Indian Journal of Fertilisers, Vol. 2 (1), April 2006, pp. 11-20 (10 pages)

IFFCO in the Service of Farmers

Dissemination of agro-technology from Lab to Land for its wide adoption and through feedback from farmers for further improvement is important to bring in changes in their practices. In this direction the promotional and other developmental programmes organised by IFFCO for the benefit of farmers and cooperatives in the last three decades have been quite effective and have provided strength and confidence to farmers. It is a fact that every 5th and 6th bag of fertiliser produced and used in the country, respectively, during 2004-05 was that of IFFCO. The paper highlights IFFCO's contribution towards the service of farmers community and various other activities like collaborative work with national/international organisations, value addition to fertilisers, IFFCO Chair, training and publicity programme, ICT initiatives and other social/community oriented activities. Through these programmes IFFCO is reaching to over one million farmers annually.

D.K. BHATT
Indian Farmers Fertiliser Coop. Ltd.
53-54, Goverdhan, Nehru Place
New Dellhi - 110 019
Email : dkbhatt@iffco.nic.in

AGRO-SCIENTISTS HAVE DEVELOPED various location specific farm-technologies in a way to increase the productivity of crops. Over a period of time these technologies have undergone further improvements in order to meet the aspirations of farmers. It is important to disseminate the technology from Lab to Land for its widespread adoption and to obtain feedback from farmers to bring about improvements to meet local needs. Farmers participation therefore becomes important in this process. In India various agencies viz. GOI, State Govts., State Agricultural Universities/Research Institutes, Input Supply Agencies, National/International Organisations, NGO's, Credit Institutions, etc., are associated and or involved directly or indirectly in transfer of farm technologies. The work done by fertiliser industry on promotion of fertiliser use has been reviewed by Kumar and Shrotriya (13); Kumar et al (12) and Govil and Kaore (4). The growth in fertiliser consumption over the last five decades has perhaps only statistical significance for the reason that it partially meets the nutrients requirement of crop/cropping system as nutrient removals are 3 to 6 times higher as compared to nutrient application of 96.7 kg NPK/ha (2004-05) leading to mining of nutrients, occurrence of multi nutrient deficiencies affecting soil health and leading to stagnation in productivity of crops. On this ground, some of the issues that need continuous attention are : **a)** Crop based approach to promote fertiliser use, **b)** Correcting seasonal distortion in fertiliser use, particularly in *Kharif* season, **c)** Ensuring timely availability of fertiliser in adequate quantity at consumption point, **d)** Correcting district-wise distortions in nutrient use through micro planning i.e., present fertiliser use, soil fertility status, credit, storage, logistics etc., and **e)** Strengthening extension system for effective transfer of technology.

Indian Farmers Fertiliser Cooperative Limited (IFFCO) engaged in the production and distribution of fertilisers to farmers through cooperative channel, has always believed in reaching the farmers and cooperatives through its various promotional programmes since inception in 1967. These programmes have provided platforms for interaction between the farmers, cooperatives, IFFCO and the officials from various departments /institutes associated with agricultural development in general and fertiliser use in particular. The thrust through these programmes has always been on maintaining soil health for sustained better crop yields. In this paper IFFCO's efforts made in the service of farmers and cooperatives have been highlighted.

ABOUT IFFCO

IFFCO WAS REGISTERED AS A MULTI-UNIT cooperative society on November 3, 1967 with an initial membership of 57 societies, which contributed a sum of Rs. 0.549 million to its share capital. In the last over three decades the cooperatives have contributed immensely to the growth of IFFCO and their membership has steadily increased to 37381 with a share capital of Rs. 4210.8 million (as on 31.3.2005).

Production and Marketing

Fertiliser

IFFCO is engaged in the production of urea at Kalol (Gujarat), Phulpur and Aonla (Uttar Pradesh) and DAP / NPK grades (10:26:26 and 12:32:16) at Kandla (Gujarat). Production was started in 1974–75 at its Kalol unit for urea followed by Kandla unit for DAP/NPK grades. Urea production at Phulpur and Aonla was started in 1981 and 1988, respectively. The production capacity were enhanced and this work was completed during 1996 for Aonla, 1997 (Kalol and Phulpur) and 1999 (Kandla). Further, IFFCO has acquired DAP / NPK plant at Paradeep, Orissa in September 2005. Production and sales of IFFCO fertilisers are given in **Table 1**. The total turnover was Rs.72240 million during 2004-05 with sales of 64.64 lakh mt of fertiliser material. It is estimated that every 5th bag and 6th bag of fertiliser produced and used in the country, respectively, during 2004-05 was from IFFCO.

IFFCOs fertiliser marketing activities are spread in over 28 States and Union Territories of the country. The entire market area of IFFCO has been divided in to 5 zones with 20 State Offices and 62 Area Offices for administrative purpose. In each state, there are 2 to 11 area offices depending upon the volume of sales. Each area office covers 2–10 districts depending on potential of the area. In each area office, 4 to 10 field officers are

