Knowledge Empowerment through Participatory Trials in Rainfed Rice Ecosystem

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ABSTRACT

A study was undertaken to assess the impact of farmers’ participatory trials on Integrated Crop Management (ICM) technology on the knowledge level of rice growing farmers under rainfed rice based cropping system in Koderma district of Jharkhand. The knowledge level of the farmers was measured on three major parameters of ICM viz., a) improved crop management practices, b) improved pest management practices, and c) improved weed and rodent management practices. The results indicated that there was remarkable change in the knowledge level and attitude of the rice growing farmers in all the three aspects of ICM after on-farm trials. The mean knowledge level was increased from 22.66% (pre-exposure) to 81.66% (after exposure) indicating a change of 59.0% in the overall knowledge level of the farmers about ICM.

Key words: Farmers participatory; Integrated crop management; Knowledge level

Developing suitable technologies for rainfed farming forms a major thrust area of rice research. The rainfed rice area is about 24.4 million hectare with low productivity of less than 0.98 tones/hectare, due to uncertainty of available water. It is a fragile ecology and divided in sub-ecologies viz., rainfed uplands (plain area and high altitude hill rice), deep water, semi-deep water and shallow rainfed (drought prone, lowland favourable and submerged prone) and coastal saline rice. Upland rice is grown in unfavourable rainfed soil and weather conditions. To achieve the target of increased rice production due to growing population, there is a need to raise the productivity, a major portion of which has to be achieved from this ecosystem as the yield level in irrigated ecosystem have been exploited to the maximum level. The warm and humid climatic condition being conducive for many pests, form a major constraint for increasing rice production in this ecosystem. Therefore, it is essential to evolve suitable location specific integrated crop management strategy that is environment friendly, economically viable and socially acceptable. In this context, farmers’ participatory on-farm trials on ICM in rainfed upland rice ecosystem of Koderma district of Jharkhand were conducted to increase the farmers’ access to ICM technology and to test the suitability/ viability of the technology on farmers’ fields. Therefore, a study was conducted with the objective to access the impact of on-farm trials on the knowledge level of participating farmers about the ICM technology and to document the benefits of on-farm trials as perceived by the farmers.

METHODOLOGY

The study was conducted in Chandwara block of Koderma district of Jharkhand. In the present study knowledge was conceptualized as the sum total of farmers’ knowledge about different components of integrated crop management practices. Out of total adopted farmers for on-farm trials, a target number of 50 respondents were randomly selected for this study from five villages’ viz., Urwan, Badki Ghamri, Jogidih, Madangundi and Chandwara of Chandwara block in district Koderma.

Participatory Rural Appraisal was performed with the selected farmers to measure the knowledge level of farmers in three major areas viz., a) improved crop management practices, b) improved pest management practices and c) improved weed and rodent management practices. Fifty questions were framed including open-ended and close-ended questions. A score ‘1’ was awarded for each correct answer and ‘0’ for wrong answers. Thus, the minimum and maximum score that an individual could obtain was ‘0’ and ‘50’, respectively. The pre-knowledge level of the respondents was tested by using the PRA tools prior to implementation of farmers’ participatory
on-farm trial. The information collected during the pre-
knowledge test provided the basic idea about the existing
knowledge level of the farmers.

After completion of the farmers’ participatory on-
farm trials, again the knowledge level of the respondent
farmers was evaluated through farmers participatory
PRAs. However, along with this, some other information
relating to their sources of information about the ICM
technology and benefits of farmers participatory on-farm
trials were gathered and analyzed accordingly.

RESULTS AND DISCUSSION

A perusal of Table 1 indicates that Subject Matter
Specialists from Krishi Vigyan Kendra, Koderma were
the major source of information relating to ICM practices
as reported by all the respondents followed by pesticide
dealers and traders (76%), personal experiences (70%),
neighbouring farmers (68%) and village level agricultural
workers (64%), respectively. A percentage of the
respondents (40%) got the information from mass media
and only 36% respondents from Agricultural Extension
Officer.

