**Summative Evaluation of Training for Effective Water Management: Case of Extension Personnel in Bihar’s Milieu, India**

**M. S. Meena1, K. M. Singh2 & M. A. Khan3**

1Senior Scientist, 2 Principal Scientist and Head & Director

ICAR Research Complex for Eastern Region

(P.O. Bihar Veterinary College) Patna (Bihar)-801 505 (India)

Phone No. 9470465688; 0612-2228662 (off)-Ext.119; Fax: + 91-612-2223956

Email: ms101@sify.com

**ABSTRACT**

A fourteen days intensive training on scaling up of water productivity was conducted and evaluated at ICAR RCER, Patna (Bihar). The study was undertaken to measure the knowledge, skill, attitude and aspiration level of extension personnel. Data were solicited during February, 2010 from 25 extension workers at two point of time (pre and post evaluation). The investigation reveals a significant impact among the extension personnel as they gained a significant change in acquiring new knowledge, developed participatory skills, changed in their attitude and aspirations fulfilled toward scaling-up of water productivity. Hence, it is expected that this enhanced learning will be effectively transferred to their workplace for the effective water management in agriculture. This systematic appraisal will also provide corrective measures to improve an on-going or future training program. Study also recommends that there is a great need to keep them up-to-dated in technological advancement especially in water scares areas as they are playing catalytic role in adoption of agricultural technologies. Information seeking pattern is strong as they used to receive information from scientists of National Agricultural Research System followed by mass media.

**1. Introduction**

In India, training evaluation is either ignored or done half-heartedly which invariably fails to reflect the success of training investment. There is scanty evidence of systematic training evaluation, if any, is restricted to the feedback / reaction of the participants. Although, it is an extremely difficult process (Mclean, 2005), however, it continues to be an essential activity in judging / demonstrating the value of human resource development (Preskill, 1997). Even though, importance of training evaluation is well recognized (Bober and Bartlett, 2004; Noe, 2000; Swanson and Holton, 1999). While expenditures have grown, training organizations have not taken extra step to show payoff of their efforts. Monitoring and evaluation are the in-built component of extension and training systems. Training evaluation acts as a systematic appraisal tool to provide corrective measures to improve an on-going or future training program. It is a means of justifying training investment among the training consultants and top management (Hashim, 2001). Now-a-days, need for understanding the evaluation techniques is becoming more important (Bober and Bartlett, 2004) and through evaluation process, learning can be enhanced and transferred to their workplace (Bartram and Gibson, 1999).

Moving toward a more decentralized, participatory and market driven approach, extension system will require substantial investments in up-grading the skills and knowledge of all extension personnel, especially those at field level (Swanson, 2008). Hence, need for strengthening the extension-personnel through effective training programs has become an integral part of agricultural strategy. Significance of water management as a precious input is well evident and these days it has become a critical issue globally. Water resource development and management is imperative for sustainable agricultural in water scarce areas (Ashraf *et al.,* 2007). Perfect blending of extension functionaries, training and technology may leads to maximize the agricultural production for improving the livelihoods. The study was undertaken to get hands-on-experience for efficient use of water, enhance the scientific outlook in water management which will lead to increase in their knowledge, skill and attitude level of extension personnel. The study was conducted to understand the demographic attributes, and to measure the knowledge, skill, attitude and aspiration levels of extension personnel.

**3. Research Methodology**

A fourteen days intensive training program was organized and evaluated at ICAR Research complex for eastern region, Patna (Bihar) India. Data were solicited from 25 extension personnel from institutes of Indian Council of Agricultural Research, State Agricultural Universities (SAUs), Krishi Vigyan Kendra (KVK) and development departments of Bihar State. Evaluation of trainees was done at all the stages of KASA (Knowledge, Attitude, Skill and Aspiration) model. The model assumes that change in knowledge, attitude, skill and aspiration leads to modify in the scientific practices, which create desired change. The training was conducted through lecture method followed by result or method demonstration following *learning by doing* and *seeing is believing* principles. Modular approach was applied and whole training program was divided into following modules; (i) Socio-economic facets of water saving technologies (ii) Water management in agronomic and horticultural crops (iii) Water management in live-stock and fishery sector (iv) Agricultural engineering technological interventions (v) Integrated nutrient and disease management (vi) Role of women, financial institutions and participatory approach (vii) Result / method demonstration / interactions / group discussions with farmers, extension functionaries and scientists. Before and after design with singe-group was followedto measure the impact of training. A knowledge test was developed and minimum and maximum obtainable score was 7 to 29. Data on skills were measured on three point continuum namely new skill learnt, known skill sharpened and no new learning. Attitude towards scaling up of water productivity was measured on three point continuum namely: agree undecided and disagree. Aspiration or expectation level was also measured on three point continuum i.e. highly satisfied, satisfied, not satisfied. Non-parametric statistics was employed to test the difference in paired data.

