Impact Assessment of the Farmers Trainings on Scaling-up of Water Productivity in Agriculture

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ABSTRACT

The present study was attempted to know the impact of the farmers training programmes conducted in eight districts of Odisha during the year 2007-11.These training programmes each of seven days duration were organized by Directorate of Water Management, Bhubaneswar with major theme of the trainings "scaling-up of water productivity in agriculture for livelihoods". To assess the impact of trainings, questionnaire surveys covering 25-30% of farmers trained during the training programmes were carried out after a gap of minimum one year period. The findings implied that farmers showed significant improvement in their overall awareness (70.10%), attitude (68.27%) and skill (64.91%). The overall knowledge gain of the farmers on different scientific techniques for enhancing water productivity in agriculture was found to be significant and the adoption of these techniques by the farmers were found to be satisfactory level. Thus, trainings had motivated the farmers for adopting the modern techniques in order to get more production and farm income per drop of water.

Key words: *Training; Water productivity; Knowledge gain;*

Water scarcity has emerged as one of the challenging issues in recent years. So, it should be conserved, harvested and utilized in an efficient and profitable way in order to get more gain per drop of water. Present day agriculture and Indian farming community is facing multiple problems to maximize crop productivity. Inspite of successful research on new agricultural practices related to crop cultivation, the majority of farmers are not getting upper bound yield due to several reasons. One of the concerns that often sighted is scientific advice regarding crop cultivation does not reach to the farming community in a timely manner. Extension agency plays a major role in bridging this gap and communicate the latest technologies to the farmers (*Kumar & Ratnakar, 2011*). To increase the productivity of crop, the adoption of improved technology is a pre–requisite (*Yadav et al. 2011*). Use of new or improved inputs and adoption of technology in agriculture are important in increasing farm productivity (*Kher et al. 2005)*. Adoption of technology depends on the required information received by the farmers from different sources as it is a critical input and as important as other key inputs such as credit, seeds, fertilizers and water. Different sources and channels of agriculture information can play important role to meet this requirement (*Yadav et al, 2011)*. The adoption of an innovation depends upon its impact on the minds of potential adopters (Prasad &Katteppa, 2005). Farmers' attitudes determine adoption of improved technology (*Chilonda and Van Huylenbroeck, 2011*). Attitude is operationalised as the degree of positive or negative feeling of farmers towards the technologies communicated by extension services (*Kumar & Ratnakar, 2011*). Favourable attitude is essential for acceptance of any scientific innovation (*Kanwat et al, 2011)*.

Directorate of Water Management, Bhubaneswar conducted 69 farmers' trainings (each of seven days) in different districts of Odisha during the year 2007 to 2011. These trainings courses mainly focused in disseminating the scientific techniques to farmers those would enhance the water productivity in agriculture and improve livelihoods. Here water productivity is defined as the production obtained (Rs.) per unit volume of water (m^3). Therefore, enhanced water productivity includes application of all scientific techniques along with efficient and multiple uses of water in agriculture which

as a whole increase the production. The present study was undertaken to assess the impact of these farmers trainings conducted during past years after a minimum gap of one year.

METHODOLOGY

The training effectiveness operationalised as the transfer effects of training: the extent to which farmers use their newly gained knowledge, skills and attitudes. Questionnaire surveys covering a sample of 25-30% of the farmers trained during the farmers' trainings were carried out for impact assessment of the trainings after minimum time gap of one year. The data were collected from randomly selected 427 farmers undergone the trainings in sample of eight districts (Khurda, Puri, Cuttack, Nayagarh, Jajpur, Jagatsinghpur, Dhenkanal, Balasore) of Odisha through questionnaire survey for impact assessment. Questionnaire was devised for collecting the information regarding the post training effects on the farmers. Social and personal information were collected and the feedbacks regarding awareness, attitude, skill and knowledge gain of the farmers were recorded on a three point continuum scale: low, medium, high with score as 1, 2 and 3, respectively. The data related to the adoption of the different scientific techniques with area of adoption were also collected. The knowledge gain by the farmers was calculated by the following formula :

$$\text{Knowledge Gain (\%)} = \frac{\text{Mean Knowledge gain score of a tech niques/pracices/issues } (G_j)}{\text{Maximum Knowledge gain score for that techniques/pracices/issues } (G_m)} \times 100$$