Table 1. Distribution of the respondents according to their
sources of information relating to integrated crop
management techniques (N=50)

<table>
<thead>
<tr>
<th>Information Sources</th>
<th>Frequency</th>
<th>%*</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Extension Officer</td>
<td>18</td>
<td>36.00</td>
<td>VII</td>
</tr>
<tr>
<td>Experts from KVK</td>
<td>50</td>
<td>100.00</td>
<td>I</td>
</tr>
<tr>
<td>Mass Media</td>
<td>20</td>
<td>40.00</td>
<td>VI</td>
</tr>
<tr>
<td>Neighbouring Farmers</td>
<td>34</td>
<td>68.00</td>
<td>IV</td>
</tr>
<tr>
<td>Personal Experiences</td>
<td>35</td>
<td>70.00</td>
<td>III</td>
</tr>
<tr>
<td>Pesticides Dealers and Traders</td>
<td>38</td>
<td>76.00</td>
<td>II</td>
</tr>
<tr>
<td>Village Agricultural Workers</td>
<td>32</td>
<td>64.00</td>
<td>V</td>
</tr>
</tbody>
</table>

* The added percentage is more than 100 since multiple
  responses were allowed

It is obvious that the SMS from KVK Koderma were
the major sources of information among the farmers
because the farmers’ participatory on-farm trials on ICM
technologies were directly carried out by the KVK. The
farmers used to exchange their views, ideas and
experiences more informally and frequently with the
KVK. Conducting farmers’ participatory on-farm trials
in farmers’ fields proved to be very effective for creating
awareness and acceptance of improved rainfed rice
production practices among farmers and ultimately getting
relative advantages/benefits by adopting the improved
practices.

A critical examination of Table 2 indicates that insect
pest management was perceived as the top most benefit
of on-farm trials on ICM technology by all the
respondents. This may be because of the knowledge that
was provided for identification of the insect pest and
natural enemies and introduction of newer methods of
management during the on-farm trials. Besides, disease
management, weed and rodent management and improved
crop management practices were other important benefits
of on-farm trials which were perceived by 94%, 86%
and 78% respondents, respectively. A few other benefits
including increased yield (72%), reduced cost of
cultivation (64%), sharing technology with fellow farmers
(60%) and labour saving techniques (56%) were also
perceived by the respondents.

Table 2. Benefits of On-farm trial as perceived by the
farmers (N=50)

<table>
<thead>
<tr>
<th>Benefits perceived in areas</th>
<th>Frequency</th>
<th>%*</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease Management</td>
<td>47</td>
<td>94.00</td>
<td>II</td>
</tr>
<tr>
<td>Exposure visit to nearby Rice Research Station</td>
<td>20</td>
<td>40.00</td>
<td>X</td>
</tr>
<tr>
<td>Helping other Farmers in Practicing the Technology</td>
<td>25</td>
<td>50.00</td>
<td>IX</td>
</tr>
<tr>
<td>Improved Crop Management Practices</td>
<td>39</td>
<td>78.00</td>
<td>IV</td>
</tr>
<tr>
<td>Increased Yield</td>
<td>36</td>
<td>72.00</td>
<td>V</td>
</tr>
<tr>
<td>Insect Pest Management</td>
<td>50</td>
<td>100.00</td>
<td>I</td>
</tr>
<tr>
<td>Labour Saving Techniques</td>
<td>28</td>
<td>56.00</td>
<td>VIII</td>
</tr>
<tr>
<td>Opportunity to attend Farmers’ Day related to Rice Technology</td>
<td>18</td>
<td>36.00</td>
<td>XI</td>
</tr>
<tr>
<td>Reduced Cost of Cultivation</td>
<td>32</td>
<td>64.00</td>
<td>VI</td>
</tr>
<tr>
<td>Sharing of Technology with Fellow Farmers</td>
<td>30</td>
<td>60.00</td>
<td>VII</td>
</tr>
<tr>
<td>Weed and Rodent Management</td>
<td>43</td>
<td>86.00</td>
<td>III</td>
</tr>
</tbody>
</table>

