent respondents had high level of cosmopoliteness scores. The mean of 4.33 is indicative of the fact that the farmers in general had low level of cosmopoliteness.

The Table 2 reveals that out of fourteen variable studied, as many as seven variables were found statistically corrected with the gain in knowledge of nutrition training programme. These variables are age, education of respondents, education of respondent's husband, land size, social participation, income and cosmopoliteness. All the seven correlated variables were found to be highly significant at 0.01 level of probability.

Table 2: Correlation co-efficient between social-personal and economic variables and gain in knowledge of nutrition training programme

S. No.	Independent variables	Value of correlation co-efficient (r) of the gain in knowledge
1.	Age	- 0.3138**
2.	Education of respondents	0.3098**
3.	Education of respondent's husband	0.4533**
4.	Caste	0.0070
5.	Family type	0.2194
6.	Family size	0.1166
7.	Occupation of respondents	0.1254
8.	Occupation of respondent's husband	0.0938
9.	Land Size	0.2810**
10.	House type	- 0.1149
11.	Possession of animals	- 0.0455
12.	Social Participation	0.6082**
13.	Income	0.6924**
14.	Cosmopoliteness	0.4585**

**Significant at 0.01 level of probability

The respondent's age was observed to have negative association with the acquisition of knowledge of nutrition training programme. It can be inferred from such data that respondents of young age group acquire more knowledge towards nutrition. This finding was in conformity with the findings of Srivastava and Rathor (1983), Devi (1997), Kale, Ghotal and Virkhare (1999).

The variables caste, family type, family size, occupation, house type, possession of animals were not found to have significant correlation with the gain in knowledge about nutrition training programme. The effects of these variables were found non-significant. This finding was in agreement with the findings of Singh and Verma (1987)

Conclusion

Respondent's of young age groups acquire more knowledge towards nutrition. Education is key to success. Educated respondents are more likely to have more interest in acquiring the knowledge of the nutrition training programme, therefore, higher the education of a family, higher would be the knowledge of nutrition training programme. Size of holdings was also expected to increase interest among the trainees to gain more knowledge of the nutrition training programme because larger the farm size greater would be the ability to take risk and this risk taking ability, in turn, would motivate the trainees to acquire greater degree of knowledge. The respondents having higher income had greater degree of knowledge in training. Social participation was also expected to increase interest among the trainees to gain more knowledge of the training programme because maximum the social participation greater the motivation of the trainees to acquire knowledge. The respondents having more sources of information about nutrition practices had frequent contact with nutrition scientists and other personnel and had more knowledge as compared to the respondents who utilized fewer sources and had less contact with such extension agencies.

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Adoption Status of Chemical Weed Control in Wheat in Sirsa District of Haryanan

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Abstract

The present study was undertaken in Sirsa district of Haryana state with a sample of 120 wheat growers to study the adoption status of chemical weed control for the wheat crop. The finding revealed that the adoption status of chemical weed control was at moderate level. Majority of the respondents had fully adopted the recommended weedicides and method of application of weedicides. The variables like education, socio-economic status, knowledge level of farmers about weedicides, mass media exposure, extension contact, scienticism & weed infestation were found significantly associated with adoption status of chemical weed control of wheat crop.

Weeds have been associated with the crops since inception of agriculture. It has been recognized that crop production has been a continuous struggle with weeds because they compete with crop plants for water, nutrients, light and space. Without good weed control, better and profitable crop production is indeed difficult. With the advent of modern crop production technologies, wheat production has increased few folds. In the process, weed problem has also increased. After green revolution with the large scale adoption of dwarf wheat genotypes along with improved irrigation and fertilizer application, weed flora has undergone a considerable change. The losses caused by weeds in these dwarf genotypes are considerable and to achieve full yield potential of wheat crop, weed management is a must. The conventional method of manual weeding in wheat has not been efficient for control of weeds because of their morphological similarity with the crop until flowering, severe infestation of weeds, scarcity of labour, infestation of weeds within rows etc. To get rid of these problems, the chemical weed control appears to be the only solution as it is efficient, less time consuming and labour saving.

In spite of the benefits of chemical weed control for wheat crop, its adoption in Haryana state has not been as encouraging with the farmers as it should be. In order to enhance the adoption of chemical weed control, it was considered necessary to know the present status of adoption of recommended weedicides for wheat crop in Haryana.

Methodology

The present study was conducted in purposively selected Sirsa district of Haryana state as this district was highest area and production of wheat. A multistage random sampling technique was followed to select the wheat growers for data collection. Two blocks, namely, Sirsa and Nathusari Choupta were selected randomly from the selected district. Four villages were selected randomly from two blocks followed by random selection of 30 farmers from each village. Thus a total sample size of 120 respondents was selected for the study.

Adoption status was measured with the help of schedule developed in accordance with recommended

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package of practices for weed control for wheat crop by CCSHAU, Hisar. The schedule so developed was thoroughly examined by the expert scientists of the university. To ascertain the adoption status the farmers were asked about actual use of each and every recommendations concerning chemical weed control for wheat crop. The response of farmers about adoption of chemical weed control for wheat crop were obtained on three point continuum i.e. 'full adoption', 'partial adoption' and 'no adoption'. Where ever, the three point continuum method was not possible, the response of farmers was obtained as 'yes' or 'no' and score of 1 for 'yes' and 0 for 'no' were assigned. The data so collected were tabulated and analyzed by using appropriate statistical techniques.

Results and Discussion

The adoption of chemical weed control practices varies from individual to individual and aspect-wise also. An attempt has been made in the present study to find out the adoption status of chemical weed control in wheat-crop. The findings obtained are presented in the following sub heads:

Overall adoption status

The respondents were categorized into low, medium and high adoption categories on the basis of their adoption score. Their distribution is given in Table 1.

Table 1: Overall adoption status of farmers about chemical weed control in wheat crop

N= 120

S. No.	Category	Score Range	Frequency	Percentage
1	Low	8-15	23	19.17
2	Medium	16-23	65	54.17
3	High	24-31	32	26.66

Mean adoption score: 19.9 Adoption score range: 8-31

Perusal of the data presented in Table1 revealed that majority (54.17%) of the respondents had a medium level of adoption status of recommended chemical weed control for wheat crop. Only 19.17 per cent of the respondents fall in low adopters category, while about 22.66 per cent had high adoption of the recommended chemical weed control practices. The overall adoption scores of the respondents ranged from 8 to 31 having mean adoption score 19.90 against the maximum possible adoption score of 45 and the minimum possible score was zero. The mean adoption (19.9) of farmers about chemical weed control for wheat crop was 64.19 per cent, which may be considered as moderate level of adoption.. These findings are also supported by Singh (1998) who reported that majority of the respondents fall in medium level of adoption category.

On the basis of above findings it can be concluded that farmers are using chemicals for the control of weeds in wheat crop but they are yet to adopt full recommendations. The major reasons for non adoption/partial adoption were due to non–application of weedicide at proper time, dose, water required per acre for spraying, method of spraying. Few farmers were adopting broad cast method which was also not recommended. Therefore, it is suggested that there is need to put extensive efforts to motivate farmers to adopt recommended chemical weed control for wheat crop.

Extent of adoption of chemical weed control

It was felt that adoption of chemical weed control by farmers might not be uniform in wheat crop. Therefore, the recommended practices for chemical weed control in wheat crop included in the study to determine the extent of adoption were divided into four components namely adoption of recommended weedicides, recommended dose of weedicides, time of their application and method of application of weedicides by the respondents. The results so obtained on component wise extent of adoption have been presented in the Table 2.

Table 2: Extent of adoption of chemical weed control

N= 120

S. No.	Practice	Adoption status		
		Full Adoption	Partial Adoption	No adoption
1	Adoption of recommended weedicides	85 (70.83)	27 (22.50)	8 (6.67)
2	Recommended dose of weedicides	41 (34.17)	67 (55.83)	22 (18.13)
3	Time of application	33 (27.50)	76 (63.33)	11 (9.17)
4	Method of application	86 (71.66)	20 (16.67)	14 (11.67)

Figure in parentheses indicate percentage

Adoption of recommended weedicides

The study indicated that a significant majority of wheat growers (70.83%) had fully adopted the recommended weedicides for the control of weeds in the crop fields. The remaining 22.50 per cent had partially adopted and 6.67 per cent wheat growers had not adopted the recommended weedicides for the control of weeds. The possible causes for partial and non-adoption of recommended weedicides may be, exploitation of farmers by shop keepers, illiteracy, lack of finance and high cost of weedicides, adulterated weedicides and lack of demonstrations on proven improved technology. Therefore, the farmers needs to be educated by providing technical guidance and recommended weedicides at proper time and rate to the farmers.

Recommended dose of weedicides

It was observed from the Table 2 that more than half (55.83 %) of the respondents had partially adopted the recommended dose of weedicides, 34.17 per cent of respondents had fully adopted and18.13 per cent did not adopt it. The reason for partial/non adoption of recommended dose of weedicides might be due to lack of knowledge, high cost of weedicides and lack of technical guidance for application of weedicides.

Time of application

The study has brought out that 63.33 per cent had partially adopted and 9.17 per cent had not adopted the recommended time of application of weedicides which was so important to protect the wheat crop from the weedicides which may otherwise cause the heavy losses to crop if applied at wrong time. The remaining 27.50 per cent had fully adopted it.

Method of application

The knowledge and adoption of method of application of weedicides is one of the important aspects for proper use of weedicides. The method of application varies according to weedicide. Data shows that more than two-third of the respondents (71.66%) had fully adopted the recommended method of application of weedicides in wheat crop. However, there were 16.67 per cent respondents who had partially adopted and 11.67 per cent had not adopted the recommended method of application.

The available reports on technological gap in weed control of different categories of farmers indicated that more than half of the farmers were not practising weed control and it was more so in case of small farmers (Singh and Mathur, 1984).

Correlation between socio-psychological traits of respondents and their adoption status of chemical weed control for wheat crop

Further analysis was done in order to find out association and contribution of socio-psychological traits of respondents with their adoption status of chemical weed control for wheat crop. The zero order correlation was computed to determine the association between socio-psychological traits and adoption status of

chemical weed control of wheat growers. The results obtained have been presented in Table3. The study shows that the socio-economic status (r = 0.618) had positive and highly significant correlation (at 0.01 level of probability) with the adoption of recommended chemical weed control for wheat crop. These findings are in conformity with the results of Singh and Patel (1988) and Supe *et al.* (1990), who observed that socio-economic status had highly significant relationship with the adoption status. Since socio-economic status included several important traits, viz., education, caste, occupation, land holding, social participation, farm power, material possession, house type, family type, etc., it was likely to influence the rate of adoption on positive side. Therefore, who is having higher education, more farm power and material possession and higher personal contacts with other progressive farmers and farm functionaries etc., higher would be the adoption of recommended package of practices.

The perusal of data revealed that knowledge (r =0.341) had positive and highly significant relationship with adoption status. It is one of the most important components of human beheviour which urged the man to do what he knows in this mind. Similar findings were also reported by Jagtap (1995) and Kumar (1992) that knowledge had significant positive relationship with adoption of recommended practices in different crops. The study further revealed that mass media exposure (r=0.456) had positive and highly significant correlation (at 0.01 level of probability) with adoption status of chemical weed control for wheat crop. It implies that adoption status of the respondents increased with the increase in their frequency of exposure to the mass media. The similar relationship between mass media exposure and adoption has been reported by Harish (2002).