Table 1 - Production and sales of IFFCO fertilisers - 2002-03 to 2004-05

Year	Urea	NPK 10:26:26	NPK 12:32:16	DAP	Total
Production ('000 mt)					
2002-03	3685.3	279.8	580.0	1501.9	6047.0
2003-04	3600.7	232.1	622.5	1246.0	5701.3
2004-05	3713.6	386.6	762.6	1290.9	6153.7
Total	10999.6	898.5	1965.1	4038.8	17902.0
Sales ('000 mt)					
2002-03	3672.2	313.0	495.3	1530.9	6011.4
2003-04	3701.8	250.6	679.7	1421.4	6053.5
2004-05	3670.4	415.5	844.9	1533.6	6464.4
Total	11044.4	979.1	2019.9	4485.9	18529.3

posted who are Graduate/Post Graduate in agriculture. Presently 567 agriculture graduates/post graduates are engaged in fertiliser distribution and promotion at various levels in the country. As a matter of policy, IFFCO is channelising its entire production through the cooperative channel and institutional agencies such as State Agro Industries Development Corporations, Commodity Federations etc. Since cooperatives are covering almost entire villages in the country, it helps to ensure timely availability of fertilisers particularly at remote and inaccessible locations. Besides, IFFCO's 158 Farmers Service Centres located in 10 states viz. West Bengal, Haryana, Himachal Pradesh, Punjab, Rajasthan, Bihar, Uttar Pradesh, Uttaranchal, Madhya Pradesh and Goa supply agro-inputs, viz., IFFCO fertilisers, seed, agro-chemicals, zinc sulphate, bio-fertilisers etc., directly to the farmers **(Table 2)**. These centres are places for interaction between farmers and IFFCO on various aspects such as soil testing, balanced and integrated use of inputs, supply of nutrients including micro-nutrients and agro-chemicals and seeds, etc. Literature in local languages on crop production technology is made available for farmers use. In order to strengthen the cooperatives, IFFCO has been giving preferences to the cooperatives for storage of fertilisers in their warehouses/ godowns to ensure timely availability of fertilisers at the sale points. Cooperatives are also given preferences in handling and transportation of fertilisers.

Crop seminar

Biofertiliser

A biofertiliser unit was established at CORDET, Phulpur in 1996-97 and Kalol in 2003-04 with annual production capacity of 75 mt and 165 mt, respectively, of different cultures viz. *Rhizobium, Azotobacter*, PSB, *Azospirillium* and *Acetobacter*. The biofertilisers are sold through IFFCO's Farmers Service Centres and cooperative societies and also distributed to the farmers as one of the component of Critical Input Package (CIP) to promote integrated use of nutrients. The production and sale of biofertilisers are given in **Table 3**.

IFFCO Programmes – An Overview

In the last three decades (1975-76 to 2004-05) IFFCO has organised 68547, farmers meeting, 19492 field days, 25196 sales point personnel training + district cooperative conferences, 3765 crop seminars, 29529 two plot demonstrations, distributed 481684 CIP kits, 14245 soil test campaigns (collected 14.62 lakh samples) and 585 training and visit programmes. Besides these activities, women training, agricultural (weed control, seed treatment etc.)/social (tree plantations/veterinary and medical check up, etc.) campaigns were also organised. IFFCO has undertaken location specific 51 special projects viz. dry land farming/area development, land reclamation, tribal area development, lab to land programme and

Table 2 - Performance of farmers service centres - 2002-03 to 2004-05

Year	Fertiliser sale (mt)					Zinc sulphate (mt)	Agro-chemicals (Rs lakhs)	Seed (Rs lakhs)	Turn over (Rs lakhs)
	Urea	NPK 10:26:26	NPK 12:32:16	DAP	Total				
2002-03	90729	5863	34103	70368	201063	1960	152.9	270.6	16245.9
2003-04	88169	7563	37629	57086	190447	793	300.3	186.5	15828.9
2004-05	108993	9627	51653	65306	235579	1238	119.0	364.0	21950.4
Total	287891	23053	123385	192760	627089	3991	572.1	821.0	54025.2

Table 3 - Production and sale of biofertiliser (mt), CORDET, Phulpur / Kalol - 2002-03 to 2004 - 05

Year	CORDET	Biofertiliser										Total	
		Rhizobium		*Azotobactor*		PSB		*Azospirillium*		*Acetobacter*			
		Production	Sale	Production	Sale	Production	Sale	Production	Sale	Production	Sale	Production	Sale
2003-04	Kalol	4.18	2.29	6.16	2.09	10.21	6.61	3.10	2.24	0.00	0.00	23.66	13.23
2004-05	Kalol	7.33	8.81	21.02	24.05	67.82	59.86	8.34	9.20	23.50	21.97	128.01	123.89
Total	Kalol	11.51	11.10	27.18	26.14	78.03	66.47	11.44	11.44	23.50	21.97	151.67	137.13
2002-03	Phulpur	5.50	5.72	56.22	59.69	71.17	74.25	0.34	0.31	0.00	0.00	133.23	139.98
2003-04	Phulpur	1.21	1.21	50.56	46.99	61.03	56.80	0.03	0.08	0.00	0.00	112.84	105.08
2004-05	Phulpur	0.04	0.06	99.18	101.55	104.95	105.27	0.03	0.01	6.93	3.00	211.13	209.90
Total	Phulpur	6.75	7.00	205.96	208.22	237.15	236.32	0.40	0.40	6.93	3.00	457.20	454.95
Grand total		18.26	18.10	233.15	234.36	315.18	302.79	11.85	11.85	30.43	24.98	608.87	592.08

hi tech projects on agricultural development. IFFCO has also worked in more than 3000 villages under its Village Adoption Programme for their development with thrust on agricultural related aspects. IFFCO has also undertaken in a limited way seed multiplication programme (59003 ha) on its own and also in collaboration with State Seeds Corporation to augment supply of seeds to the farmers. IFFCO has conducted demonstrations / trials on farmers fields on its own and also in collaboration with national / international organisations as under:

1. Urea supergranules – Conducted 389 demonstrations on rice in 11 states during 1981-82 to 1984-85 and also in collaboration with ICAR/State Agricultural Universities (14, 15)

2. FAO–IFFCO sulphur research network programme – Conducted 96 trials on 13 crops in 3 states during 1987-88 to 1989-90 (16, 5). Network programme was reviewed by Biswas and Tewatia (1).