* The added percentage is more than 100 since multiple
  responses were allowed

The knowledge levels of the respondents about ICM
technologies were studied before and after exposure to
farmers’ participatory on-farm trials to study the impact
of these trials. The data presented in Table 3 depicts that
there was a remarkable change (59%) in overall knowledge
level of the farmers about ICM practices. In crop
management, the mean knowledge level increased from
28% (pre-exposure) to 90% (post-exposure) indicating
the highest change of 62%. Similarly, in pest management
practices and weed and rodent management, the pre-
exposure mean knowledge level increased from 20% (pre-
exposure) to 80% (post-exposure) and from 20% (pre-
exposure) to 75% (post-exposure) showing a change of
60% and 55%, respectively. These findings are in
conformity with the earlier work of Ray (1976), Bhat
(1980), Manjunath (1980), Singh and Prasad (1986),
and Dani et al. (2007).
Table 3. Distribution of respondents according to their mean knowledge level before and after exposure to participatory on-farm trials

<table>
<thead>
<tr>
<th>Areas</th>
<th>Range of scores</th>
<th>Pre-exposure mean knowledge</th>
<th>Post-exposure mean knowledge</th>
<th>Change in mean knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Management scores</td>
<td>0-25</td>
<td>7.0(28.00)</td>
<td>22.5(90.00)</td>
<td>15.5(62.00)</td>
</tr>
<tr>
<td>Pest Management</td>
<td>0-15</td>
<td>3.0(20.00)</td>
<td>12.0(80.00)</td>
<td>9.0(60.00)</td>
</tr>
<tr>
<td>Weed and Rodent Management</td>
<td>0-10</td>
<td>2.0(20.00)</td>
<td>7.5(75.00)</td>
<td>5.5(55.00)</td>
</tr>
<tr>
<td>Overall Knowledge Levels</td>
<td>0-50</td>
<td>12.0(22.66)</td>
<td>42.0(81.66)</td>
<td>30.0(59.00)</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate percentage.

Table 4. Distribution of respondents according to their increase in knowledge level in pest management

<table>
<thead>
<tr>
<th>Areas</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of Insect pests, Diseases and Natural enemies</td>
<td>44</td>
<td>88</td>
<td>I</td>
</tr>
<tr>
<td>Monitoring of Insect Pests, Diseases and Natural enemies</td>
<td>42</td>
<td>84</td>
<td>II</td>
</tr>
<tr>
<td>Introduction of Seed treatment</td>
<td>40</td>
<td>80</td>
<td>III</td>
</tr>
<tr>
<td>Introduction of Dolomite application in soil</td>
<td>37</td>
<td>74</td>
<td>IV</td>
</tr>
<tr>
<td>Use of Pesticides</td>
<td>35</td>
<td>70</td>
<td>IV</td>
</tr>
</tbody>
</table>

* The added percentage is more than 100 since multiple responses were allowed.

The increase in knowledge level of participants was also studied with regards to five major areas of pest management. The results presented in Table 4 clearly indicated that the maximum number of respondents (88%) expressed gain in knowledge in identification of insect pests, diseases and their natural enemies. Similarly, 84% of the respondents expressed an increase in knowledge level in the area monitoring of insect pests, diseases and natural enemies followed by introduction of seed treatment (80%), introduction of dolomite application in soil (74%) and use of insecticides (70%), respectively.

**CONCLUSION**

There was a significant change in knowledge level of the farmers about ICM technologies after exposure to farmers’ participatory on-farm trials. This change can be attributed to different reasons like frequent contacts with KVK, exposure to improved crop management practices and field day related to rainfed rice production technology. Hence, the planners, administrators and researchers must give focal importance to train the grass root extension workers and progressive farmers on the concept of farmers’ participatory on-farm trials on farmers’ field. Conducting farmers’ participatory on-farm trials on farmers’ fields can prove to be a very effective extension approach for creating awareness and acceptance of improved production technologies for sustaining rice production.

**REFERENCES**