A perusal of the Table 3 shows that education of respondents had positive and significant correlation (at 0.05 level of probability) with the adoption of recommended chemical weed control practices of wheat crop (r=0.220) The findings of this study are in agreement with findings of Supe *et al*. (1990) who also observed that education had positive and significant relationship with the adoption of scientific recommendations. Accordingly, higher the level of education higher would be the adoption of improved technology. Therefore, the extension workers should try to take into account the educated farmers in the initial stages extension programmes for the success of any programme. The table reveals that operational size of land holding (r=0.0122) and adoption of chemical weed control for wheat crop have not been found to be significantly correlated. The findings of the study are in corroboration with the findings of Wasnik (1988) and Kumar A. (1991). However, Singh and Rajindra (1990) and Patwa (1993), reported that size of land holding had significant and positive correlation with adoption of improved technological practices.

Table 3: Correlation coefficient between farmers' adoption status and independent variables N=120

S. No.	Variables	Correlation coefficient
1	Education	0.220*
2	Operation size of land Holding	0.122
3	Socio-Economics status	0.618**
4	Knowledge level of farmers about weedicides	0.341**
5	Mass media exposure	0.456**
6	Extension Contact	0.524**
7	Scientism	0.222*
8	Weed infection	0.539*

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

Extension contact (r=0.524) had positive and highly significant correlation (at 0.01 percent level of probability) with adoption of recommended chemical weed control for wheat crop. This shows that more contact between farmers and the extension functionaries more would be the adoption of recommended practices. This variable in fact is an educational input to farmers to

get new information regarding agricultural technology. Adoption takes place only after the farmer is fully convinced about its relative advantage. Extension contacts play an important role in this process of adoption. The findings of this study are in confirmation with the findings reported by Harish (2002).

It is clear from the Table 3 that scienticism was positively and significantly correlated (r=0.222) with adoption of chemical weed control for wheat production. This psychological variable was taken to see whether farmers are ready to adopt scientific technology or not, and found that a majority of farmers agree with the scientific techniques. The study reveals that weed infestation(r=0.539) had positive and significant (at 0.05 level of probability) relationship with adoption of chemical weed control for wheat crop. This shows that higher the weed infestation in the fields of the wheat higher will be adoption of chemical weed control for wheat crop.

Conclusion

Based on the findings of the study, it can be concluded that majority of the respondents had medium level of adoption status of chemical wed control. The component wise adoption analysis revealed that majority of wheat growers fully adopted the recommended weedicides and its method of application. However, the respondents had partially adopted the recommended dose of weedicides and its timely application. The correlation between over all adoption of chemical weed control for wheat crop of respondents and socio-economic variables reveals that education, socio-economic status, knowledge level of farmers about weedicides, mass media exposure, extension contact have positive and significant relation with the adoption status. The study indicated that a significant majority of respondents had not adopted the chemical weed control for wheat crop fully. Therefore, it would be worth while for the extension functionaries to organize trainings, demonstration and also take up different education programmes so that the farmer can get required information and skills to adopt the recommendation.

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Profile of Women Entrepreneurs : Indicators of Empowerment

Veenita Kukmari

Abstract

Socio-personal and economic profile of women entrepreneurs have a significant role to play in their empowerment. A study was conducted as part of 'Intra Mural Research Project' funded by Central Agricultural University in West Garo Hills district of Meghalaya. The study revealed that overall socio-personal and economic level of the respondents was medium level for 80.67% of the respondents. The correlation coefficient (r) between attitude and socio-personal and economic score of the respondents was non-significant (0.035), attitude and age was slightly significant (0.228) and non-significant association between attitude and educational level (0.0809) was found. The Chi-square test showed that age and education of the respondents were not having any significant association with their economic, social and political empowerment. However, the association of income of the respondent was significant with economic and social upliftment but non-significant with political upliftment.

Women entrepreneurs have been making considerable impact in all segments of the economy. It has been firmly established that women in India are vital and productive contributors to the national economy but their access to knowledge, skills, resources, opportunities and power still remain rather low. Overall development of women entrepreneurs and their enterprise depends upon the degree to which these women are involved in various aspects related to the managing of the enterprises. Various socio- economic and demographic characteristics have significant impact on involvement of women entrepreneurs in their enterprise management. It summarises that entrepreneurial development is a function of person in interaction with the environment. The support of entrepreneurship is being provided both at governmental and non- governmental level, since it increases the social and economic status of women, especially with reference to Indian condition.

The major discussion of empowerment process pertains mainly to the profile of women workforce, status of female – headed households, policies and programmes related to women, empowerment of women through literacy and women in Panchayat. Women empowerment has to be understood through these dimensions conjointly rather than in isolation. The hidden entrepreneurial potentials of women have gradually been changing with the growing sensitivity to the role and economic status in the society. The personal characteristics of an entrepreneur contribute to the success and results in achievement motivation (Desai, 2005).

The relationship between profile of women entrepreneurs and the level of their empowerment is a dimension to be examined. Hence, the objective of the study was to determine the profile of women entrepreneurs and to establish relationship between attitude of women entrepreneurs towards SHPIs and also to establish relationship between selected socio-economic characteristics of the respondents and the level of their economic, social and political empowerment.

Methodology

The study was conducted in the West Garo Hills district of Meghalaya. Data was collected from 150 respondents covering 30 villages with the help of well-

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structured and pre-tested interview schedule. In order to assess socio- personal and economic profile of women entrepreneurs associated with Self Help Group (SHG), some questions pertaining to the variables like age, caste, educational qualification, occupation, family size, land holding, social participation, background information related to SHG organization, motivational factors for being entrepreneur, reasons for running an SHG etc. were included in the interview schedule. Statistical tools like correlation coefficient (R) and Chi-square test were utilized to establish relationship between their profile and economic, social and political empowerment as well as attitude of the respondents towards their SHPIs. Other statistical tools like mean, percentage and S.D. were applied for meaningful interpretation.

Results and Discussion

Socio-personal and economic profile of the respondents

A perusal of data in Table 1 reveals that majority of the respondents (61.33%) were middle aged, married (99.33%) and having medium level of education (56.67%) and living in rural areas (90%). All of them had nuclear family of which majority of them (60%) had medium size of family i.e. 3-4 No. of children. 72% of the respondents were SHG members, remaining were office bearers, treasurers or secretary in SHG.

Table 1: Socio-personal and economic profile of women entrepreneurs

(N=150)

S. No.	Variables	Frequency	Percentage
1	Age		
	(a) Young	28	18.67
	(b) Middle	92	61.33
	(c) Old	30	20.00
2	Educational level		
	(a) High	04	2.67
	(b) Medium	85	56.67
	(c) Low	61	40.67
3	Marital Status		
	(a) Unmarried	01	0.67
	(b) Married	149	99.33
4	Occupation of respondent		
	(a) SHG member	108	72
	(b) SHG officer, Treasurer, Secretary	42	28
5	Occupation of husband/father		
	(a) Farmer	77	48.00
	(b) SHG member/Business	55	36.67
	(c) Govt. Servant	23	15.33
6	Area		
	(a) Rural	135	90.0
	(b) Urban	15	10.0
7	Family Type		
	(a) Nuclear	150	100
8	Family Size		
	(a) Big	26	17.33
	(b) Medium	90	60.00
	(c) Small	34	22.67
9	Land Holding		
	(a) Landless	47	31.33
	(b) <1 hectare	03	2.00
	(c) 1.0 - 2.0 hectare	59	39.33
	(d) 2.1-4.0 hectare	38	25.33
	(e) Above 4.0 hectare	03	2.00
10	Material Possession		
	(a) High	8	5.33
	(b) Medium	102	68.00
	(c) Low	40	26.67
11	Membership of any other organization except SHG		
	(a) Yes	1	0.67
	(b) No	149	99.33
12	Skill oriented /entrepreneurship related training		
	(a) Yes	123	82.00
	(b) No	27	18.00
13	Annual Income of respondent		
	(a) Low	6	4.00
	(b) Medium	133	88.67
	(c) High	11	7.33
14	Annual Income of respondent's family		
	(a) Low	25	16.67
	(b) Medium	125	83.33
	(c) High	0	0

Their husbands of 48 percent respondents were farmers. Almost every respondent (99.33%) was not associated with any other organization except SHG. Most of the respondents (39.33%) had small size of

land. 68% percent of the respondents had medium level of physical facilities at home. Their annual income from SHG and total annual income of the family was medium for majority of the respondents i.e. 88.67% and 83.33% respectively. Cent percent of them didn't have any experience before establishment of the SHG. As such 82% of them had attended skill oriented/entrepreneurship related training organized by the SHPIs.

The respondents were asked to indicate the factors both internal and external which motivated them to enter into this enterprise. From the results of Table 2 it is observed that majority of the respondents (98%) had reported 'strong urge to do some independent job' as the internal factor to enter into SHG while majority of them (31.33%) indicated any other factor (not listed in the table) as external factor motivating them to enter into SHG. It means that they consider some other external factor in exception to those listed which drove them into this enterprise. Whereas 29-33% of the respondents indicated Good attitude/policy as external factor to enter into SHG.

Table 2: Factors motivating entry into enterprise

N = 150

S. No.	Factors	Frequency(%)
1	**Internal Factors**	
	(a) Strong urge to do some independent job	147(98.00)
	b) Technical knowledge/expertise	01(0.67)
	c) Business experiment in the same line	02(1.33)
2	**External Factors**	
	a) Govt. attitude polity	44(39.33)
	b) Availability of machinery on hire or purchase	04(02.67)
	c) Financial assistance from NGOs	16(10.67)
	d) Heavy demand for the product	03(02.00)
	e) High Profit factor	36(24.00)
	f) Any other	47(31.33)
	Total	**150(100)**

The respondents were asked to rank the reasons which in their opinion have strengthened women entrepreneurship. The result is given in Table 3.

Table 3: Reasons which have strengthened women entrepreneurship

(N = 150)

S. No.	Reasons	Frequency	Percentage	Rank
1	Increased education of women	146	97.33	I
2	Increased success of women	106	70.67	II
3	Equality status of women	96	64.00	III
4	Increased social recognition to women	72	48.00	IV
5	Increased rate of women in economic development	70	46.67	V
6	Automation of household activities	67	44.67	VI
7	Increased social freedom and liberty to women	51	34.00	VII
8	Increased women activities	47	31.33	VIII

It was found that 97.33% of the respondents had ranked 'increased education of women' as first rank which has strengthened women entrepreneurship followed by increased success of women (70.67%), equality status of women (64%), increased social recognition to women (46.67%), automation of household activities (44.67%), 'increased social freedom and liberty to women (34%), and increased women activism (31.33%) as II, III, IV, V, VI. VII and VIII rank respectively.

The respondents were also asked to indicate the areas in which they had more entrepreneurial abilities. The result is presented in Table. 4.

From the findings of the table, it is observed that 'fruits and vegetables preservation' was reported at rank I by 52% of the respondents. Other areas of entrepreneurial opportunities as reported by the respondents in declining order are 3P's (Pickle, Powder and Papad), Garments and Textile items, Weaving, Bamboo industry, Interior decoration, Art and craft industry, Interior designing and Nursery raising at rank II, III, IV, V, VI, VII, VIII and IX respectively. It suggests that still fruits and vegetable preservation and 3P's stand at priority for women enterprise. It may be because they have more skill for it than any other enterprise.