3. PPIC (India programme) – IFFCO collaborative programme on maximum yield research in 3 states during 1990-91 and 1991-92 (4).

4. Soil test based trials – Conducted 511 trials on 15 crops in 108 villages in 92 districts covering 14 states during 1992-93 to 1994-95 (4)

5. Integrated plant nutrition system

a. Conducted demonstrations (1647 entries) on 24 crops covering 55 locations involving 146 farmers of 14 states (11, 3, 4, 5, 7)

b. FAO – IFFCO collaboration on integrated plant nutrition system – A technical cooperation programme project – TCP/IND/6611 "Development of an integrated plant nutrition system methodology" (FAO – IFFCO 1997 (2)).

c. Organised a national workshop on IPNS, Bhubaneshwar, March 10-12, 1997 (10).

d. Organised an international seminar on IPNS for sustainable development, New Delhi, November 25-27, 1997.

6. IMPHOS–IFFCO extension project – Field demonstration – Conducted 265 demonstrations on 14 crops in 44 villages in 30 districts of 8 states during 2000-01 to 2003-04 (8)

7. IARI–IFFCO collaborative project on transfer of technology – Conducted 1280 demonstrations on cereals, pulses, oilseeds, fodder, vegetables, flowers in 7 states during 2000-01 to 2002-03 (IARI, 2005 (6)).

8. Fortification of NPK 10:26:26 with 0.3% boron - Conducted 280 demonstrations on 25 crops in 58 districts in 6 states during 2002-03 *(Rabi)* and 2003-04. Farmers feedback (366 respondents) was obtained from 4 states.

FERTILISER PROMOTION PROGRAMMES

Field Programmes

The gap between the technologies developed under On Station situations

Table 4 - Field programmes of IFFCO - 2002-03 to 2004 - 05

Programmes	Unit	2002-03	2003-04	2004-05	Total
Farmers meeting	No.	4733	4144	4671	13548
	PP	267284	242701	277736	787721
Field days	No.	734	684	777	2195
	PP	71522	63385	72253	207160
Sales point personnel training	No.	877	904	920	2701
	PP	59940	54927	65082	179949
Crop seminar	No.	157	170	154	481
	PP	121001	89900	138785	349686
Two plot demonstation	No.	909	810	936	2655
Critical input package kit	No.	1100	8920	6836	16856
Soil test campaign	No.	1297	1053	1098	3448
	Samples	144803	136619	136182	417604
Biofertiliser campaign	No.	350	343	384	1077
District cooperative conference	No.	335	321	327	983
	PP	45930	30124	33659	109713
Sales campaign	No.	208	247	246	701
	PP	41139	101875	83602	226616
Training & visit programme	No.	67	76	71	214
	PP	3890	3955	4695	12540
Visit to research station/univer	No.	96	0	43	139
Women training	No.	152	181	155	488
	PP	13371	18578	14047	45996
Villages adopted	No.	395	427	420	-
Seed multiplication	ha	2080	1967	2347	6394
programme	q	80268	65745	87440	233453
Medical check up	No.	136	117	106	359
	PP	22020	25197	21100	68317
Veterinary check up	No.	101	105	120	326
	Animal	17534	21360	36052	74946

and its implementation under On Farm situations need to be minimised. The technology could be demonstrated on the farmer's field through demonstration/trials which is the most effective method of convincing the farmers on the usefulness of balanced fertilisation in crops. Balanced fertiliser use was promoted initially by giving incentive to cooperatives @ Rs.20 per mt. This was supported by undertaking field demonstrations. To support the demonstration programme other field activities like field day, farmers meetings, campaigns, use of electronic and print media, training programmes for sale point personnel etc. should be effectively utilised/organised to disseminate the message of balanced fertilisation. Integration of fertiliser supplies and field programmes together with involvement of cooperatives is necessary for increasing productivity of crops. The programmes organised during 2002-03 to 2004-05 are given in (**Table 4**). IFFCO has established two static soil testing laboratories at CORDET, Phulpur and Kalol and pressed into service five mobile testing vans and analysed 3.03 lakh soil samples (**Table 5**). CORDET, Phulpur and Kalol together have analysed 9.9 lakh soil samples during 1980-81 to 2004-05 whereas mobile soil testing vans have analysed 1.88 lakhs soil samples during 1988-89 to 2004-05. Data from soil testing over a period of time reveal that status of major nutrients in soil is gradually declining from high to medium and medium to low status. Mobile soil testing vans have analysed soil samples in the villages itself and results were explained to farmers the same day. They were motivated to apply nutrients dose based on soil test values. A limited number of soil samples for micronutrients were also analysed at CORDET, Kalol and Phulpur. The cooperatives are involved in transfer of farm-technologies as they have direct access to their member farmers. IFFCO has provided financial assistance to the cooperatives for the construction of 47 storage cum community centres during the period 2002-03 to 2004-05 These centres are used as a venue for holding meetings of farming community; besides storage of fertilisers. As a part of corporate social responsibility, social and community development programmes are organised for providing relief to the farmers and cooperatives based on specific needs viz. drinking water facilities by installing hand pumps, tube-wells and storage tanks, eye camps, assistance to school/school children, worked at the time of natural calamities like earthquake, flood and drought.

