Impact of Interventions on Knowledge and Adoption of Improved Technologies in Banana Cultivation

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ABSTRACT
Tuticorin district of Tamilnadu has the potential of growing Banana in an area of more than 11,000 ha annually under canal irrigation system. The farmers were lacking in technical knowhow about improved technologies in Banana cultivation. The present study was conducted during 2013 to ascertain the knowledge gain and adoption level of thirteen specific technologies demonstrated through various interventions during earlier years by the KVK. Tiruchendur and Alwarthirunagari blocks of Tuticorin District were taken for study and the respondents were randomly selected at the rate of 50 beneficiary farmers per block. The data were collected through personal contacts (interview) with well designed questionnaire. The data revealed that the gain in knowledge was more than 50 per cent for technologies viz., foliar application of Banana special (73 %), use of bunch cover (63%), drip irrigation (62 %) and application of Pseudomonas (54%). Similarly, foliar application of Banana special and soil application of neem cake and Furadon recorded the highest extent of adoption, 66 and 53 per cent, respectively. This could be due to the easiness and effectiveness of technologies in field application and yield enhancement. Though the acquisition of knowledge for the technologies like drip irrigation (85 %), use of tissue culture plants (52%) and high density planting (42%) was high, the number of farmers adopting these technologies were very low i.e. 18, 11 and 5 %, respectively due to the various reasons.

Key Words: Technology Dissemination, Banana, Tissue Culture, Knowledge, Adoption

INTRODUCTION
Tuticorin District of Tamilnadu is located in extreme Southern part of Tamilnadu which has the potential of cultivating wet land, garden land and rainfed crops. Paddy is the major wet land crop while Banana and Coconut are the important garden land crops. Greengram, blackgram, coriander, chillies, maize and minor millets are the rainfed crops raised in black cotton soils during north east monsoon season. The literacy level of farmers and the technical know-how on advanced crop production practices was poor due to the lack of resource centres like KVK or Regional Agricultural Stations etc. The Krishi Vigyan Kendra was established by the reputed NGO – Social Change and Development (SCAD) under the guidance and financial support of Indian Council of Agricultural Research, NewDelhi during the year 1996 to cater the needs of farmers of Tuticorin district.

Banana is an important cash crop cultivated in an area of more than 11,000 ha annually under garden land condition mainly in four blocks of Tuticorin district viz., Tiruchendur, Alwarthirunagari, Karunkulam and Sathankulam under canal irrigation. Few of the farmers had access to open or bore well irrigation facilities. The important varieties under cultivation are Nendran, Nattuvazahi and Kozhikoodu (Rasthali) for domestic use and also for export purposes. Tuticorin ranks first in export of Banana among the districts of Tamilnadu. The banana farmers were less assured of their crop due to the socioeconomic factors viz., common canal irrigation system, less affordability towards high cost of inputs, biotic and abiotic stresses.

The SCAD KVK focussed its extension activities in the four banana growing blocks of Tuticorin from 2005-06 to 2009-10 to improve the knowledge level of farmers and adoption of
advanced production technologies pertaining to banana cultivation. The KVK demonstrated various technologies through series of interventions in the form of trainings, front line demonstrations, on farm trials, exposure visits etc. The present study was undertaken to ascertain the gain in knowledge level among the respondents and to study the adoption level of various interventions on banana cultivation and also to find out the reasons for non-adoption of certain technologies and to suggest suitable alternatives to enhance the income level out of Banana cultivation.

MATERIALS AND METHODS
Though most of the interventions were carried out in four blocks, but only two blocks viz., Tiruchendhur and Alwarthirunagari were selected for the study. For the selection of respondents, a list of beneficiaries of various programmes of KVK during last five years (2005-06 to 2009-10) was prepared. Out of 568 beneficiaries, only 100 farmers were selected by simple random sampling procedure from Tiruchendhur and Alwarthirunagari with 50 farmers from each block. A questionnaire was prepared and the data were collected through personal interviews with the respondents. The data collected were processed, tabulated, classified and analyzed interms of percentage. Total thirteen practices were selected as criteria to evaluate the farmers for extent of knowledge gained and adoption of banana production technologies as results of various intervention viz., trainings, method demonstrations, front line demonstrations (FLDs), on farm trials (OFTs), diagnostic visits, advisory services, exposure visits, radio talks and popular articles.