**Hypothesis:**

H0: There is no difference in knowledge, skill, attitude and aspiration level of

two groups.

H1: There is significant difference in knowledge, skill, attitude and aspiration level of two groups.

 **4. Results and Discussion**

***4.1 Descriptive statistics***

The age of respondents in this study ranged from 25 to 49 years with a mean of 39 years (Table 1). The most of extension personnel had master degree followed by bachelor degree. Most of them were male and had rural family background. Their job experience ranged from 1 to 28 years with a mean of 11 years. Most of them engaged in research followed by extension activity. Only few of them had the working experience of less than one year in water related works. Information seeking behavior of respondents show that 92 % extension personnel contacted the scientists of ICAR, SAU and KVK for getting agricultural related information. However, mass media (Television) is also playing a key role in dissemination of proven technologies as reported by 52 % followed by Kisan mela, Radio and News paper. Descriptive studies pertaining to each of the dependent variables regarding knowledge, skill, attitude and aspiration toward scaling up of water productivity in agriculture.

* 1. ***Impact of the training program***

Non-parametric test was (Wilcoxon Signed Rank test) employed to test the difference in paired data. The test is based on the magnitude of the difference between the pairs of observation. The values in two groups compared are naturally linked, and usually arise from individuals being measured more that gather before and after the measurements.

 ***4.2.1 Gain in Knowledge level and skill development***

Table 2 shows that initial knowledge score ranged from 8 to 26 with mean score of 19.76. After exposure to training, knowledge score ranged from 20 to 29 with mean score 24.68. Thus, overall gain in knowledge was found to be 16.13 %. However, this improvement was found significant (Z =4.21) as Wilcoxon Signed Rank Test is higher than table value. As far as participatory skill development is concerned, pre-training score varied from 11-37 with an mean of 23.91.The score of post-training was ranged from 25-48 with the mean score 38.74. Thus, the difference was found 30.92 % which is significant at 0.01 % (Z=4.41).

***4.2.2 Changed in attitude and aspirations fulfilled***

Table 3 depicts that pre-evaluation attitude score ranged from 7 to10 with 9.04 mean score while post-training score was observed in the range of 14 to 20 with mean value 19.08. Consequently, study shows a nearly 50 % change in attitude toward scaling up of water productivity. The pre and post-evaluation scores for expectation / aspirations ranged from 6 to12 and 12 to 18, respectively. The average score was found to be 8.64 and 14.64, respectively. The aspirations of the extension personnel measured as 55.38 to 93.46 % with a difference of 38.46 %. This change is significant (Z=5.00). As the study was conducted at KASA model and all four variables were measured and a significant change in knowledge, attitude, skill and aspiration level was observed, hence, null hypothesis is rejected.

**5. Conclusion and Recommendations**

Moving toward a more decentralized, participatory and market driven approach, extension system will require substantial investment and improvement in up-grading the knowledge, skills, attitude and aspiration level of field extension personnel. The investigation reveals a significant impact of the training conducted on scaling up of water productivity in agriculture. Study reveals that extension personnel gained a significant change in acquiring new knowledge, developed participatory skills, changed in their attitude and aspirations fulfilled toward scaling-up of water productivity. It is expected that the enhanced learning will be effectively transferred to their workplace for effective water management in agriculture. This systematic appraisal will also provide corrective measures to improve an on-going or future training program, consequently, justifying the training investment. As water resource development and management is imperative for sustainable agricultural, study reveals that few of them had experience in water related technologies. Hence, there is a great need to keep them up-to-date in technological advancement especially in water scares area as they are playing catalytic role in adoption of agricultural technologies. The strong Information seeking pattern and wide experience can be effectively utilized through in research and extension activities through organization of need-based and skill-oriented training programs.

**Acknowledgement:**

This project is funded by Ministry of Water Resources (MWR), New Delhi (India) toward the implementation of new policy and programs on *“Scaling up of water productivity in agriculture for livelihood”.* We are sincerely thankful to MWR for providing funds to carry out the project and Director, ICAR RCER, Patna for providing all the necessary help for execution of this project.

**REFERENCES**

Ashraf, M., Kahlown, M. A., Ashfaq, A., (2007). Impact of small dams on agriculture and groundwater development: a case study from Pakisthan. *Agricultural Water Management,* 92, 90-98.

Bartram, S. & Gibson, B. (1999). Evaluating Training: A Resource for Measuring the Results and Impact of Training on People, Departments and Organizations (Amherst, MA: HRD Press).

Bober, C. F. & Bartlett, K. R. (2004). The Utilization of Training Program Evaluation in Corporate Universities, *Human Resource Development Quarterly*, 15, 4, 363-83.