Table 5 - Soil testing by IFFCO and CORDET, Phulpur and Kalol - 2002-03 to 2004-05

Year	Soil samples analysed (No.)			Total
	IFFCO - mobile soil testing van	CORDET		
		Phulpur	Kalol	
2002-03	18896	35543	34502	88941
2003-04	20876	36122	51711	108709
2004-05	28388	37277	40500	106165
Total	68160	108942	126713	303815

Table 6 - Special projects

Sr. No.	State	District	Name	Villages (No)
	Punjab	Sangrur	Agriculture & Rural Development Project, Sunam	19
1.	Uttar Pradesh	Lucknow	Integrated Rural Development Project, Chinhat / Bakshi Ka Talab	30
2	Uttaranchal	Haldwani	Watershed Development Project, Okhalkanda	12
3	Uttaranchal	3 districts	Agriculture Development Project, Nainital, Almora, Pithoragarh	7
4	West Bengal	Purulia	Fruit and Vegetable Project, Jhalda	5
5	Rajasthan	Jhalawar	Agriculture Development Project	9
6	Chhattisgarh	Bilaspur	Watershed Management Project, Sakola	4
7	8 states	30 districts	IMPHOS - IFFCO Extension Project - Field demonstrations	44
8	7 states	Several	IARI - IFFCO Collaborative project on Transfer of Technology	Several
9	Jharkhand	Ranchi	Watershed Development Project, Barsa	4 check

Special Projects

IFFCO has implemented area specific agricultural development projects to extend benefit of technology to the farmers through demonstration approach and to bring about overall development in the area (**Table 6**). This approach of working with farmers in a concentrated manner helped to increase the productivity of crops by adoption of better farming practices. Promotional and educational programmes were organised to educate farmers to increase productivity of crops through balanced use of fertilisers. Farmers were taken to research

Training programme on fruits and vegetable preservation

institutes for imparting training on various aspects of agricultural development such as crop production technology, animal husbandry, bee keeping, mushroom cultivation, fruit and vegetable preservation, storage of foodgrains etc. Social and community based programmes such as vermicompost/nadep method of compost; creation of drinking water facilities by installation of hand pumps, tube-well and storage tank; construction/ renovation of *nali*/farm ponds; assistance to school and school children; cooperative development; supply of - agricultural equipments (sprayers, dusters, sickles, winnowers, pump sets, etc.), fruit saplings, PVC/alkathene pipes, animal feed; formation of self-help groups; distribution of - wheel chairs, sewing machines, tricycles, *thelia*, etc; medical and veterinary campaigns and need-based activities for the benefit of farmers. Integration of various programmes leads to increase in – **a)** area under HYV, **b)** productivity of crops, **c)** fertiliser consumption and **d)** area under irrigation in watershed areas. A case study of Agriculture Development Project, Jhalawar, Rajasthan is as under:

Agriculture Development Project, Jhalawar, Rajasthan – A Case Study

Project was implemented in 9 villages (Durgapura, Mandawar, Govardhanpura, Pruthivipura, Thugni, Panwasa, Ektasa, Jitapura and Junakheda) of Jhalrapatan block of Jhalawar district of Rajasthan during 2002–03 and 2003–04 with an objective to enhance productivity of crops through balanced fertilisation and moisture conservation through watershed development approach. Transfer of improved farm-technologies was brought about by undertaking number of activities related to agriculture and rural development (**Table 7**) that lead to increase in productivity of crops and fertiliser use (**Table 8**) and benefited 223 farmers by creating additional irrigated area of 508 ha and also recharged 79 wells under watershed development. Officials/Scientists from Dept. of Agriculture, Dept. of Cooperation, KVKs, MPUA&T, Udaipur were involved in these programmes. Besides package of practices of maize, soybean, wheat, coriander was written in local language on walls at strategic locations for its dissemination. Crop related literature was made available to the farmers. Under cooperative development programme 50 new farmer members were enrolled at the local society.

Table 7 - Agriculture development project, Jhalawar, Rajasthan - at a glance

Sr. No.	Activity	No	Remark
1	CIP kits	1350	Kits containing fertiliser, seed, agrochemical biofertiliser were supplied
2	Farmer meeting	46	
3	Field day	6	
4	Biofertiliser campaign	18	
5	Soil test campaign	13	Analysed 1200 soil samples. OC-71% high. P_2O_5 - 100% low, K_2O - 49% low & 25% medium
6	Crop seminar	2	Participated by 1060 farmers
7	Demonstration on medicinal plants	20	
8	Plant protection campaign	3	
9	Farmers visit to NRC on Orange, Nagpur	20	
10	Horticulture development	4	Supplied 2000 saplings of amla and guava
11	Veterinary check up	8	Treated 1800 animals
12	Drinking water facility	1	Installed one tubewell and water storage tank
13	Farm women trainings	9	Attended by 820 women. Contents of programme were - general information on agriculture, preparation of jam, jelly etc.; formation of SHG etc.
14	Medical check up	7	Treated 800 patients
15	Tree plantation	9	
16	Chaff cutters	20	
17	Storage beans	280	
18	Pheromone traps	1000	
19	Fodder (q)	450	Supplied during drought year 2002 - 03
20	Watershed development	6	

Anicut at village Durgapur

IMPHOS – IFFCO Extension Project – Field Demonstrations

The demonstrations comprising three

Table 8 - Agriculture development project, Jhalawar, Rajasthan : fertiliser consumption and productivity of crops