Table 4: Areas in which women have entrepreneurial opportunities

(N = 150)

S. No.	Areas of enterprise	Frequency	Percentage	Rank
1	Fruits and vegetable preservation	78	52.00	I
2	3P's (Pickle, Powder (spice) and Papad)	76	50.67	II
3	Garments and Textile items.	74	49.33	III
4	Weaving.	74	49.33	IV
5	Bamboo industry.	66	44.00	V
6	Interior decoration.	65	43,33	VI
7	Art and crafts industry (Soft toys, candle making, flower making etc.).	58	'38.66	VII
8	Interior designing.	57	38.00	VIII
9	Nursery raising.	56	37.33	IX

Overall socio-personal and economic level of respondents

The total score for socio-personal and economic level obtained by the respondents was calculated. Based on their score they were categorized into three categories i.e. low, medium and high which is depicted in Table 5.

Table 5: Socio-personal and economic score of the respondents

(N = 150)

S.No.	Total Score	Frequency	Percentage
1	High	19	12.67
2	Medium	121	80.67
3	Low	10	06.67

The result signifies that the respondents in general (80.67%) had medium level of socio-personal and economic score. It is also interesting to note that only 6.67% of the respondents had low level of socio-personal and economic characteristics. It means that the profile of the women entrepreneurs was average in nature.

Correlation between attitude and socio-personal and economic characteristics of the respondents

Respondents were given a set of 10 statements on the attitude of women entrepreneurs towards SHPIs. They were asked to indicate their opinion on a five point continuum scale. Attitudinal score was obtained based on their response. A correlation coefficient was computed between the attitude and overall socio-personal and economic score of the respondents as also with the age and educational level of the respondents. The result is depicted in Table 6.

Table 6: Correlation coefficient between attitude and selected variables

S. No.	Variables	Correlation coefficient (r)
1	Socio-personal and Economic	0.035*
2	Age	0.228**
3	Educational level	0.0809*

*Non-significant; **Significant

It is observed from the results of table No. 6 that the age and attitude of the respondents is positively correlated and is slightly significant. It means that the elder women entrepreneurs had more favourable attitude of the respondents towards SHPIs. It may be because as they grow old they become more mature and develops appropriate attitude.

However attitude of the respondents is not significant with the overall socio-personal and economic score of the respondents as well as their educational level.

Chi-square analysis

Chi-square test was done between the parameters of age, education and income of the respondents with the level of upliftment in their economic, social and political status. The findings of the table is depicted in Table 7.

Table 7: Chi-square between independent variables and dependent variables

S. No.	Independent Variable	Dependent variable	Chi-Square value
1	Age	Economic	6.397 (NS)
2		Social	8.570 (NS)
3		Political	5.209 (NS)
4	Education	Economic	2.767 (NS)
5		Social	3.955 (NS)
6		Political	1.076 (NS)
7	Income	Economic	14.79 (S)
8		Social	116.79 (S)
9		Political	9.130 (NS)

NS= Non –significant ; S = Significant (P<0.01)

From the above table it is found that the income level of the respondents is significant with their economic and social upliftment which is evident from their Chi-square value of 14.79 and 116.77.

It explains the fact that respondents with medium level of income had medium level of upliftment in their economic and social status. Whereas respondents even with low income had high level of upliftment in economic and social status as a result of the efforts of these SHPIs.

The result also highlights that other parameters like age and education is not significant with economic, social and political upliftment of women entrepreneurs as is evident from their Chi-square values.

Conclusion

It is concluded that the respondents had medium level of socio-personal and economic characteristics. Attitude of the respondents towards SHPIs was positively and significantly correlated with the age of the respondents. Income of the respondent was significant with their economic and social upliftment.

To be successful in any enterprise, the socio-personal and economic profile of the entrepreneur is important. Also the respondents who were young, educated, having some skill orientation for entrepreneurship will facilitate them in their endeavours. Therefore, more young, educated, skilled but unemployed women should be encouraged to enter into entrepreneurship through SHG and support and sustain their family income.

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Constraints in Mobilizing Fish Farming Community for Scientific Aquaculture : Also Change Inside

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Abstract

The findings of the study pointed out that most of the respondents belonged to low socio-economic status categories who obtained technical information from TOT programme. They were encountering with various impediments in adoption of improved aquacultural technologies under the schemes of central/state government mainly implemented by Fish Farmers Development Agencies (FFDAs) in Tripura. The major impediments were poverty, high cost of inputs involved in fish culture and lack of need based training. Similarly the officials involved in TOT under the schemes were also facing the varieties of problems like lack of communication and transportation facilities, lack of infrastructural facilities and late communication of messages.

Despite of enormous water resources in North Eastern states including landlocked state Tripura, the present rate of fish production is much below the actual potential. Although a good progress has been made in India in the field of aquaculture, but so far as the transfer of aquaculture technology to the ultimate user is concerned the expected progress in terms of income and productivity of the fish farmers could not be achieved. It is estimated that only about 15-20 per cent of the total available water area is under scientific fish culture, in spite of vigorous efforts is being made by the line departments to disseminate the recent advances are under the Aquaculture Extension Services provided mainly through the Fish Farmers Development agency (FFDA) programmes. However, fish farmers still face a lot of constraints in adoption of improved aquaculture technologies. Wayal and Ingle (1994) reported that the lack of knowledge was the main constraints in increasing fish production and adoption of agricultural technology. The main constraints perceived by the farmers include poor transport, poor input supply, high cost of advocated technology and inadequate information. The review of the past activities of the programme reveals that adequate attention was not paid towards transfer of technology.

In view of the slow pace of adoption of scientific fish culture by the farming community, the present study was undertaken to asses the constraints experienced by the fish farmers in adoption as well as in transfer of the scientific fish culture by the State Fishery officials in Tripura State.

Methodology

The study was conducted in two purposively selected blocks i.e. Mohanpur and Dukali of West Tripura. A sample of 10 beneficiary villages (5 villages from each block) were selected randomly from the total list of villages covered by the technology transfer (TOT) programme of the State Dept. of Fisheries. From the complete list of TOT beneficiaries in the above villages, a random sample of 100 beneficiary farmers (proportionately allocated to each village) were finally chosen as respondents' sample of the present study to ascertain their constraints in adoption of improved aquaculture technologies.

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Further, 15 Fisheries officials of the State Dept. were also chosen to evoke their handicaps in the process of transfer of improved aquaculture technologies to beneficiary farmers. The primary data were collected from both the categories of respondents under their response categories; i.e. 'agree', 'indifferent ', and 'disagree assigning 3, 2 and I scores respectively. They were subjected to respond to one of the given responses against each statement depending on their level of constraints perception in adoption/transfer of the improved aquaculture technologies. Simple statistical tools like mean, percentage and rank order were used to interpret the result.

Results and Discussions

1. Distribution of the respondents on the basis of SES categories

Table 1: Classification of the respondents falling under different SES categories

(N=100)

S. No.	SES categories	Percentage of respondents
1.	Lower class (38 to 45)	57
2.	Upper lower class (45 to 49)	14
3.	Middle class (49 to 58)	26
4.	Upper Middle class (58 to 63)	3
5.	Higher class (Above 63)	00
	Total	**100**

The figures depicted in Table 1 indicates that more than 57 per cent respondents were in lower socio-economic class followed by 26, 14, and 3 per cent of respondents to middle class, upper lower class, and upper middle class respectively.

It is observed that most of the fish farmers under this study belonged to lower class category. This shows that their socio-economic status was low and also the income derived from fish farming was not sufficient to maintain their livelihood. Obiviously, they require dependence upon other sources of income for catering their daily needs and livelihoods.

Constraints perceived by fish farmers

In spite of the best efforts made by the TOT officials to help rural poor in uplifting their economic status, the fish farmers experienced several problems impediments in adoption of the technologies being transferred to them. These are presented in Table 2.

Table 2: Constraints perceived in adoption of improved aquaculture technology by fish farmers

(N=100)

S. No.	Constraints perceived	Mean score	Rank order
1.	Poverty	2.9	I
2.	Lack of need based training	2.7	III
3.	High cost inputs	2.8	II
4.	Lack of participatory approaches in extension activities	2.6	IV
5.	Not profitable	2.0	IX
6.	Faulty selection of beneficiaries under TOT prog	2.3	VI
7.	Delayed supply of inputs	2.2	VII
8.	TOT staff unable to solve the non technical problems of farmers.	1.9	VIII
9.	Lack of timely technical assistance	2.0	IX
10.	Undesirable intervention by local leaders to select the potential beneficiaries	2.6	IV
11.	Not yet convinced/motivated	2.3	VI
12.	Absence of extension literature	2.2	VII
13.	Lack of fallow-up activities	2.3	VI
14.	Inappropriate technology	2.0	IV
15.	Complexity of technology	1.7	III
16.	Not suited with available local resources	2.1	VIII
17.	Inadequate transportation and marketing facilities	1.7	XI
18.	Lack of required level of education & technical know-how	2.3	VI
19.	Small size & seasonal ponds	2.3	VI
20.	Poaching and poisoning	2.5	V

Table 2 presents the constraints in adoption of improved aquaculture technologies as perceived by the fish farmers. There were 20 constraints perceived by the respondents. Out of these constraints, poverty was ranked first (2.9), high cost of inputs was ranked second (2.8), lack of need based training was ranked third (2.7), 'Lack of participatory approaches in extension activities' and 'undesirable intervention by local leaders' to select the potential beneficiaries both were ranked fourth (2.6) and poaching and poisoning was ranked fifth (2.5). Other important impediments were: lack of required level of education & technical know-how, poor conviction/ motivation, small size & seasonal ponds, lack of fallow-up activities and faulty selection of beneficiaries under TOT proggramme, all these impediments were equally perceived by the respondents and ranked sixth (2.3), absence of extension literature, technology not suited with available local resources, inappropriate technology, inability of the TOT staff to solve the non technical problems of the farmers, complexity of technology and inadequate transportation and marketing facilities respectively. The table clearly shows that 'poverty' and high cost of inputs are major impediments in adoption of improved aquaculture technologies in Tripura. Fish farmers of this region can not afford high cost and input intensive technology basically fish feed which constitutes 50-60 percent of the total variable cost in fish farming. Low cost technology using appropriate combination of timely availability of raw material/inputs is other important factor in adoption/rejection of the technology and it must be suited with the locally available resources. Consequently, the poor economic status of the fish farmers has a bearing impact on the adoption of fish farming technologies.

Constraints faced by the officials in transfer of technology

The constraints in transfer of improved aquaculture technologies perceived by the officials of the State Department of fisheries are presented in Table 3. They perceived 15 associated constraints. Out of these constraints, lack of communication and transportation facilities was ranked first (3.0), lack of infrastructural facilities and failure in timely communication of messages were second (2.9) and inability to demonstrate with audio-visual aids was ranked third (2.6). High target set by the organization, uncommandable jurisdiction of coordinator were ranked fourth (2.5), non –aquacultural extension duties was ranked fifth (2.4).