RESULTS AND DISCUSSION
Gain in knowledge
Most of the farmers were traditional in nature and had less access to resource centres like KVK before the inception of SCAD KVK during 1996. It is presumed that the knowledge of a farmer to a larger degree relies upon the extent of exposure given to him through tools like trainings, demonstrations, exposure visits etc.

The data presented in Table.1 reveals the increased knowledge gain on various technologies due to the series of intervention of KVK. The highest gain of 73 per cent was observed in knowledge on foliar application of Banana special to improve the yield and quality of Banana bunches. This could be due to the frequent trainings and demonstrations conducted by the KVK and because of the easiness of technology in field application. This is in consonance with the findings of Singh et al (2014) with respect to adoption of Pusa Bamati 1121 due to conductance of the trainings and front line demonstrations. Drip irrigation technique recorded the knowledge gain to the tune of 62 per cent and it could be due to the exposure visits organized by KVK to the Dharmapuri district of Tamilnadu where the precision farming technologies in Banana were proven and under mass adoption. The beneficiary farmers realized the usefulness of the technology by seeing the performance of banana crop under drip irrigation and by interaction with the successful farmers. Sixty three per cent gain in knowledge was observed towards use of bunch cover techniques to improve the quality of bunches by avoiding pest problems and sunscald. Application of *Pseudomonas* along with FYM to the banana plants recorded the knowledge gain of 54 percent, as it is very effective, cheaper and easily available. The least gain in knowledge was observed for time of planting as the 60 percent of the farmers knew the best planting season (June-July) and rest of the 21 per cent of the respondents alone understand the need of June-July planting after KVK’s intervention. The technologies viz., sucker selection and high density planting (HDP) revealed 32 per cent of knowledge gain due to the interventions of KVK as the exposure to these technologies might be less.

EXTENT OF ADOPTION
The data (Table 2) revealed that 66 per cent of the farmers adopted foliar application of Banana special, 53 per cent of the farmers applied Neem cake + nematicide and 47 per cent of the farmers adopted application of *Pseudomonas*. The reason for higher adoption of these technologies could be the beneficial effect of these technologies in enhancing yield and quality of banana bunches and thereby increased level of income. The micro
nutrient deficiency (hidden hunger) and its correction by the foliar spray of Banana special resulted in high yield and hence the farmers impressed upon this technology and its adoption was also high. Likewise, the nematode and stem borer are the major menace in banana cultivation and by series of intervention of KVK on containing these problems by the application of Neem cake + nematicide as basal dose could resulted in higher adoption percentage. Application of *Pseudomonas* showed high adoption (47%) as it is effective, low cost and available throughout the year in KVK itself.

Though the removal of male flowers after 10-15 days of last hand opening is essential technique, 40 per cent of the farmers were adopting this technology even before the KVK’s intervention. It was noted that, gain in knowledge about application of Biochar among the farmers was to an extent of 42 per cent as its effects on moisture and nutrient retention capacity was well realized and recognized by the beneficiary farmers. Further, the farmers of the study area received water for Banana cultivation from Manimutharu reservoir through canals so the farmers are solely dependent on external source of irrigation. In this case, the application of Biochar helped in rescuing the plants when the water release from reservoir was delayed. The results of the FLDs and farmers experience showed that the banana growth and yield was same in the Biochar applied plots when irrigated at 10-12 days interval with that of non-biochar applied plots when irrigated at 5-7 days interval. Only 18 per cent of the farmers were adopting Biochar application before KVK intervention and it was 60 per cent after KVK intervention. About 25 per cent of the farmers were taking control measures against Sigatoka leaf spot disease even before KVK’s influence as it was visible and easily identifiable disease. This was in agreement with De Groote *et al* (2004). The farmers used to take the samples to the nearby agro centre and the shop keeper recommends chemicals but after KVKs intervention, the farmers were familiar in handling the integrated approaches for Sigatoka leaf spot management.