S.No.	Particular	2001 - 02	2003 - 04	2003 - 04 vs 2001 - 02 (%)
I	***Fertiliser consumption (kg/ha) - village-wise***			
1	Junakheda	78.5	85.0	8.3
2	Jitapura	70.4	80.0	13.6
3	Ektasa	72.9	80.0	9.7
4	Panvasa	67.8	75.0	10.6
5	Thugani	42.5	50.0	17.6
6	Pruthvipura	44.8	55.0	22.8
7	Govardhapura	49.8	55.0	10.4
8	Mandawar	62.5	70.0	12.0
9	Durgapura	74.4	85.0	14.2
10	Mean	62.6	70.0	11.8
II	***Productivity of crops (q/ha)***			
1	Soybean	12.5	14.5	16.4
2	Maize	7.3	9.6	32.1
3	Wheat	24.0	25.4	5.7
4	Chickpea	8.1	8.6	6.6
5	Coriander	10.1	11.0	8.5
6	Mustard	12.4	12.9	4.0

treatments **1.** Farmers practice, **2.** 50% recommended dose (RD), and **3.** 100% recommended dose (RD) were laid out in the same field and in the same cropping sequence during *Rabi* 2000-01 to *Kharif* 2003. Recommended doses of fertiliser and crop production practices were followed for the respective crops. IFFCO has conducted 265 On-farm demonstrations in 44 villages of 30 districts in eight states and also organised 133 programmes comprising of soil test campaigns, farmers meetings and field days **(Table 9)**. Publicity to these programmes was given through local press, which has created a good impact in promoting balanced dose of nutrients. Results of demonstrations indicate that application of 100% RD of nutrients has increased the yield of various crops over 50% RD of nutrients and farmers practice indicating advantage of application of balanced dose of nutrients **(Table 10)**. Application of 50% recommended dose of nutrients decreased the yield of cotton, rice and wheat in Punjab; rice in Tamil Nadu and Chhattisgarh over farmers practice, the yield of rice in Bihar and wheat in Chhattisgarh was not influenced between 50% RD of nutrients and farmers practice as in most of the crops, farmers have applied more nutrients in farmers practice as compared to 50% RD of nutrients. As a part of project IMPHOS - IFFCO has undertaken following activities during the project period:

Table 9 - IMPHOS - IFFCO demonstration project

Sr No	State	Demonstration (No)	Districts	Programmes organised	
				No	PP
1	Himachal Pradesh	26	Chamba, Sirmour	17	915
2	Punjab	48	Muktsar, Amritser, Sangrur Bhatinda, Hoshiarpur, Ropar,	36	2675
3	Bihar	48	Madhepura, Jehanabad, Sitamarhi	18	1784
4	Jharkhand	6	Ranchi	5	610
5	Uttar Pradesh	73	Aligarh, Pratapgarh, Jhansi, Mathura, Sultanpur, Kanpur, Azamgarh, Mirzapur, Hardoi	29	4398
6	Tamil Nadu	26	Erode, Thiruvanmalai, Salem, Dindigul	15	1930
7	Chhattisgarh	16	Bilaspur, Rajnandgaon	9	874
8	Madhya Pradesh	22	Guna, Jhabua, Jabalpur	4	165
9	Total	265	30	133	13351

1. National level meeting for launching IMPHOS - IFFCO extension project - field demonstrations: On-farm trials on efficient use of phosphorus in balanced nutrition of crops in India, July 3-4, 2000, Fertiliser Marketing Development Institute, IFFCO, Gurgaon.

2. Group discussion on response in crops to applied phosphorus in India, December 10, 2001, Fertiliser Marketing Development Institute, IFFCO, Gurgaon.

3. Published folder – On-farm demonstrations on balanced use of fertilisers in low fertiliser consumption areas in India

IARI – IFFCO Collaborative Project on Transfer of Technology

IARI–IFFCO organised a demonstration programme on farmer's field with an objective to create awareness about latest production technologies; to demonstrate the potential of improved varieties and disseminate the technology through field demonstrations under On-farm conditions; to bring about further refinement of technology and to promote balanced use of nutrients for increasing productivity of crops. Scientists from state agricultural university/research institute and officials

Rabi crop seminar

from Govt. Departments were involved in the programme. The programme was initiated during *Rabi* 2000–01 and continued for 5 crop seasons till *Rabi* 2002–03 in the states of Delhi, Uttar Pradesh, Haryana, Himachal Pradesh, Madhya Pradesh, Bihar and Tamil Nadu. Total 1280 demonstrations on cereals, pulses, oilseeds, fodder, flower and vegetable crops over an area of 603 ha were carried out on crop/varietal diversification, zero tillage technologies, balanced fertiliser use during the above period. By and large demonstrations conducted on various crops on farmers field with different package of technologies have benefited the farmers in increasing the yield and income (6). Number of extension activities like field day, kisan mela, farmers visit to research stations, scientists visit to farmer's field,