Table 3: Constraints faced by the officials in transfer of technology

(N=15)

S. No.	Constraints perceived	Mean score	Rank order
1.	Delay in communication of messages at the right time act as barrier to the successful implementation of the programme	2.9	II
2.	Bureaucratic pattern of district administration	1.9	VIII
3.	Top level officials failed to provide adequate leadership to staff	1.5	XI
4.	Non –aquacultural extension duties	2.4	V
5.	Poor coordination with various development agencies	1.8	IX
6.	Lack of infrastructural facilities	2.9	II
7.	Demonstration with audio-visual aids	2.6	III
8.	Lack of communication and transportation facilities	3.0	I
9.	Inadequate budget provided by the Govt. for TOT programme	2.2	VII
10.	Inadequate availability of raw material/inputs	2.3	VI
11.	Lack of mobility	2.5	IV
12.	Un commandable block of authoritative control	1.7	X
13.	High target set by the organization	2.5	IV
14.	Uncommandable jurisdiction of coordinator	2.5	IV
15.	Scanty guidance by the superior	2.3	VI

Other important impediments were: inadequate availability of raw material/inputs and scanty guidance by the superior officials (2.3), inadequate budget

provided by the govt. for TOT programme, bureaucratic pattern of district administration; poor coordination with various development agencies and uncommandable block of authoritative control and failure of top level officials failed to provide adequate leadership to staff were other barriers in the process of technology transfer to fish farmers.

Conclusion

The present study was undertaken in two blocks of Tripura to assess the constraints experienced by fish farmers in adoption as well as in transfer of the scientific fish culture by the state fishery officials. Hence, it is suggested that fish farmers should get easy access to institutional credit of both short and medium terms, low cost technologies mainly based on locally available resources and need based capacity building initiative are priority area of immediate attention. In addition, the officials involved in TOT programme should also be fortified with the needed assistance viz., transportation and communication facilities, in-service training, effective guidance, adequate budget, timely supply of inputs to farmers etc. in the larger interest of the fish farming community.

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Constraints in Pigeonpea Production in Maharashtra

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Abstract

The study was conducted to identify the constraints in pigeonpea production in Maharashtra. For this purpose a survey was conducted in Akola district of the State which was representative of the main pulses growing zone of India. Three villages were selected randomly i.e. one from Akola taluka and two from Murtizapur talukas. A sample of 135 farmers were selected, of which, 90 farmers were from adopted villages and 45 farmers from non-adopted villages. The result of the present study was observed to identify the constraints in pigeonpea production. In last five years soybean, black gram, green gram were found replacing pigeonpea (12.59 percent). It is hypothesized that some constraints in pigeonpea production must be responsible for reducing the area of pigeonpea and it is observed that major constraints in pigeonpea were non-availability of good quality seed, high seed price and lack of information about recommended variety, high incidence of pest and disease, poor test which was analyzed by Garrett ranking method.

Pigeonpea (*Cajanus cajan* (L.) Millsp.) is one of the oldest and important pulse food crops and ranks fifth in importance among edible legumes of the world (Morton 1976). Pigeonpea is a tropical grain legume grown mainly in India**.** The major producers of pigeonpea in the world includes India, followed by Uganda, Tanzania, Kenya, Malawi, Ethiopia, and Mozambique in Africa; the Dominican Republic, Puerto Rica, and the West Indies in the Caribbean region and Latin America; Burma, Thailand, Indonesia, and the Philippines in Asia; and Australia (Sinha, 1977).

With low productivity from rainfed agriculture especially for all the food grains and pulses, the gap between the requirements and supply of food grains in the state has widened. Therefore, any attempt to bridge this gap would require a steady increase in the food grain production, especially cereals and pulses. In India, pigeonpea is one of the most widely cultivated pulse crops. The residual effect on a following cereal crop can be as much as 40 kg N/ha (Nene 1987).

Although if pigeonpea is an important pulse crop in Maharashtra, area under pigeonpea is decreasing over the last few years. Farmers are growing soybean, black gram, green gram in place of pigeonpea. Therefore, the present study has been made to assess the constraints responsible for declining production of pigeonpea in Maharashtra.

Methodology

In India, area under pigeonpea is highest in Akola district of Maharashtra. Therefore, for the present study Akola district was selected purposively in Maharashtra State. In Akola district, Akola and Murtizapur talukas were selected. Three sample villages were selected randomly i.e. one from Akola taluka and two from Murtizapur talukas. The sample size of 135 farmers were selected, of which, 90 farmers were from adopted village

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(seed and other input supply by University) and 45 farmers from the village's, adjacent to adopted villages.

The study was based on primary data and secondary data. Secondary data were collected from the public records, journals, and web portals. The primary data were collected from the sampled farmers through personal interview method using a well-designed and pre-tested interview schedule. The collected data were analyzed by using the weighted average, count, percentage analysis and garrett's ranking method.

Results and Discussion

A) Scenario of pigeonpea in the study area

It is seen from Table 1 that, most of the farmers of adopted villages were growing Maroti, Asha and Ganesh Variety of pigeonpea while in case of non-adopted village farmers grow only Maroti and Asha variety of pigeonpea. On overall basis farmers grow 5.39 percent area under Maroti variety, 3.98 percent area under Asha variety and 1.67 percent area under Ganesh variety of pigeonpea.

Table 1: Percent area under different varieties of pigeonpea

Varieties	Adopted	Non-adopted villages	Overall villages
1. Maroti	5.44	5.29	5.39
2.Asha	2.79	6.35	3.98
3.Ganesh	2.5	00	1.67

Table 2: Change in area of Pigeonpea in the last 5 years

Change in area	Adopted village	Non-adopted village	Overall
Decreasing	14(15.56)	3(6.67)	17(12.59)
Constant	76(84.44)	42(93.33)	118(87.41)
Total	90(100)	45(100)	135(100)

Figures in parenthesis shows percentage

The extent of change in area of pigeonpeas crop of selected farmers were studied by working out the number & percent of farmers. Out of 135 farmers, area under pigeonpea of 17 farmers (12.59 percent) has declined over the period of five years and area of 115 farmers (87.41 percent) were constant.

It is revealed from the Table 3, 14 farmers (10.37 percent) diverted sown area of pigeonpea towards soybean, 4 farmers (2.96 percent) shingled gram instead of pigeonpea, and 7 farmers (5.19 percent) has diverted area towards green gram.

Table 3: Crops replacing the pigeonpea in the last 5 years

Crops replacing	Adopted	Non-adopted	Overall
Soybean	11(12.22)	3(6.67)	14(10.37)
Black gram	4(4.44)	0(0.00)	4(2.96)
Green gram	7(7.78)	0(0.00)	7(5.19)

Figures in parenthesis shows percentage

Table 4 show, the constraints in purchasing the seeds and the major constraint was non-availability of seed of good quality. It was also expressed by farmers that some inert material were mixed in seeds and this was followed by high seed price. Further, expensive seeds were not affordable for them. Lack of information about recommended variety, non availability of required variety, need to travel long distance and non-availability of credit facilities were also the important constraints found at the time of purchasing the seeds.

The major problems faced by the pigeonpea growers were identified and ranked by using Garrett's ranking method (Garett *et al.*, 1969). The findings showed that high pest incidence was the major constraints followed by poor test. The third major constraint was high disease incidence, as it reflected on yield. Small grain size and long duration were also important constraints observed in available pigeonpea cultivars.

Table 4: Major constraints in purchasing seed of pigeonpea

Constraints	Adopted		Non-adopted		Pooled	
	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank
1. Lack of information about recommended variety	23.71	4	39.29	2	28.90	3
2. Non-availability of required variety	25.89	3	24.33	4	25.37	4
3. Seed is not of good quality (up to expectation level)	38.73	1	39.98	1	39.15	1
4. High seed price	28.13	2	32.71	3	29.66	2
5. Need to travel long distances	18.36	5	17.18	5	17.97	5
6. Credit facility not available	10.6	6	8.89	6	10.03	6

Table 5: Garrett scores for constraints in cultivars of pigeonpea

A/C	**Adopted villages**						**Non-adopted villages**							
Variety	**Maroti**		**Asha**		**Ganesh**		**Maroti**		**Asha**		**Ganesh**		***Pooled***	
Constraint*	**GS**	**R**	**GS**	**R**	**GS**	**R**	**GS**	**R**	**GS**	**R**	**GS**	**R**	**GS**	**R**
LY	6.81	7	10.92	5	0		9.39	7	0		0		7.85	7
HPI	46.77	1	50.17	1	56	2	47.45	1	69	1	0		47.69	1
HDI	27.35	3	7.75	8	73	1	25.5	3	50	2	0		25.69	3
LD	18.05	4	10.58	6	43	3	14.23	6	0		0		16.09	5
SGS	17.86	5	16.08	3	0		27.66	2	31	3	0		20.89	4
PC	9.34	6	11.17	4	0		16.64	5	0		0		11.62	6
PT	28.53	2	40.5	2	27	3	21.27	4	0		0		26.85	2
LRS	0.97	9	4.67	9	0		4	8	0		0		2.24	8
LMP	1.94	10	9.17	7	0		0.61	9	0		0		2.12	9
NFC	1	8	0		0		0		0		0		0.57	10
PFQ	0.65	12			0		0		0		0		0.37	12
SSP	0.75	13			0		0		0		0		0.43	11

*Note: GS=Garrett Score R=Rank

LY=Low Yield LD=Long Duration PT=Poor Taste NFC=Not Fit into Cropping System

HPI=High Pest Incidence SGS=Small Grain Size LRS=Low Recovery/Shelling % PFQ=Poor Fodder Quality

HDI=High Disease Incidence PC=Poor Colour LMP=Low Market Price SSP=Susceptible to Storage Pest

Conclusion

It is concluded from the study that in last five years soybean black gram, green gram replaced pigeonpea to the extent of 12.59 percent. The major constraint in producing pigeonpea were farmers did not receive good quality seeds and price of seed was very high, farmers did not have proper information about recommended variety. The major problems found in growing Maroti, Asha and Ganesh cultivars of pigeonpea were high pest incidents, poor test, high disease incidence.

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Farm Diversification : Problems and Prospects

Jogender Singh[1], U.C. Sharma[2], V.P. Chahal[3] and S.P. Singh[4]

Abstract

The high-yielding varieties in the post green revolution period made paddy-wheat cropping system most productive and profitable with low labour intensity in Indo-Gangatic plains including Sonipat district of Haryana. However, the declining productivity and profit margins being experienced of late are the causes for concern for sustainability of the rice-wheat system. Macro and micro-level analysis reveals nearly stagnating productivity trend in both major crops. The productivity level is approaching harvestable potential, creates many problems on input supply fronts and environment fronts. Therefore, diversification of agriculture is necessary. The present study was conducted to study the problems and prospects of farm diversification. The study revealed that half of the total respondents rated low prospects of diversification followed by medium (26.07%) and high (23.93 %). The serious problems faced by the respondents in diversification were, 'lack of support price' and 'high credit requirement'.

The broad based diversification of agriculture covering field crops, horticultural crops, livestock, fisheries and efficiently mediated improvement in productivity is the viable options to enhance agricultural production in India. Agricultural diversification also helps in improving soil health and agro-ecosystem with socio-economic improvement of the farmers as it also takes into account the economic returns from different crops and other allied components of farming system.

Over the years, the farmers in Indo-Gangatic plains and particularly in Sonipat district of Haryana have adopted paddy- wheat rotation on their farms. The high-yielding varieties which are highly responsive to fertilizers and irrigation made this cropping system most productive. However, the declining productivity, profit margins and declining environment being experienced lately are the causes for concern. Macro and micro-level analysis reveals nearly stagnating productivity trend in both major crops. The productivity level is approaching harvestable potential, creating many problems on input supply fronts. Agricultural scientists have suggested the diversification of farms as a solution to sustain the income, save fertile land, water resources and environment from the exhaustive nature of system. Therefore, it was decided to find out the problems and prospects of agricultural diversification.