Where, Gj = S Gij / N

Where

i = 1,2, ……, N

j = 1,2, ……, K

N = total number of respondents=427

K = total number of technologies/practices/issues = 28

Gm = Maximum Knowledge gain score = 3

The adoption of the techniques by the farmers was calculated by

$$\text{Exten of adoption (\%)} = \frac{\text{Number of farmers adopted a technique/practice } (A_t)}{\text{Total numbers of farmers surveyed}} \times 100$$

Where t = 1, 2,……. , m

m=Total number of techniques/ practices=25

The responses of the sampled farmer-trainees were analyzed using appropriate statistical techniques.

RESULTS AND DISCUSSION

Profile of the farmers trainees

The profiles of the farmers are given in Table 1. Most of the respondents (54.70 %) were under middle age (40-60 yrs) group. Relatively less number of young farmers calls for the need of encouraging farm youths to be actively involved in agriculture and to adopt scientific technologies being more educated and positive mindset than old farmers (*CIMMYT, 1993)*. Around 48 per cent of farmers were below poverty lines. Majority of the farmers (94.50%) were found to be undergraduate and around 47 per cent farmers had no experience of participation in trainings during past years. So, it reiterates the need of the training to these farmers to make them aware about the modern scientific technologies for improved agriculture with more productivity and farm income. The education through training is expected to enhance the decision making and the adoption of agricultural technologies (*Cavane, 2011*). Adoption of technology is influenced by physical, socio-economic and psychological factors like agro-ecological conditions, age, family size, education, how-to-knowledge, source of information and farmer's attitude towards the technology (*Neupane et al., 2002 and Rogers, 2003*).

Table 1. Profile of the farmers undergone trainings N=427

S.N.	Variables	Category	F	%
1.	Gender	Male	358	83.84
		Female	69	16.16
2.	Age	Young (0-40 years)	134	31.49
		Middle (40-60 years)	234	54.70
		Old (60-90 years)	59	13.81
3.	Economic Status	BPL	205	47.91
		APL	222	52.09
4.	Education	Illiterate	3	0.74
		Functional literate	44	10.32
		Primary	113	26.54
		Secondary	167	39.07
		Higher Secondary	77	17.94
		Diploma/ Degree	23	5.41
5.	Training attended during past years	Nil	199	46.56
		1-2 trainings	183	42.98
		3-4 trainings	34	7.99
		4-5 trainings	4	0.83
		More than 5 trainings	7	1.65

Impact of training :

Impact of training was realized through analyses of improvement in awareness, attitude and skill of farmers undergone the training. From Fig 1, it is re-

vealed that overall improvement in awareness, attitude and skill of the farmers are found to be medium and in the range of 65 to 70 per cent which showed that the trainings had positive effects on the farmers about the modern scientific techniques for scaling-up of water productivity in agriculture. These results are in conformity with findings of *Das and Sharma (1998)* who also found that training programmes contributed significantly in improvement of respondent's knowledge about scientific practice.

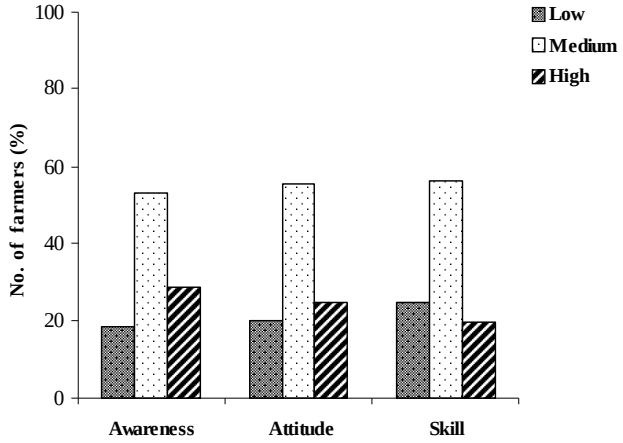

Fig 1: Distribution of farmers (%) based on improvement in awareness, attitude and skill towards scaling-up of water productivity in agriculture

Table 2 shows the mean value of improvement in awareness, attitude and skill of the farmers of different districts. It was found that awareness of the farmers of Balasore district was higher in comparison to other districts. The attitude change was found more for the farmers of Jagatsinghpur district while the farmers of Nayagarh showed maximum skill development. The variation (standard deviation) in improvement of all three criteria is found to be almost same; however, the improvement in awareness was relatively more as compared to attitude and skill.