Table 10 - Yield of various crops under IMPHOS - IFFCO demonstrations

Sr. No.	State	Crop	Trial (No)	Grain yield (q/ha)			Yield increase (%)		
				FP	50 % RD	100 % RD	50% RD over FP	100 % RD over FP	100 % RD over 50 %
1	Himachal Pradesh	Maize	5	21.3	26.1	35.4	22.5	66.0	35.5
2	Himachal Pradesh	Rice	8	43.4	47.6	59.3	9.6	36.4	24.4
3	Himachal Pradesh	Wheat	13	24.3	28.1	40.1	15.6	65.0	42.7
4	Punjab	Cotton	8	15.6	14.8	18.0	-5.1	15.4	21.6
5	Punjab	Rice	15	61.3	57.5	67.2	-6.2	9.7	17.0
6	Punjab	Wheat	25	44.1	38.7	50.9	-12.2	15.4	31.5
7	Bihar	Rice	24	30.4	29.9	39.0	-1.5	28.5	30.4
8	Bihar	Wheat	24	23.3	25.4	35.6	9.3	53.2	40.2
9	Jharkhand	Rice	3	27.0	28.9	47.8	6.9	76.9	65.4
10	Jharkhand	Wheat	3	19.7	21.6	30.9	9.9	56.9	42.7
11	Uttar Pradesh	Ground nut	2	6.1	7.5	11.0	21.6	80.0	48.0
12	Uttar Pradesh	Pearl millet	4	21.5	27.2	32.4	26.3	50.6	19.2
13	Uttar Pradesh	Rice	23	34.3	41.1	54.8	20.0	59.9	33.2
14	Uttar Pradesh	Wheat	44	32.2	33.9	47.9	5.2	48.7	41.4
15	Tamil Nadu	Black gram	3	7.1	8.9	10.7	26.4	50.9	19.4
16	Tamil Nadu	Chillies	1	2.4	3.8	4.4	58.3	83.3	15.8
17	Tamil Nadu	Ground nut	1	6.4	8.2	8.7	28.1	35.9	6.1
18	Tamil Nadu	Rice	18	35.9	30.8	49.8	-14.4	38.6	61.9
19	Tamil Nadu	Tapioca	2	34.0	50.0	68.0	47.1	100.0	36.0
20	Tamil Nadu	Tomato	1	137.0	180.0	221.0	31.4	61.3	22.8
21	Chhattisgarh	Rice	7	37.2	31.1	47.7	-16.3	28.3	53.2
22	Chhattisgarh	Wheat	9	18.7	18.5	29.4	-1.1	57.5	59.2
23	Madhya Pradesh	Black gram	2	4.7	7.4	8.6	56.4	81.9	16.3
24	Madhya Pradesh	Chick pea	5	5.8	8.8	11.9	50.5	103.8	35.4
25	Madhya Pradesh	Maize	7	7.0	8.9	15.2	26.8	115.6	70.1
26	Madhya Pradesh	Pea	1	11.0	17.0	24.0	54.5	118.2	41.2
27	Madhya Pradesh	Sorghum	1	10.5	15.6	21.5	48.6	104.8	37.8
28	Madhya Pradesh	Soybean	2	12.2	14.3	15.8	17.8	29.6	10.1
29	Madhya Pradesh	Wheat	4	19.1	23.6	29.5	23.5	54.5	25.2

Table 11 - Demonstrations on boronated fertiliser - list of districts

S.No.	State	Demonstration (No.)	Districts
1	Orissa	67	Balasore, Bargarh, Bhadrak, Bolangir, Cuttack, Dhenkanal, Ganjam, Keonjhar, Khurda, Koraput, Mayurbhanj, Nawarangapur, Nayagarh, Puri, Sambalpur, Sundergarh
2	West Bengal	112	Bankura, Birbhum, Burdwan, Coochbihar, Hooghly, Jalpaiguri, Malda,Midnapur (East), Midnapur (West), Murshidabad, Nadia, North 24 Pgs, Purulia, Uttar Dinajpur.
3	Rajasthan	37	Ajmer, Alwar, Bhilwara, Bundi, Chittorgarh, Hanumangarh, Jaipur, Jodhpur, Kota, Pali, Sikar, Sriganganagar, Udaipur
4	Uttar Pradesh	20	Baghpat, Bulandshahar, Ghaziabad, Meerut
5	Chhattisgarh	24	Ambikapur, Bilaspur, Dhamtari, Durg, Kanker, Mahasamund, Pendra Road, Raigarh, Raipur, Rajnandgaon
6	Madhya Pradesh	20	Indore
	Total	280	

etc., was carried out from time to time benefiting more than 10,000 farmers during the implementation of this programme. Publicity to various activities was given through radio and newspaper to reach large number of farmers.

Value Addition - Fortification of NPK 10:26:26 with 0.3% Boron

IFFCO manufactured boronated fertiliser 10:26:26:0.3B at Kandla and conducted 280 On-farm demonstrations on 25 crops in 58 districts in 6 states during 2002-03 *(Rabi)* and 2003–04 **(Table 11)**. Three plot demonstrations consisting of 1) Farmers practice, 2) Recommended dose of NPK (using 10:26:26), and 3) Recommended dose of NPK + B (using boronated 10:26:26:0.3) were laid out on farmer's field. Research trials/demonstrations were also conducted at state agricultural universities of West Bengal, Orissa and Jharkhand. The results of demonstrations reveal increase in yield in the range from 0.4% to 28.6% due to application of boronated fertiliser as compared to non-boronated fertiliser in different crops indicating need for application of boron in crops. Subsequently, IFFCO manufactured 1420 mt 10:26:26:0.3B and supplied to Orissa, West Bengal, Uttar Pradesh, Chattisgarh, Gujarat and Maharashtra and it was sold at par with 10:26:26 rate (without boronated fertiliser) through cooperatives/FSC's. The additional cost of 0.3%B was absorbed by IFFCO and it was not charged to farmers. Farmers survey (366 respondents) from the states of Maharashtra (50), Gujarat (72), West Bengal (176) and Uttar Pradesh (68) on 20 crops indicate better plant growth, yield and quality of produce due to application of boronated fertiliser as compared to non-boronated fertiliser, expressed willingness to buy boronated fertiliser, etc.