Methodology

The study was conducted in Sonipat district of Haryana, which was selected purposively considering its vicinity to National Capital Delhi. A total of 280 farmers were selected as respondents for the study with specific objective to find out problems and prospects of agricultural diversification. Data so collected and obtained were analyzed by using appropriate statistical techniques.

Result and Discussion

Problems in diversification

The data pertaining to the problems foreseen in agricultural diversification are presented in Table 1. The

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Table 1: Problems in diversification

(N=280)

S. No	Problem	Nature of problem						Total score	Rank
		Serious		Somewhat Serious		Not Serious			
		Frequency	%	F	%	F	%		
1	Lack of support price	204	72.86	53	18.93	23	8.21	741	**I**
2	High credit requirement	201	71.79	54	19.29	25	8.92	736	II
3	Lack of technical guidance	108	38.57	38	13.57	134	47.86	534	III
4	High labour requirement	99	35.36	34	12.14	147	52.50	512	IV
5	Complicated method of growing /rearing/doing	99	35.36	18	6.42	163	58.22	496	V
6	Lack of storage facilities	76	27.14	33	11.78	171	61.08	465	VI
7	Inadequate irrigation facilities	29	10.35	42	15.00	209	74.65	380	VII
8	Water logging conditions	11	3.92	36	12.86	233	83.22	338	VIII
9	Lack of market facilities	06	2.14	36	12.86	238	85.00	328	IX
10	Inadequate transport facilities	04	1.43	34	12.14	242	86.43	322	X

Multiple responses obtained

'serious' problems foreseen by farmers were lack of support price followed by high credit requirement and lack of technical guidance. High labour requirement, complicated method of growing/rearing/doing and lack of storage facilities were rated as 'somewhat serious'. Whereas, inadequate irrigation facilities, water logging conditions, lack of marketing facilities and inadequate transport facilities were considered 'not so serious' problems in agricultural diversification. Similar findings were also reported by Kaur *et al.* (1989) and Kaur (1990) in Punjab state.

Prospects of diversification

The prospects of diversification were seen as farmers perception on its status ranging from low to light. The data in Table 2 shows that 50 percent of the respondents viewed low prospects of diversification followed by medium (26.07 percent) and only 23.93 of them expressed high prospects of diversification. It could be due to uncertain market price of crops namely vegetables, mushroom; dairy & poultry products and the poor financial conditions of the farmers as well as high investment in diversifying crops/enterprises. Kaur (1990) also reported similar results in her study.

Table 2: Prospects of diversification

(N=280)

S. No.	Status	F	%
1	Low (16.07 scores)	140	50.00
2	Medium (16.08- 43.91 scores)	73	26.07
3	High (>43.91 scores)	67	23.93
	Total	**280**	**100.00**

Table 3: Prospects of different crops and enterprises

S. No.	Level of prospects	Kind of crops and enterprises
1	Low	Pig farming, fish farming, pulses and cotton
2	Medium	Poultry, flowers, fruits and bee-keeping
3	High	Vegetables, dairy, sugarcane and mushroom

Crops and enterprises

Received levels of prospects of diversification for various crops enterprises. The data in Table 4 reveals that pig farming, fish farming, pulses and cotton had low prospects, whereas, vegetables, dairy, sugarcane and mushroom had high prospects. On the other hand, poultry, flowers, bee-keeping and fruits crops had medium prospects. Similar findings were also reported by Dutt (2001).

Choice of farmers for the type of agricultural diversification

The data in Table 4 shows that 55 percent of farmers wanted to grow vegetables followed by dairy (54.64 %), flowers (36.78%), sugarcane (26.07), mushroom (18.92%) and pulses (11.07). Whereas, only 2.50, 1.07, 0.35 and 0.35 percent of the farmers wanted to diversify in poultry, fruit crops, fisheries and bee-keeping, respectively. These results revealed that the farmers wanted to diversify in high value crops and enterprises. This may be due to the proximity of national capital Delhi which offers demand, consumption along with better facilities of transport and marketing. The result of Kebebe *et al.* (2000) also support the findings of the present study.

Reasons for diversification

The reasons for diversification as received by the farmers all given in Table 5. It is evident from the Table 5 that better economic return and availability of better marketing facilities are the main reasons for diversification, However, better input supply facilities, safeguard against degradation of environment are 'somewhat important' reasons for agricultural diversification. Increased purchasing power and changing food habits were also the reasons of agricultural diversification.

Table 4: Choice of farmers for kind of diversification (N=280)

S.	Kind of diversification	Frequency	%
1	Vegetables	154	55.00
2	Dairy	153	54.64
3	Flowers	103	36.78
4	Sugarcane	77	26.07
5	Mushroom	53	18.92
6	Pulses	33	11.07
7	Poultry	07	02.50
8	Fruits	03	01.07
9	Fishery	01	00.35
10	Bee-keeping	01	00.35

Multiple responses obtained

Conclusion

From the above findings it may be concluded that farmers rated better prospects for agricultural diversification and have also foreseen some problems in practicing. Some of them are reluctant in adoption of

Table 5: Reasons for diversification

S. No	Reason	Nature of problem						Total score	Rank
		More important		Somewhat important		Not so important			
		F	%	F	%	F	%		
1	Better economic return	203	72.50	35	12.50	42	15.00	721	I
2	Better marketing facilities available	194	69.29	52	18.57	34	12.14	720	II
3	Better input supply facilities	187	66.79	23	8.21	70	25.00	677	III
4	Safeguard against degradation of environment	179	63.93	38	13.57	63	22.50	676	IV
5	Increase in purchasing power	119	42.50	54	19.29	107	38.21	572	V
6	Changing food habits	104	37.14	693	22.50	113	40.36	551	VI

diversified technology due to prejudice and false notions against certain foods. Therefore, better awareness of nutritional value of mushroom, dairy products, poultry products, fishes and eco-preservative nature of the system should be highlighted through mass media and measures should be adapted for clearance of hurdles from the path of diversification.

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Impact of Training Packages on Knowledge level of *Kisan Mitras*

J.B. Singh[1], Y.P. Singh[2], G.P. Singh[3] and R.K. Singh[4]

Abstract

Knowledge about various agriculture technologies and their management is not satisfactory among farmers especially in rural areas in India. Various incorrect practices and myths associated with agriculture technology still exist. Training and education about correct management of technology for farmers is a sound and logical investment. A randomized sampling was undertaken among 155 Kisan Mitras of Pratapgarh district of UP. Kisan Mitras were randomly assigned to 3 groups (Group A, B and C) of 50 each using 'blocked randomization process'. Both groups were administered a pre tested questionnaire for assessing their base line knowledge, followed by on-the-spot assessing their post knowledge test skills. Post intervention evaluation of the level of knowledge and attitude of all groups was done 3rd day after the training. A scoring system was devised to quantify the knowledge and attitude of Kisan Mitras on agriculture technology. It was observed that kisan mitras lacked knowledge in subject areas like deficiency symptoms of micro nutrients, row to row and plant to plant distance in vegetable crops and qualitative and quantitative value of chemical for seed treatment. The scores for all groups (Group A, B and C) on combined knowledge and skills were higher at post-intervention than pre-intervention. Increase in level of knowledge from pre-test and post-test was greater for all groups. Over all knowledge and attitude increased to 25 percent and above in all groups.

Since the 1970s, agricultural productivity growth in developing countries has been boosted by the arrival of high-yielding varieties, which in combination with fertilizer and irrigation achieved impressive gains in certain areas. The transfer of production technologies continues to dominate the extension agenda. Whilst the emphasis on productivity enhancement is always important, as has been argued elsewhere, that if extension is to benefit the poor, especially in the poorly integrated areas, higher priority must be given to technologies that reduce vulnerability and enhance employment. Indian farmers is receiving greater attention in relation to improved agriculture technology. The information about agriculture technology is coming from many sources. Without a fundamental understanding of agriculture technologies, it is likely that farmers may be confused and unable to discern between credible and false information. Therefore, it is utmost important that information providers should choose such kind of tools so that the users can improve their own condition of agriculture easily by increasing the knowledge level. Farmer's education and mentality is an important aspect in the adoption of any new technology. The objective of this study was to determine whether farmer's knowledge and attitudes would be influenced by a face to face presentation and classroom teaching involving agricultural technology.

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Methodology

The study was conducted over a group of *Kisan Mitras* in Department of Agriculture, Pratapgarh. A meeting of trainers was organized for standardization of agricultural technology to be used in the study. For the collection of data, selected *Kisan Mitras* were addressed about the nature and purpose of the study on the training day. Then a pre tested questionnaire in Hindi (local language) was administered to the *Kisan Mitras* for assessing their baseline knowledge about agricultural technologies. The questionnaires were divided into three parts, Part A, B and C. Each part consisted of 5 questions that carried one mark to each question. Thus the overall knowledge score was 15. Total time allotted for completing the questionnaire was 20 minutes. The completed questionnaires were collected on the spot.

Pre and post tests were compiled for 155 farmers who attained face to face training programme held in February-March 2008in Krishi Vigyan Kendra, Pratapgarh. The pre and post tests were matched and analized. The duration of training was three days. The participants as *Kisan Mitra* were of varying educational background and of 21-45 years of age. Presentations included informationson technical perspective of agriculture in the core subject areas of agronomy, horticulture and plant protection under commercially available cropping systems. Pre and post-test questions included questions to assess knowledge and attitude before and after the presentation.

Result and Discussion

All the *Kisan Mitra* responses to the 15 question are provided in Table 1, 2 and 3. The question asked under pre tests to measure basic knowledge were inclusively detailed under respective presentations of core subjects areas viz. Agronomy, Horticulture and Plant Protection.

Table 1 shows that the pre test knowledge level of the kisan mitra was higher in the question no.3, followed by 4,1,2,5 and their per cent was 48.38, followed by 40.00, 30.32, 26.45 and 8.38 respectively. The post test knowledge was higher in the question no. 3, followed by 1,4,5,2 and their per cent was 75.48, followed by 67.09, 66.45, 61.29, and 59.35 respectively. The higher differences were observed in the question no.5 followed by 1,2,3,4 respectively.

Table 1: Response of *Kisan Mitras* to pre and post test of Agronomy

(N=155)

Training stage	Number responding	Per cent
Question 1- What is seed rate of timely sown wheat?		
Pre	47	30.32
Post	104	67.09
Difference	+57	+36.77
Question 2- In wheat if one irrigation is assured then it should be given to at?		
Pre	41	26.45
Post	92	59.35
Difference	+51	+32.90
Question 3- What is the dose of NPK/ha in wheat crop?		
Pre	75	48.38
Post	117	75.48
Difference	+42	+27.10
Question 4- In paddy crop under ideal condition No. of hills required per square meter are?		
Pre	62	40.00
Post	103	66.45
Difference	+41	+26.45
Question 5- In wheat crop nitrogen deficiency symptoms are?		
Pre	13	8.38
Post	95	61.29
Difference	+82	+52.91

It is clear from the results that maximum respondents were known to application rate of fertilizers, however, a major shift has been observed to visualize the deficiency symptom of micro nutrients.