Chand, S., Sikka, A. K., Madhu, M., Singh, D.V. & Sundarambal, P. (2003). Impact

assessment on socio-economic aspects of watershed programs: A case study, *Journal of Rural Development*, 22 (4); 487-500.

Hashim, J. (2001). Training Evaluation: Client’s Roles, *Journal of European Industrial Training,* 25, 7, 374-80.

Mclean, G. N. (2005). Examining Approaches to HR Evaluation: The Strengths and Weaknesses of Popular Measurement Methods, Strategic Human Resources, 4, 2, 24-27.

Noe, R. (2000). Invited Reaction: Development of Generalized Learning Transfer System Inventory, *Human Resource Development Quarterly*, 11, 4, 361-66.

Preskill, H. (1997). Using Critical Incidents to Model Effective Evaluation Practice in the Teaching of Evaluation, *Evaluation Practice*, 18, 1, 65-71.

Singh, A. K., Sikka, A. K., Upadhyaya, A., Bhatnagar, P. R., Dhanphule, S., Singh, M. K. and Singh, S.R. (2008). Scientific perceptions and community responses in a participatory water management endeavor, *Water Resource Management*, 22: 1173-1189.

Swanson, B. E. (2008). Redefining agricultural extension’s role in achieving sustainable rural development, *International Journal of Extension Education*, 4: 1-12.

Swanson, R. A. & Holton, E. F. (1999). Results: How to Assess Performance, Learning, and Perceptions in Organizations (San Francisco, CA: Berrett-Koehler).

**Table 1: Socio-economic Attributes of Extension Personnel, 2010, Bihar, India.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attributes |   | N | *%* | Range |
| 1. Age (in years)  | < 33 | 7 | 28.00 | 25-48 |
|  | 33-45 | 13 | 15.90 |  |
|  | > 45 | 5 | 19.10 |  |
| 2. Education | B. Sc. | 7 | 28 |  |
|  | M. Sc. | 13 | 52 |  |
|  | Ph. D | 5 | 20 |  |
| 3. Gender  | Male | 23 | 98 |  |
|   | Female | 2 | 8 |  |
| 4. Back ground  | Rural | 14 | 56 |  |
|   | Urban | 11 | 44 |  |
| 5. Working experience ( in years)  | < 4 | 7 | 28 | 1-28 |
|  | 4-18 | 13 | 52 |  |
|  | >18 | 5 | 20 |  |
| 6. Job Area  |
| Research |  | 11 | 44 |  |
| Extension |  | 10 | 40 |  |
| Research and extension |  | 2 | 8 |  |
| Extension and training |  | 1 | 4 |  |
| Information technology |  | 1 | 4 |  |
| 8. Experience in water related activities (in years)  | < 1  | 2 | 8 |  |
| 9. Information seeking behavior  |
| Input dealer |  | 10 | 40 |  |
|  Newspaper |  | 12 | 48 |  |
| Radio |  | 12 | 48 |  |
| Television |  | 13 | 52 |  |
| Progressive farmers |  | 6 | 24 |  |
| Scientists of ICAR / SAU / KVK |  | 23 | 92 |  |
| Exhibition |  | 11 | 44 |  |

**Table 2. Gain in Knowledge and skills through training, 2010, Bihar, India**.

|  |  |  |
| --- | --- | --- |
| Particulars | Gain in Knowledge | Skill Developed |
| *Pre-Training* | *Post- Training* | *Change (%)* | *Pre-Training* | *Post- Training* | *Change* *(%)* |
| Minimum & maximum score | 7-29 | 7-29 |  | 0-48 | 0-48 |  |
| Range of score obtained | 8-26 | 20-29 |  | 11-37 | 25-48 |  |
| Mean-score | 19.76 | 24.68 |  | 23.91 | 38.74 |  |
| Overall gain (%) | 68.13 | 85.10 | 16.13 | 49.83 | 80.75 | 30.92 |
| ‘Z’ Value |  4.21\*\* |  4.41\*\* |
| *\*\* Significant at 0.01 % level* |

**Table 3 Change in attitude and aspiration level through training, 2010, Bihar, India.**

|  |  |  |
| --- | --- | --- |
| Particulars | Change in Attitude  | Aspirations fulfilled  |
| *Pre-Training* | *Post-Training* | *Change* *(%)* | *Pre-Training* | *Post-Training* | *Change* *(%)* |
| Minimum & maximum score | 0-20 | 0-20 |  | 6-18 | 6-18 |  |
| Range of score obtained | 7-10 | 14-20 |  | 6-12 | 12-18 |  |
| Mean-score | 9.04 | 19.08 |  | 8.64 | 14.64 |  |
| Overall gain (%) | 45.20 | 95.40 | 50.20 | 55.38 | 93.84 | 38.46 |
| ‘Z’ Value |  4.26\*\* | 5.00\*\* |
| *\*\* Significant at 0.01 % level* |