IFFCO Chair

IFFCO has established linkages with the state agricultural universities and research institutes by instituting 17 IFFCO Chairs (16 Chairs in Agricultural Universities and one at Vaikunth Mehta National Institute of Cooperative Management, Pune) for collaborative research work on agricultural and fertiliser related aspects and also to seek their guidance in the field programmes on various aspects of crop production. Resource persons/experts from national institutes review the work of IFFCO Chair and formulate action plan for the individual Chair. IFFCO Chair Professors are also involved in field programmes for transfer of farm-technologies and also associated in the training programmes organised for IFFCO's staff. Since inception 12 IFFCO Chair Professors conferences are organised. These Chairs are operational in various disciplines as under:

1. Agronomy – PAU, Ludhiana; JNKVV, Jabalpur (Indore campus); APAU, Hyderabad; TNAU, Coimbatore; BCKVV, Nadia and SVBPUA&T, Meerut.

Table 12 - Training programmes organised by IFFCO, FMDI and CORDET - 2002-03 to 2004-05

Year	IFFCO, FMDI Gurgaon		CORDET						Total	
			Phulpur		Kalol		Kandla			
	No	PP	No	PP	No	PP	No	PP	No	PP
2002-03	41	795	85	4741	68	3725	8	2724	202	11985
2003-04	78	1465	76	4765	72	4463	12	2225	238	12918
2004-05	57	1320	85	6586	85	4134	14	1345	241	13385
Total	176	3580	246	16092	225	12322	34	6294	681	38288

2. Soil Science – AAU, Anand; GBPUA&T, Pantnagar; CCSHAU, Hisar; OUAT, Bhubaneshwar; MPUA&T, Udaipur; CSAUA&T, Kanpur and CSKHPKVV, Palampur.

3. Extension and Cooperation – UAS, Bangalore and VMNICM, Pune

4. Agro Economics – KAU, Vellanikkara.

5. Fertiliser Technology – BHU, Varanasi.

Training Programmes

IFFCO organises inservice training programmes for their field staff and FSC salesman and helpers on annual basis to review and formulate action plan for sales, promotional programmes and other related aspects. IFFCO has developed training facilities for in-house participants and also for cooperative personnel at its Fertiliser Marketing Development Institute, Gurgaon, Haryana where training programmes are organised throughout the year on various aspects, viz., agro-technology cooperative development, marketing and finance management, organisational development, computer systems related, etc. **(Table 12)**. CORDET, Phulpur and Kalol regularly organises training programmes for farmers for a period of 1-5 days on crop production technology including horticultural crops, dairy, poultry, fruits and vegetable preservation, computer training, tailoring and embroidery, etc. Rural development programmes are also undertaken by CORDET in cluster of villages on agriculture and horticulture related work. In all the training programmes resource persons from national level organisation and also from in-house are invited to deliver lecture.

Publicity Programmes

IFFCO is exploring various sources of communication such as use of computers, electronic and print media, radio and information technology based medium to reach cooperatives and farmers. The thrust is on to disseminate the message of balanced and efficient use of nutrients. IFFCO has participated in fair and exhibitions organised at various level. Literature in the form of folders, leaflets, pamphlets, booklets etc., printed in local language on crop production and fertiliser use is distributed in various programmes. A film on *Miti ki parakh* was prepared on the theme of balanced use of fertiliser. IFFCO has erected hoardings/road side signboards and also painted walls of the society godowns, etc., at strategic points. Package of practices of crops are also written on walls in the villages.

ICT Initiatives for Farmers and Cooperatives

An endeavour is made by IFFCO to take the agriculture related information to farmers and cooperatives through information and communication technology called 'IFFCO's agri-portal'. At present, sixteen states have been covered with information of relevance to farmers in local languages and can be accessed through IFFCO's website www.iffco.nic.in. In addition, links to other sites are also provided. User-friendly intuitive graphic based navigation is provided to facilitate viewing in touch screen environment. Audio summaries, in local languages, have been incorporated in important sections. IFFCO has installed about 100 Farmers Information Kiosk in 16 states. It consists of a computer and connectivity through which farmers and cooperatives can have electronic access. Training programmes and farmers meetings are conducted to encourage farmers to use the facilities provided in farmers information kiosks.

Indian Farm Forestry Development Cooperative Limited

Indian Farm Forestry Development Cooperative Limited (IFFDC) promoted by IFFCO was registered on October 22, 1993 under the Multi State Cooperative Societies Act, 1984 with an objective to develop wastelands for ecological balance and generate additional employment through integrated farming systems approach with peoples participation. More than 26000 ha of wasteland have been converted into multipurpose forest by promoting village level Primary Farm Forestry Cooperative Societies (PFFCS) in the states of Uttar Pradesh, Madhya Pradesh and Rajasthan. IFFDC has worked in collaboration with IFFCO, India-Canada Environment Facility; Deptt. for the International Development, UK; State Innovations for Family Planning Services Project Agency, Lucknow; National Oilseeds and Vegetable Oils Development Board, Govt. of India; District Poverty Initiatives Project/Rural