Table 2: Responses of *Kisan Mitras* to pre and post tests of Horticulture

(N=155)

Training stage	Number responding	Per cent
Question 1- Do you know the high yielding variety of Bottle gourd?		
Pre	84	54.19
Post	124	80.00
Difference	+44	+25.81
Question 2- What is the seed rate of tomato crop/ha?		
Pre	55	35.48
Post	112	72.25
Difference	+57	+36.77
Question 3- What is the row to row and plant to plant distance in tomato crop?		
Pre	31	20.00
Post	71	45.80
Difference	+40	+25.80
Question 4- How many days old nursery of tomato, chilly and brinjal should be transplant?		
Pre	54	34.83
Post	116	74.83
Difference	+62	+40.00
Question 5- Which one is medium late variety of Mango?		
Pre	88	56.77
Post	137	88.38
Difference	+49	+31.61

Table 2 shows that the pre test knowledge level of the kisan mitra was higher in the question no.5, followed by 1,2,4,3 and their per cent was 56.77, followed by 54.19, 35.48, 34.83 and 20.00 respectively. Due to prevalence of mango orchards the post test knowledge was higher in the question No.5 followed by 1,4,2,3 and their per cent was 88.38, followed by 80.00, 74.83, 72.25 and 45.80 respectively**.** The higher differences were observed in the question No. 4 followed by 2,5,1,3 respectively.

Table 3: Responses of *Kisan Mitras* to pre and post tests of plant protection

(N=155)

Training stage	Number responding	Per cent
Question 1- Which chemical is used at nursery stage in tomato crop against damping off?		
Pre	61	39.35
Post	105	67.74
Difference	+44	+28.39
Question 2- In seed treatment which bio agent is used in vegetable pea against wilt disease?		
Pre	78	50.32
Post	136	87.74
Difference	+58	+37.42
Question 3- Which chemical is used in Potato crop against late blight in standing crop?		
Pre	40	25.80
Post	122	78.70
Difference	+82	+52.90
Question 4- What measures are used in tomato against leaf curl virus in standing crop?		
Pre	80	51.61
Post	129	83.22
Difference	+49	+31.61
Question 5- What is the quantity of carbendazim in seed treatment?		
Pre	30	19.35
Post	82	52.90
Difference	+52	+33.55

Table 3 shows that the pre test knowledge level of the *Kisan Mitra* was higher in question no.4, followed by 2,1,3,5 and their per cent was 51.61, followed by 50.32, 39.35, 25.80 and 19.35, respectively because it is very common problem of the tomato growing areas. The post- test knowledge was higher in the question no.2 followed by 4,3,1,5 and their per cent was 87.74, followed by 83.22, 78.70, 67.74 and 52.90,

respectively**.** The higher differences were observed in the question No.3 followed by 2,5,4,1 respectively. The occurrence of wilt in pulses and late blight of potato are the important problems of respective growing areas. Therefore, respondents took prime consideration on the same line.

Due to lack of time between the pre and post tests, there is possibility that some of the change from pre to post test could be attributed to the exposure to the pre test. The reliability of the data gathered by the tests was not obtained for this instrument. There was no attempt to measure whether the change in attitude was long lasting or just a temporary programme outcome. Future research needs to examine whether or not this increased acceptability of agriculture technology continues as new issues arise in media.

Conclusion

For this study, the data indicate that when *Kisan Mitras* were provided science based information concerning agriculture technology, they were more knowledgeable. Therefore, there is a definite need for strengthing the knowledge of these subject areas among Kisan Mitras by regular quality training programmes on agricultural technologies. Scientist/Subject Matter Specialist/Master trainers should also be trained so that they may further train their *Kisan Mitras.*

This requires systematic and sensitizing educational programmes. Hence, for maximum effectiveness, qualitative programmes need to be held on a continuous basis as it has been well documented that such programmes may have great impact on *Kisan Mitras* and other extension functionaries.

Dynamics of Ethnic Food of the *Khasi* Tribe: Learning from Traditional Wisdom in Eastern Himalayan Ecosystem

Rajesh Kumar[1], Shantanu Kumar[2] and Uma Sah[3]

Abstract

The investigation was carried out in Ri-Bhoi district of Meghalaya State. The information related to traditional foods was collected through personal interview method using pre-tested interview schedule. This was supported with Participatory tools and focus group discussion to get more specific information about the foods. The headmen of all the villages were also involved in the discussion. A transact walk was conducted to understand the existing flora and fauna available in the village. Findings of study helped to document large number of ethnic foods prepared from locally available crops and vegetation. The farmers' rational, purpose and occasion of use of these ethnic foods were also documented.

Northeast region is dominated by the tribal population in different states. Meghalaya is one of the states of the NE region, which comes from the word (*Megh* meaning cloud and *Alaya*- abode) Abode of Clouds. It comprises of three Hills, Khasi, Jaintia and Garo. Most of the Tribals take traditionally made food in their diet. Even some of the foods are available in the local tea stalls. The traditional foods are prepared by using locally available materials which are collected from the forest or grown in the kitchen garden. Some specific local varieties are grown for the purpose. Keeping in view the importance of the Traditional foods, a study was conducted to document the traditional foods used by the farmer in order to see the importance of traditional food and their economical, social and environmental suitability.

Methodology

The investigation was carried out in the Ri-Bhoi district of Meghalaya State. The information related to traditional foods was collected through personal interview method with pre-tested interview schedule. Tools such as Participatory Rural Appraisal and focus group discussion were also held to get more specific information about the foods. The headmen of all the villages were also present in the discussion. A transact walk was also done to understand the existing natural resources available in the village. Then a recipe contest was organized in the village to get unique traditional food. In this contest 42 women and men participated from different villages of Umroi area. Information on Traditional Food obtained from the women and men was analyzed for suitable conclusion. Principal sources of information were the women, men and users of the product. The authenticity of this knowledge was assessed and verified from different individuals, Tea stalls, and old people. Exploratory research design was utilized for the above study.

Result and Discussion

The major traditional foods documented from the study are discussed below under different sub-heads.

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Traditional Food

1. *Jalynshir Chutney* (*Sonchus arvensis*)

It is perennial herb commonly available in the local forest and kitchen garden. The leaf of the plant is crushed and mixed with onion (25 g), boiled potato (250 g), salt, and chilly. Thus, *chutney* is prepared in any type of utensils. It is helpful in controlling of Malaria. It is used by all the villagers. This *chutney* is started for consumption by tribal since their childhood so as to have the adaptability for its bitter taste.

2. *Chutney of Sohngang* (*Solanum gillo*)

It is perennial shrub commonly available in local forest/kitchen garden. The fruit of this plant is used with chilly, onion, salt and mustard oil. No specific utensil is required for preparation of *chutney*. It is used once or twice in a week. It was opined by the tribal farmers that it helps in controlling the Diabetes. All the villages know and use it. The forefathers recommended this *chutney.* The specialty of this *chutney* is that it is given since childhood itself so that child may become habituated to the bitter taste of it.

3. Juice of *Jajew Dkhiew* (*Oxalis corniculata)*

It is a creeper commonly available specially after harvesting of paddy crop. It is available throughout the year except winter season. Both the green leaves as well as dried leaves are used. The leaves are grinded with water and filtered, then taken 2-3 times in a day. It is useful in managing Stomach problems. Such juice is used by all the people of the village.

4. Paste of Banana Yam (*Musa acuminata*)

This is a community food, which is used by all the people in case of having dysentery/ injury/ cutting .It is available throughout the year either in the forest or grown in the Kitchen garden. The root of the plant is used for the treatment of stomach problem/injury/cutting. Juice of Banana Yam is also taken to treat these problems.

5. *Chutney*/Juice of *Jamain Syiar (Centella asiatica)*

It is a creeper available in low land paddy fields. Generally it is available in the rainy season only, sometimes it is available in the shade of other plants. The juice of plant is taken; sometimes whole plant is also taken. All community people use it for blood purifying as well as stomach problems.

6. *Shiah Iambait* (Touch me not) (*Mimosa pudica)*

It is community based food used by about 25% of the villagers, as its juice has got two functions. Firstly, it is used for controlling of sugar for diabetic patient, and secondly the boiled root is used for controlling of stone in kidney. It is an herb found in the forest and nearby villages also.

7. *Shriew* (Yam) (*Dioscorea species*)

It is also a community food used by about 40% of the villagers. It is an herbal plant available in the village and forest very commonly. It is used for curing beri-beri disease in childhood. The whole plant is taken as vegetable in solid form. No specific utensil is required for this preparation.

8. *Putharo* (Paddy-*Oryza sativa*)

It is a product made by indigenous variety (Mynri) of Paddy. This variety of paddy is grown in low land and upland especially for making of this product, the sequential steps to prepare Putharo as follows:

- Rice is soaked for half an hour.
- Dry by putting into Bamboo basket.
- Grind it for powder.
- Mix with mild hot water.
- Stir with a spoon.
- Earthen pot is kept on the fire
- Then pour the paste on the hot earthen pot.
- Cover it immediately with an earthen lid.
- If lid is cold then it takes 15 minutes to make ready.

- If the lid is hot then it takes 7 to 8 minutes.
- Then it is packed in Banana leaf.
- Then it is ready to sell or eat.

It is a solid product and widely used in small-scale agro enterprise. It is a source of income in the village sick person also takes it. It reduces Gastric problem in human being. It is sold in almost in all the Tea stalls.

9. *Pumolo* (Paddy- *Oryza sativa*)

It is a solid rice product made in the villages in a traditional way. It is cultivated in the low land. The ingredients used in this product are rice powder and mild hot water. The step-wise procedure is given below. (i) Rice is soaked for half an hour in the water. (ii) Drying by putting in a bamboo basket.(iii) Grind it so that it becomes like *suji*. (iv) Mix small quantity of cold water to wet the Rice *suji*. (v) Then put the rice and *suji* in the small lid of the Kettle (teapot) and cover with a white cloth and put in the mouth of the kettle and allow for steam cooking for 5 to 6 minutes.

The materials needed to prepare this product are i)Bamboo basket (ii) Kettle (iii) Big basin (iv) Wooden grinder (v) Wooden spoon (vi) Iron sieve (vii) White cloth (viii) Banana Leaf and Bamboo.

It is generally taken with Tea. It has no adverse effect. It is a community food. It provides employment and income to the rural sector especially to the women. hence, it is often referred as women managed agro-enterprise.

10. *Kpu Tyndong* (Paddy- *Oryza sativa*)

It is a community food made by *Kba* (Paddy) in the village by the women and sold in the market and tea stalls. This variety (Mynri) is grown by 40% people in the village for this product. It is grown in low land. The colour of grain is white.

The material needed for preparation of this product is (i) bamboo basket (ii) bamboo piece (iii) big basin (iv) wooden grinder (*Kharol Musli*) (v) Iron sieve or bamboo sieve Banana leaf and big Bamboo chat.

The procedure for preparation is given below:

i. Rice is soaked for half an hour under water.
ii. Drying by putting in a bamboo basket.
iii. Grind it and it should become like *Atta* powder.
iv. Then put the Rice powder in a small bamboo piece and hang in the fire and roll it continuously till it is cooked properly. It takes 8 to 10 minutes.

11. *Kpur Lung* (Paddy- *Oryza sativa*)

It is again a community food made by Kba (Paddy) in village alike above, it is also made by the women and sold in the market and tea stalls. This variety (Mynri) is grown by 40% people in the village for this product. It is grown in low land. The colour of the grain is white.