**Knowledge with Adoption of Technologies in Banana Cultivation**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Technology</th>
<th>Knowledge level (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before KVK intervention</td>
<td>After KVK intervention</td>
</tr>
<tr>
<td>1</td>
<td>Time of planting (June-July)</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>Proper selection of suckers</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Paring and pralinage</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>Use of Tissue culture plantlets</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Application of Biochar</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>Application of Neem cake + nematicide</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>High Density planting</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Drip irrigation</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>Foliar application of Banana special</td>
<td>00</td>
</tr>
<tr>
<td>10</td>
<td>Application of <em>Pseudomonas</em></td>
<td>08</td>
</tr>
<tr>
<td>11</td>
<td>Spraying of fungicides to manage Sigatoka leaf spot</td>
<td>32</td>
</tr>
<tr>
<td>12</td>
<td>Removal of male flowers</td>
<td>47</td>
</tr>
<tr>
<td>13</td>
<td>Use of bunch covers</td>
<td>12</td>
</tr>
</tbody>
</table>

Knowledge Acquisition Vs Extent of adoption

The gain in knowledge depends on various factors like easiness of technologies, educational background of the participating farmers, extension approaches handled in technology transfer, farmers’ attitude, ability of extension personnel, teaching and learning situation etc. Likewise the extent of adoption of a particular technology relies mainly on easiness and usefulness of the technology besides the socio economic status, access to the technological inputs etc. Fig. 1 reveals the percentage of respondents acquired
knowledge on different technologies after KVK intervention and percentage of adoption of thirteen specific technologies taken for the present study. The present study on percentage gain in knowledge and percentage adoption could certainly generate some useful information for future line of study or the changes needed in existing system of cultivation of Banana. About time of planting, 81 per cent of the respondents gained knowledge on advantage of June-July planting and it was adopted by 72 per cent of the respondents. The similar trend was also noticed in the case of proper sucker selection as the knowledge gain and extent of adoption was 62 and 55 per cent, respectively. From the data it was evident that the farmers realize the importance of sucker selection from disease free fields and sword suckers. Ravichamy et al (2014) also reported the same trend among the Banana growers of Tiruchirapalli district of Tamilnadu.

In contrary to that, paring and pralinage (a kind of sucker treatment with clay slurry and nematicide) was known to the farmers to an extent of 44 per cent after KVK trainings but its adoption was less (14%). This could be due to the practical difficulties in handling huge quantities of suckers for its treatment. So this kind of technologies may be simplified and it suggests for further scientific researches to find out suitable alternatives. Similarly the gain in Knowledge in respect tissue culture plants was high (52%) but only 11 per cent of farmers used tissue culture plantlets for planting. From the interviews made with the respondents, it was clear that, they acquire knowledge on first generation biotechnological tools like Tissue culture and its practical utilities but they could not adopt it because of their irrigation source was through canal, by which all the farmers received water. In this situation the only option was surface irrigation whenever the water flows in the canal. Due to the uncertainty in water availability, heavy demand of tissue culture plants for water and nutrient the farmers were reluctant to take up planting of tissue culture plants. This was in accordance with the findings of Changadeya et al (2014).

The other technologies like application of biochar, neem cake + Nematicide, foliar application of banana special, application of Pseudomonas, measures for Sigatoka leaf spot management, removal of male flowers exhibited the similar trend of comparatively higher level of acquisition of knowledge and also adoption among the participating farmers by the various interventions of KVK. In contrary to that the knowledge acquired by the beneficiary farmers was high but its adoption was less for the technologies viz., HDP, drip irrigation and use of bunch cover. Regarding HDP, the farmers by experience opined that by HDP the bunch weight and quality decreases due to the competition among plants and results in reduced price; instead
of that the normal planting resulted in good quality bunches and it fetch premium price. Though the drip irrigation technique proved to be the best in water saving, yield improvement and has other potential advantages, their main water source was canal. Few of the farmers owning open or bore wells installed drip irrigation systems. Though 75 per cent of the respondents knew about use of bunch cover only 34 per cent of the farmers practiced the bunch cover technology. This implies that still more awareness on this technology has to be imparted to the farmers and the easy availability of the bunch cover in right time should be ensured. This kind of technology would be of promising in getting premium prices for their quality clean bunches as it is being exported directly.

CONCLUSION

The findings of the present study reveals that the interventions of SCAD KVK, certainly facilitated the knowledge acquisition by the farmers and adoption at higher level in banana cultivation with respect to the technologies viz., proper time of planting, sucker selection, application of biochar for moisture conservation, foliar application of Banana special, application of *Pseudomonas*, integrated approaches of Sigatoka leaf spot management and removal of male flowers. The present study also suggests the need of alternatives or further refinement for the technologies like paring and pralinage and HDP. The timely availability of critical inputs like banana bunch cover could be ensured and some more awareness is required on use of bunch cover techniques.

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