Data presented in Table 3 revealed that the overall knowledge gain on different scientific techniques was 62% which showed that the trainings had helped farmers in increasing their level of knowledge regarding new scientific technologies for improved agriculture which in turn helped them towards adoption of these technologies gaining more production and farm income. Farmers acquired maximum knowledge on different techniques/issues *viz.* growing pulse crops through residual soil moisture utilization during *rabi* season (71%), horticultural crops cultivation: vegetables, fruit crops (71%), farm implements and their uses/farm mechanization (70%), growing more rice with less water through SRI method (70%), rainwater conservation/ harvesting techniques (69%), mushroom cultivation (68%), use of organic fertilizers (bio fertilizers, vermicompost, etc.) (68%), judicious use/optimum dose of fertilizers (67%), livestock rearing (cattle/goat/sheep) (66%), multiple uses of conserved rainwater (65%), groundwater utilization through dugwell, borewell, tubewell, etc (65%); crop diversification (65%), availing benefits as beneficiary farmer under different schemes (65%), plant protection measures: insect and disease management in major crops (64%), water-saving irrigation methods instead of flooding method of irrigation (63%), economic use of waterlogged areas through cultivation of aquatic crops, fish farming (62%) and conjunctive use of groundwater and surface water (61%).

Table 2. Improvement in awareness, attitude and skill of farmers of different districts in Odisha undergone training

S.N.	Name of the district	Awareness		Attitude		Skill	
		Mean	SD	Mean	SD	Mean	SD
1.	Khurda (118)	2.01	0.59	2.07	0.56	2.13	0.60
2.	Puri (54)	1.76	0.43	1.33	0.51	1.35	0.65
3.	Cuttack (45)	2.31	0.67	2.20	0.63	2.16	0.64
4.	Nayagarh (15)	2.33	0.49	2.07	0.73	2.20	0.56
5.	Jajpur (20)	2.05	0.51	1.80	0.52	1.85	0.59
6.	Jagatsinghpur (65)	1.98	0.85	2.52	0.64	1.92	0.74
7.	Dhenkanal (80)	2.18	0.73	2.04	0.64	1.90	0.57
8.	Balasore (30)	2.73	0.45	2.17	0.38	2.17	0.38
	Overall (427)	2.10 (70.10%)	0.68	2.05(68.27%)	0.67	1.95(64.91%)	0.66

Note: Figure in the parenthesis indicate number of farmers-respondents

Table 3: Knowledge gain and adoption of the techniques/ practices by the farmers trained through one-week farmers training programmes

S. N.	Issues / Techniques / Practices discussed during the training programmes	N=427		
		No. of farmers adopted (%)	Adopted area in ha.	Knowledge Gain (%)
1	Rainwater conservation / harvesting techniques	64	117	69
2	Multiple uses of conserved rainwater	53	94	65
3	Ground water utilization through dugwell, borewell, tubewell, etc	51	74	65
4	Micro level water resources development like tank, sub-surface water harvesting, well, farm pond, etc	29	30	59
5	Water conservation measures for rainfed areas / watersheds including rubber dam as check dam	9	4	53
6	Water-saving irrigation methods instead of flooding method of irrigation	34	57	63
7	Conjunctive use of ground water and surface water	39	68	61
8	Pressurized irrigation systems (drip, sprinkler)	13	9	55
9	Farm implements and their uses / farm mechanization	79	154	70
10	Growing more rice with less water through SRI method	54	91	70
11	Growing pulse crops through residual soil moisture utilization during *rabi* season	76	124	71
12	Crop diversification	49	66	65
13	Horticultural crops cultivation: vegetables, fruit crops	65	60	71
14	Cultivation of high value crops like medicinal plants, cash crops	27	26	53
15	Economic use of waterlogged areas through cultivation of aquatic crops, fish farming	35	33	62
16	Rice-fish integration	16	7	52
17	Mushroom cultivation	22	7	68
18	Integrated farming system approach	31	30	58
19	Soil testing measures and important parameters	37	63	55
20	Soil nutrient management (nutrient deficiency symptoms and corrective measures)	37	62	52
21	Judicious use / optimum dose of fertilizers	73	117	67
22	Use of organic fertilizers (bio fertilizers, vermi-compost, etc.)	72	102	68
23	Plant protection measures: insect and disease management in major crops	73	93	64
24	Poultry farming	22	4	58
25	Livestock rearing (cattle / goat / sheep)	62	7	66
26	Group approach / participatory approach for self empowerment			59
27	Financial issues: agricultural loans/ crop loans/ crop insurance schemes			59
28	Availing benefits as beneficiary farmer under different schemes			65
	Overall	45	1500	62