The material need for the preparation of this products is (i) bamboo basket (ii) Big basin (steel) (iii) Wooden Grinder (iv) Iron sieve or bamboo sieve (v) banana leaves for packing (vi) Big bamboo (vii) Aluminum Pan and Aluminum Lid. The procedure for making kpur lung is

- Rice is soaked in water for half an hour.
- Dried by putting in a bamboo basket.
- Grind it and it should become like Atta powder and then mixed with water.
- It is a solid form of rice product good for controlling of gastric problem and has no adverse effect. It is a steam cooked process.

12. *Kpu Sla* (Paddy- *Oryza sativa*)

It is a rice product prepared in the village by the women round the year. It is a community food taken at teatime.

The materials needed for preparation are (i) bamboo basket (ii) big basin (steel) (iii) wooden grinder (iv) Iron sieve or bamboo sieve. (v) Lamet leaf (vi) big bamboo thaali (dish) (vii) Aluminum pan and lid.

The procedure for preparation of this product is given below.

- Rice is soaked for half an hour in the water.
- Drying by putting in a bamboo basket.
- Grind and make it like *Atta* powder.
- Then mix the rice powder with some water and molasses properly with the hand.
- Small quantity is kept in the Lamet Leaf and then fold it properly and put it in the big pan and fill the pan with water and cover with lid and boil it till cooked properly.
- Then taking out from the pan, it is ready to eat and sell in the market or shop. This product is used by 90% of the people in the village and they take it with Tea, It is good for health.

13. *Tung tap Chutney* (Local fish)

It is a community food taken by all the villagers. It is taken round the year. It is available in all the shops also. The ingredients used in this food are dry fish, salt, mustard oil, onion, garlic, chilly, jaiur, jyllang (like garlic) and tomato. Utensils needed include earthen pot, pan, grinding stone and bowl.

The procedure is given below for the preparation of the Chutney.

- Put the fish in the earthen pot and add salt after that keep for some time, may be one month.
- Burn in the fire or fry in the pan, add Onion, Garlic, Chilly, Jaiur, Jylang and Salt and Turmeric powder.
- Then grind it and mix everything.
- Fry the fish in the Mustard oil and then keep in the bowl, then fry the Tomato.
- Fry sliced Onion, add salt and Chilly, as per need. Then grind all the materials, now it is ready to be served.
- It is a semi-solid liquid eaten once or twice a day. It makes food tastier. After taking, person feels sleepy. The Khasi, Garo, and the Jaintia tribe know this Chutney.

14. *Rymbai Ja* (*Virgna umbellata*)

It is a community-based food used round the year, no rituals. It grows in the low land as well as upland. It is boiled with water. It is soaked then eaten. It is believed to be full of Vitamins. The boiled rice beans are packed in Lamet leaf. It is helpful in controlling of gas.

15. *Sohphlang* (*Moghania vestita*) and Neilieh (*Perilla frutesans*) Chutney

It is a community-based food grown in the Kitchen garden and farmers field. It is available round the year in the market. Roots of sohphlang and seed of Neilieh (til) is used. The procedure for making chutney is first fry til seed in a pan, grind it, then it is eaten with sohphlang. It is packed in Lamet leaves for selling @ Rs 2/- bundle. These are two separate dishes but eaten together. It is a semi-solid and solid food.

16. *Ginger pickle* (*Zingiber officinale*)

Ginger pickle is prepared and used by the entire household throughout the year. There is a ritual that ginger should not be planted during full moon to avoid the insect infestation. The major ingredient in ginger pickle are Ginger (1 kg), Green Chilly (500 gm), Mango Powder (200 g), Garlic (150 g), Hing (2 spoonful), Salt (as per need), Methi (20 g), Coriander (50 g), saunf (20 g), kala Jeera (50 g), Ajwain (50 g), Vinegar (500 ml) and Jeera (50 g). Procedure for making Ginger pickle is:

- Wash the ginger properly, cut into pieces and grind it.
- Chop the green Chilly.
- Grind the Garlic.
- Put in a big pan.
- Add all the spices, which are fried or grinded already and mix together.
- Add Mustard oil. Salt, Vinegar, Mango powder, and stir it.
- Fill in the bottles and cover with muslin cloth.
- During daytime keep in the sun and at nighttime cover bottle with Lid.
- After two weeks it is ready to eat or sell in the market. It has got medicinal value.

17. Product of *Phan Dieng* (Tapioca-*Manihot esculenta*)

Approximately 90% villagers use it. The tubers of Tapioca are boiled and taken in the morning with tea as breakfast. It is rich in Carbohydrates and Vitamins. It needs some modification as no products are made till now from this. It is less Labour-consuming crop, generally grown in upland. It cures the Vitamin deficiency.

18. *Chutney Neiong* (Kala til –*Sesamum indicum*) seeds

90% villagers grown in the Kitchen garden use it. It is a well-domesticated shrub. Frying the seeds and grinding then adding to Raddish, Salt, Chilly etc, to prepare it. It is also used in curry making.

It is used for making sweets. It is good for energy. It is also sold in the market.

Conclusion

The traditional foods documents and described in the above sub-heads are part and parcel of tribal farmers' livelihood. These are prepared from locally available plants, herbs and therefore, they socially accepted and economically favourable. The documented food items needs scientific validation and refinement, if required, for making them further nutritious and useful for the tribal farmers of Meghalaya.

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Extent of Transfer of Resource Conserving Technologies for Sustainable Dry Land Farming

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Abstract

Resource conserving technologies are recommend for efficient conservation of soil and water for maximization of the productivity of crops under dryland situation. A study was undertaken to know the extent of transfer of resource conserving technologies for sustaining dry land farming in South-West Haryana. Rapeseed and mustard ,gram and bajra were the major crops of Rabi and Kharif season, respectively, in this zone. The study highlighted that the extent of transfer of resource conserving technologies in cultivation of rapeseed and mustard, gram and bajra crops was more than 80 per cent. The level of extent of transfer of recommended resource conserving technologies in cultivation of rapeseed and mustard was medium with 78 per cent of farmers followed by low with 22 per cent of farmers. In case of gram, 64 per cent of farmers had medium level of extent of transfer followed by low and high level with 31 and 4 per cent of farmers, respectively. The extent of transfer of recommended resource conserving technologies was medium with 78 per cent of farmers followed by high and low level of extent of transfer, in case of bajra crop.

India is the second most populous country in the world. According to 2001 census, it has 1006.8 million population about 70 per cent of which is dependent on agriculture. Every year about 19 million more Indians are added to the existing population of one billion. It is reliably estimated that by 2020, the total domestic food grains demand will be about 294 million tonnes for the growing population (Singh, 2002). In India, 70 percent of the farming (100.1 million hectares) is rainfed which accounts for only 42 per cent of the foodgrains produced. Even with the full utilization of irrigation potential, agriculture could be practised in 70 million hectare (around 50 per cent of the net cultivated area) and thus leaving 50 per cent of the net cultivated area under rainfed condition. The net cultivated area is stabilized during the previous years. There is very little scope of increasing it beyond 150 million hectares without adverse effect on the fragile eco-system. However, the cultivated area can be increased by using the rainfall which is a most important natural resource. It contributes nearly half of the produce to the food basket of the nation and supports the life of a substantial chunk of the population. It is inevitable that the second green-revolution has to come from the dryland farming and accordingly the application of technology, inputs and investments has to be tailored to converts these so-called "**grey areas into green**". Sustainable agriculture involves the integrated use of inputs and appropriate technologies. Researches have indicated that not more than 20-22 per cent of modern scientific technologies have been adopted by the farming community due to one or the other reasons. The overall development of Indian agriculture needs appropriate technology. Transfer of technology starts after its perfection and ends in

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utilization by target group. Transfer of technology is a movement of information from a research system (source of technology) through an extension system (which acts as entrepreneur, disseminator and a facilitator) to the client system (users of technology). The effectiveness of technology transfer depends on the support system as well as socio-economic structure of the client system. With this background, thepresent study was carried out with the specific objective to know the extent of transfer of resource conservation technologies under dryland farming.

Methodology

The study was conducted out in dryland farming zone of south-west Haryana. Considering the highest percentage of dry farming area out of net cultivated area of the districts of South-West Haryana, three districts, namely, Gurgaon, Mahendergarh and Bhiwani were selected for the study. One block each from the three selected districts was selected randomly. From each block, two villages were selected randomly. Thus, 6 villages formed the sample of the study. From each village, 25 farmers were randomly selected who were practising dryland farming. Thus, 150 farmers practising only dryland farming constituted the sample of the study. The major dryland crops of the selected area, namely, Gram, Rapeseed and Mustard (Rabi crops) and Bajra (Kharif crop) were taken for the study. A list of recommended resource conserving technologies for dryland farming were prepared with the help of available package of Practices for Rabi and Kharif crops (CCS HAU, Hisar) and also from concerned scientists working in CCS HAU, Hisar.

Measurement of extent of transfer of Resource conserving technologies

There were 19 recommended resource conserving technologies of Rapeseed & Mustard crop and the extent of transfer of technologies score ranged from 0 to 19. The minimum extent of transfer of technology score of recommended resource conserving technologies obtained by an individual was 11 and maximum was 16 with mean of 14.06 and standard deviation of 0.79.

There were 20 recommended resource conserving technologies of Gram and the extent of transfer of technologies sore ranged from 0 to 20. The minimum score of recommended resource conserving technologies obtained by an individual was 8 and maximum was 16 with the mean of 13.58 and standard deviation of 1.49.

There were 20 recommended resource conserving technologies of Bajra and the extant of transfer of technologies score ranged from 0 to 20. The minimum score of recommended resource conserving technologies obtained by an individual was 12 and maximum was 17 with the mean of 12.34 and standard deviation of 0.98.

Considering the mean and standard deviation as a measure of check, the respondents were grouped into low, medium and high categories based on the level of extent of transfer of recommended resource conserving technologies of selected crops of dryland farming, as under.

Category	Extent of transfer of technologies score Recommended resource conserving technologies		
	Rapeseed and Mustard	Gram	Bajra
Low (<$\overline{X}$-SD)	<13.27	<12.09	<11.36
Medium ($\overline{X}$-SD to $\overline{X}$+SD)	13.27 to 14.85	12.09 to 15.07	11.36 to 13.32
High (>$\overline{X}$+SD)	14.85	>15.07	>13.32

Results and Discussion

Extent of transfer of resource conserving technologies

A. Extent of transfer of resource conserving technologies in cultivation of rapeseed & mustard

It is evident from Table 1 that the extent of transfer of resource conserving technologies in cultivation of rapeseed and mustard was more than 80 per cent in

technologies such as apply heavy planking if soil moisture is less (96.87 per cent), use of seed-cum-fertilizer drill for sowing and ploughing across the slope (90.62 per cent), sowing across the slope, use of farm yard manure and use of wheel hand-hoe for weed control and to conserve good moisture in soil (87.5 per cent) and incorporation of crop residues (81.25 per cent). The extent of transfer was 78.12 per cent in technologies, namely, adjusting sowing time so that dry spell does not occur at critical stages and planting fuel/horticultural trees along field boundaries. It was 65.62 per cent in technologies like bunding across the slope, balance use of fertilizers and use of biofertilizers. The extent of transfer was 53.12 per cent in collection of rainwater for irrigation before sowing. The extent of transfer was less than 50 per cent in technologies such as growing fodder crops on small bunds (50 per cent) and selection of recommended high yielding varieties (46.87 per cent).