Plantation site

Non-farm Development Agency, Govt. of Rajasthan; Uttranchal Livelihoods Improvement Project for Himalayas, Govt. of Uttaranchal and also provided consultancy services in diversified fields to national and international organisations. Under Western India Rainfed Farming Project, IFFDC has conducted various activities / programmes during the year 2002-03 to 2004-05, some of these are - formation of 657 Self Help Groups; developed 21 Primary Livelihood Development Cooperative Societies; dug 1799 compost pits; planted 16.84 lakh saplings; organised 117 veterinary camps and treated about 50,000 animals; organised 54 medical camps and treated about 5500 patients; developed water resources by - construction of 63 anicuts, 150 sunken ponds; excavated/deepened 36 farm ponds; constructed/deepened 253 wells; installed/repaired 124 hand pumps and also constructed number of *rapat*/ dams. In addition, soil and water conservation measures were also undertaken on an area of 380 ha, stone bunding (1030 ha), *nala* bank stabilisation (6688 m), etc., as a result of which 1785 ha area has been increased under irrigation. The work done by IFFDC under different projects is: awareness for family planning measures, vaccination in children, jatropha cultivation, formation of common interest groups to undertake various livelihood development initiatives, etc.

FUTURE STRATEGY

IFFCO ENVISAGE FOR FUTURE ALSO TO continue marketing of the fertilisers with back up of promotional programmes with thrust on maintaining soil health by mitigating multi-nutrients deficiencies, balanced and integrated use of nutrients and ensuring timely supply of NPK fertilisers. Farmers, cooperatives and institutional agencies will be involved in all such programmes. Training will be the core area for IFFCO's field staff, farmers and cooperatives to keep them abreast with the improved agro-technologies through exposure visit to state agricultural universities/research institutes and other interactive meetings. Efforts will be directed to increase productivity of crops in rainfed areas by promoting balanced use of fertilisers in cereals, pulses and oilseeds and cash crops like fruits and vegetables with the back up of adequate supplies of fertilisers. Similar efforts will continue in irrigated area as well. Crop based approach will be followed to promote fertiliser use throughout the year as far as possible. Cooperatives will continue to involved in storage, handling and transportation of fertiliser to ensure its availability and improve their viability. Community and social programmes will be given due diligence to provide benefit to farmers and cooperatives.

CONCLUSIONS

SINCE INCEPTION IFFCO HAS BELIEVED in providing service to the farmers and cooperatives through its field programmes. These programmes assist in increasing productivity of crops. Results from On-farm demonstrations indicate increase in yield due to application of balanced fertiliser use. Educating farmers through soil testing and training programmes is useful. Linkages with state agricultural universities/research institutes/national and international organisations further strengthened the programmes. ICT and other electronic medium of communication help to reach the farmers in a short time and they are useful. IFFCO will continue to provide in a humble way such services to the farmers for their better tomorrow. Strengthening the cooperatives will also be focus activity for better and efficient distribution of quality fertilisers.

REFERENCES

1. Biswas, B.C. and Tewatia, R.K. *Fert. News* 36 (4): 11-35 (1991).

2. FAO – IFFCO. A Guide to Field Implementation of Integrated Plant Nutrition System. FAO – IFFCO, New Delhi, 106 + xiii (1997).

3. Govil, B.P. and Kaore, S.V. Paper presented at Seminar organized by IFFCO on IPNS, FMDI, IFFCO, Gurgaon, Haryana. Sept. 24-26 (1996).

4. Govil, B.P. and Kaore, S.V. *Fert. News* 44 (2): 53-60 and 63-68 (1999a).

5. Govil, B.P. and Kaore, S.V. *Fert. News* 44 (4): 145-158 (1999b).

6. IARI – IFFCO Collaborative Outreach Programme, IARI, New Delhi (2005).

7. Kaore, S.V. *Fert. News* 47 (2): 61-63 (2002).

8. Kaore, S.V. Report on IMPHOS – IFFCO Extension Project – Field Demonstration – IFFCO Experience. Review Meeting of IMPHOS Supported Project in India, New Delhi, December 11, (2004).

9. Kumar V.; Govil, B.P. and Kaore, S.V. Soil Test Based Nutrient Application Trials on Farmers Field – IFFCO Experience. IFFCO, New Delhi, 38 + x (1997).

10. Kumar V.; Govil, B.P. and Kaore, S.V. Proc. of the National Workshop on IPNS, Bhubaneshwar, March 10-12, 1997, 166 + v, IFFCO, New Delhi (1997b).

11. Kumar V.; Govil, B.P. and Kaore, S.V. *Fert. News* 44 (12): 89-94 and 99-106 (1999).

12. Kumar V.; Kaore, S.V. and Shrotriya, G.C. Soil Fertility and Fertiliser Use Volume IV – Nutrient Management and Supply System for Sustaining Agriculture in 1990's. IFFCO, New Delhi, 345-357 (1990a).

13. Kumar, V. and Shrotriya, G.C. Proc. FAI Annual Seminar, SV II / 1-8, New Delhi, December 4-6, (1989).

14. Kumar V.; Shrotriya, G.C. and Kaore, S.V. Ed. Soil Fertility and Fertiliser Use – Volume III – Urea Super Granules for Increasing Nitrogen Use Efficiency. IFFCO, New Delhi, 143 + xii (1989).

15. Kumar V.; Shrotriya, G.C. and Kaore, S.V. *Fert. News.* 35(7):23-29 (1990b).

16. Kumar V.; Shrotriya, G.C. and Kaore, S.V. Crop Response to Sulphur Application. IFFCO, New Delhi, 50 + v. (1992).