It is evident that the respondents-farmers have put the scientific techniques (25 techniques) into practices in a total area of 1500 ha. Fig 2 depicts adoption of different technologies. Maximum adoption by the farmers was observed for the techniques/practices like farm implements and their uses/farm mechanization (79%) in an area of 154 ha., growing pulse crops through residual soil moisture utilization during *rabi* season (76%) in an area of 124 ha., judicious use/optimum dose of fertilizers (73%) in an area of 117 ha., plant protection measures: insect and disease management in major crops (73%) in an area of 93 ha., use of organic fertilizers (bio-fertilizers, vermi-compost, etc.) (72%) in an area of 102 ha., horticultural crops cultivation: vegetables, fruit crops (65%) in an area of 60 ha., rainwater conservation/harvesting techniques (64%) in area of 117 ha., growing more rice with less water through SRI method (54%) in area of 91 ha., multiple uses of conserved rainwater (53%) in area of 94 ha. and groundwater utilization through dugwell, borewell, tubewell, etc (51%) in an area of 74 ha.. From the results, it can be concluded that the trainings had motivated the farmers for adoption of scientific techniques in their field for gaining more production and income. These results are in conformity with findings of *Kaliba et al., 2000; Abebaw & Belay, 2001; Neupane et al., 2002; Roger, 2003; Hintz et al, 2003* and *Ahire et al., 2007* in which they reported that knowledge, source of information, mass media exposure, role of extension in dissemination of improved technologies influenced the adoption of improved technologies.

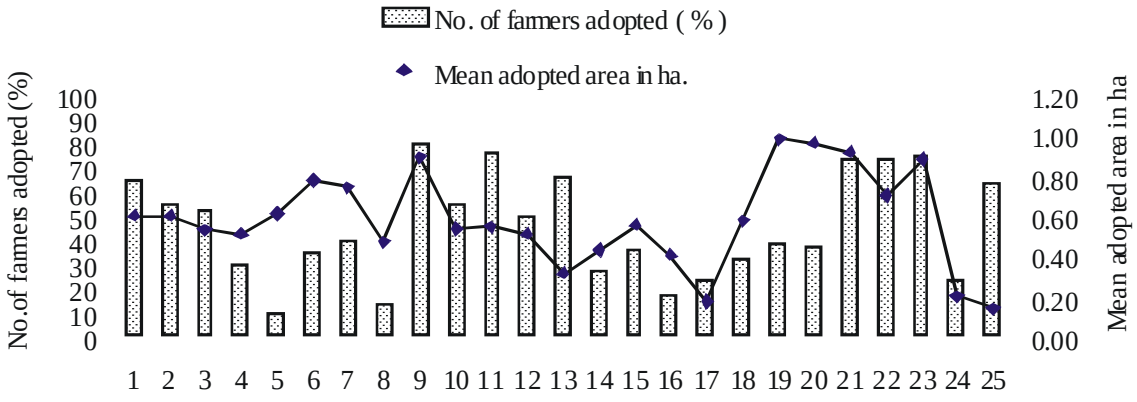

Fig 2. Techniques adopted by the farmers (%) with mean area of adoption

CONCLUSION

The farmer's undergone trainings hold positive approach towards the adoption of modern scientific techniques in agriculture for gaining more production and income. The trainings were conducted in location specific manner addressing location specific water management problems in agriculture. Thus the farmers gained not only the knowledge about the techniques for enhancing water productivity in agriculture but also developed their skill with changed positive attitude which are reflected in adoption of the technologies by substantial number of farmers. On–farm trainings are found to have more immediate impact; therefore, the Krishi Vigyan Kendras and State line departments need to emphasize more on location specific on-farm trainings of the farmers rather than only on-station routine farmers trainings.

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