Table 1: Extent of transfer of recommended resource conserving technologies in cultivation of Rapeseed and Mustard

(N = 32)

Recommended resource conserving technologies	Extent of transfer of technologies	
	Number	Percentage
1. Selection of recommended high yielding varieties depending on the time of sowing	15	46.87
2. Use of seed-cum-fertilizer drill for sowing	29	90.62
3. Sowing across the slope	28	87.50
4 Adjusting sowing time so that dry spell does not occur at critical stages	25	78.12
5. Deep ploughing in summer	28	87.50
6. Ploughing across the slope	29	90.62
7. Apply heavy planking if soil moisture is less	31	96.87
8. Bunding across the slope	21	65.62
9. Growing fodder crops on small bunds	16	50.00
10. Planting sarkanda along the field boundaries	23	71.87
11. Planting fuel/horticultural trees along field boundaries	25	78.12
12. Incorporation of crop residues	26	81.25
13. Use of farm yard manure	28	87.5
14. Proper incorporation of fertilizers	19	59.37
15. Balanced use of fertilizers	21	65.62
16. Use of wheel hand-hoe for weed control and to conserve good moisture in the soil	28	87.50
17. Intercropping	20	62.5
18. Use of biofertilizers	21	65.62
19. Collection of rain water for irrigation before sowing	17	53.12

B. Extent of transfer of resource conserving technologies in cultivation of gram

The data presented in Table 2 indicate that the extent of transfer of resource conserving technologies in cultivation of gram was more than 80 per cent in technologies such as intercropping (95.76 per cent), use of wheel hand-hoe for weed control and to conserve good moisture in the soil (93.22 per cent), use of desi plough for sowing (94.91 per cent), sowing across the slope and apply heavy planking if soil moisture is less (91.52 per cent), adjusting sowing time so that dry spell does not occur at critical stages (90.68 per cent), ploughing across the slope (88.98 per cent), deep ploughing in summer (86.44 per cent) and bunding across the slope (85.59 per cent).

Table 2: Extent of transfer of recommended resource conserving technologies in cultivation of Gram

(N=118)

Recommended resource conserving technologies	Extent of transfer	
	Number	Percentage
1. Selection of recommended high yielding varieties depending on the time of sowing	67	56.77
2 Use of desi plough for sowing	112	94.91
3. Use of seed drill for sowing	87	73.73
4. Sowing across the slope	108	91.52

5	Adjusting sowing time so that dry spell does not occur at critical stages	107	90.68
6.	Deep ploughing in summer	102	86.44
7.	Bunding across the slope	101	85.59
8.	Ploughing across the slope	105	88.98
9.	Growing fodder crops on small bunds	63	53.39
10.	Planting Sarkanda along the field boundaries	87	73.73
11.	Apply heavy planking if soil moisture is less	108	91.52
12.	Use of farm yard manure	66	55.93
13.	Incorporation of crop residues	49	41.52
14.	Proper incorporation of fertilizer	75	63.85
15.	Balanced use of fertilizers	67	56.78
16.	Use of wheel hand hoe for weed control and to conserve good moisture in the soil	80	93.22
17.	Intercropping	103	95.76
18.	Use of biofertilizers	58	49.15
19.	Integrated pest management	15	12.15
20.	Water management for irrigating the standing crop	42	35.59

It was less than 50 per cent in technologies, namely, use of biofertilizers (49.15 per cent) incorporation of crop residues (41.52 per cent) and water management (35.59 per cent). The extent of transfer was very less (12.5 per cent) in integrated pest management technology.

C. Extent of transfer of resource conserving technologies in cultivation of bajra

It is evident from the data in Table 3 that the extent of transfer of appropriate resource conserving technologies in cultivation of bajra was more than 80 per cent in technologies, viz., bunding across the slope (98.67 per cent), deep ploughing in summer (94.67 per cent), sowing across the slope (90.67 per cent), adjusting sowing time so that dry spell does not occur at critical stages (87.33 per cent), apply heavy planking if soil moisture is less (86 per cent), use of wheel hand-hoe for weed control and to conserve good moisture in the soil (84 per cent) and ploughing across the slope (80.67 per cent). The extent of transfer was 79.33 per cent in technology like growing fodder crops on small bunds followed by 73.33 per cent in planting sarkanda along the field boundaries and 68.67 per cent both in use of seed-cum-fertilizer drill for sowing and intercropping. The extent of transfer of technologies was less than 50 per cent in technologies such as proper incorporation of fertilizers (47.33 per cent), balanced use of fertilizers (37.33 per cent), use of biofertilizers (36 per cent), selection of recommended high yielding varieties depending upon the time of sowing and water management for irrigation by making bunds along with field boundaries (32 per cent) and use of farm yard manure (28 per cent). It was less than 25 per cent in technologies, namely, planting fuel/horticultural trees along the field boundaries (23.33 per cent) and maintaining plant population according to soil moisture (22.67 per cent).

Table 3: Extent of transfer of recommended resource conserving technologies in cultivation of Bajra

(N=150)

Recommended resource conserving technologies		Extent of transfer	
		No.	Percentage
1.	Selection of recommended high yielding varieties depending on the time of sowing	48	32.00
2.	Use of seed-cum-fertilizer drill for sowing	103	68.67
3	Adjusting sowing time so that dry spell does not occur at critical stages	131	87.33
4.	Sowing across the slope	136	90.67
5.	Bunding across the slope	148	98.67
6.	Apply heavy planking if soil moisture is less	129	86.00
7.	Deep ploughing in summer	142	94.67
8.	Ploughing across the slope	121	80.67

9.	Growing fodder crops on small bunds	119	79.33
10.	Planting Sarkanda along the field boundaries	110	73.33
11.	Planting fuel/horticultural trees along the field boundaries	32	23.33
12.	Use of wheel hand hoe for weed control and to conserve good moisture in the soil	126	84.00
13.	Maintaining plant population according to soil moisture	34	22.67
14.	Incorporation of crop residues	95	63.33
15.	Use of farm yard manure after one month of germination	42	28.00
16.	Proper incorporation of fertilizers	71	47.33
17.	Balanced use of fertilizers	56	37.33
18.	Intercropping	103	68.67
19.	Use of biofertilizers	54	36.00
20.	Water management by making bunds along with field boundaries	48	32.00

D. Level of extent of transfer of resource conserving technologies in cultivation of selected crops under dryland farming

It is evident from the Table 4 that the level of extant of transfer of recommended resource conserving technologies in cultivation of rapeseed and mustard was medium with 78 per cent of farmers followed by low with 22 per cent of farmers. In case of gram, 64 per cent of farmers had medium level of extent of transfer followed by low and high level with 31 and 4 per cent of farmers, respectively. The extent of transfer of recommended resource conserving technologies was medium with 78 per cent of farmers followed by high (75 per cent) and low (7 per cent) level of extent of transfer, in case of bajra crop.

The findings of the present study are in line of those reported by Erik Van Den Derf (1990), Sunil kumar and Suresh (1999) and Seetharam et al. (2001).

Conclusion

The extent of transfer of resource conserving technologies in cultivation of rapeseed and mustard, gram and bajra crops was more than 80 per cent. It was less than 50 per cent in technologies, namely, proper incorporation of fertilizers, balanced use of fertilizers, use of biofertilizers, selection of recommended high yielding varieties depending upon the time of sowing and water management for irrigation by making bunds along with field boundaries, use of farm yard manure, planting fuel/horticultural trees along the field boundaries and maintaining plant population according to soil moisture. The level of extent of transfer of resource conserving technologies in cultivation of rapeseed and mustard, gram and bajra was medium with 78, 64 and 78 per cent of farmers, respectively. Most of farmers had low to medium level of extension orientation in case of transfer of recommended technologies under dryland farming. Further, these technologies had been recently developed

Table 4: Extent of transfer of recommended resource conserving technologies in cultivation of selected crops under dry land farming

Level of Extent of transfer of recommended crop production technologies	Rapeseed and Mustard (N = 32)		Gram (N = 118)		Bajra (N = 150)	
	Number	Percent	Number	Percent	Number	Percent
Low	7	21.88	37	31.35	11	7.33
Medium	25	78.12	76	64.41	117	78.00
High	0.00	0.00	5	4.24	22	14.67
Total	32	100.00	118	100.00	150	100.00

by the researchers and had not been fully transferred among the dryland farming farmers. The farmers had received the information about most of the resource conserving technologies, which were hand down from generation to generation. They might have acquired the information about these technologies/practices by their long experience in agriculture. The government should also consider the possibility of providing necessary inputs on subsidized rates at least for resource poor dryland farming farmers. Researchers should conduct the researches considering the availability of inputs and the farmers circumstances instead of top-down approach of passing recommendation of the research stations to the farmers. The technologies should be assessed and refined in order to suit the local situation and problems of the farming community. The extension work should be strengthened and efforts should be made to reduce the existing unawareness about the recommended resource conserving and crop production technologies among the farmers. More emphasis should be given for transfer of appropriate crop production technologies.

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Editorial

Paradigm Shift in Rural Development

People are to be equipped to achieve progress in social and economic fields. For this, there is need to give special significance on human resource development. The quality and size of population are two factors that are emphasised in the development of human resource. Rapid growth in population create many obstacles to economic progress and it affects the quality of human resource adversely. On the other hand their development and quality can become an asset to the Nation.

India is an agricultural nation. Due to the increase in the cost of production and other factors agriculture is becoming unprofitable. Besides, there is no increase in the employment opportunities in other sectors and this creates more unemployment problems. It is obvious that when there is decrease in employment and income, purchase of food stuffs for maintaining health becomes imposssible. As per the estimate of the year 2000, 26.1% of people are below poverty line in India. Poverty encourages child labour. Today in India, unemployment continues to be the most serious problem. The reasons might be; collapse of agricultural sector; decline of indigenous/traditional wisdom; lack of industrial enterprises, Inadequate development of service sector, Lack of capital, Lack of entrepreneurship etc.

There is major breakthrough in the domain or rural development that came to be known as 'paradigm-shift'. The paradigm shift was not merely a change in the philosophy of rural development but in its functional aspects as well – there is now a thrust on quality and not quantity, development and empowerment replaced charity and welfare, dependecia (acute from the dependence) was overthrown by self-help. The new concept is "instead of providing the fish, impart the training of fishing" i.e. Make people self-reliant through their capacity building; make them healthy by educating them about health precautions. Making them aware of their rights and duties would be their real help.

This issue of Journal of community mobilization and sustainable development consists of 20 selected research papers focusing its attention on theoretical and empirical findings on different aspects of agricultural development and its sustainability in India and holistic development of human resource.

The papers deal with traditional wisdom of farmers, participatory agro-eco system and training need analysis, adoption and constrains in high yielding technologies/ varieties, dairy farmers, women entrepreneurs and information seeking behaviour. I hope this issue will be useful to the students and teachers in social sciences, researchers in academic and research institutions, government departments and Non-Governmental Organisations involved in the programmes of agriculture and rural development.

I take this opportunity with much pleasure to thank all the members, editorial team- Dr. Premlata Singh, Dr. Shantanu Kumar Dubey, Dr. Rupasi Tiwari and Dr. Nishi Sharma for their efforts to bring out this issue. I am also thankful to Sh. Anand Vijay Dubey for providing on line support in compiling the papers. My thanks are also due to Ms. Reema Chaurisia for providing editorial assistance.

(J.P. SHARMA)
Chief Editor

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