Asian Journal of Agricultural Extension, Economics & Sociology

19(4): 1-8, 2017; Article no.AJAEES.33707
ISSN: 2320-7027

An Assessment of Existing, Desired Competencies and Skills of Apple Growers in Mid Altitude Areas of District Shopian in Jammu & Kashmir

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Authors' contributions

This work was carried out in collaboration between all authors. Author ZAS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author RS was the guide during the whole study, designed and performed all the statistical analysis and their interpretation. Author RM managed the literature searches. Author JMM managed the analyses of the study. Author MAD finalized the design, protocol and checked the draft report. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2017/33707
Editor(s):
(1) Mohamed Hsssan M. Abdel Aaal, Faculty of Agriculture, Cairo University Egypt, Egypt.
Reviewers:
(1) Isaac Kojo Arah, Ho Polytechnic, Ghana.
(2) José Luiz Petri, Gerência Regional de Caçador, Brazil.
(3) Roberto Zoppolo, Instituto Nacional de Investigaciòn Agropecuaria, Uruguay.
(4) Stephen Fox, Tampere University of Technology, Finland.
Complete Peer review History: http://www.sciencedomain.org/review-history/21037

Original Research Article

Received 26th April 2017
Accepted 23rd August 2017
Published 18th September 2017

ABSTRACT

The present study was conducted in mid altitude areas comprising of villages viz-Chek-Sadipora, Sadipora and Narvav of district Shopian of Jammu and Kashmir with sample size of 60 apple growers. The district Shopian was purposively selected, because of the potentiality for the development of horticulture, mainly because 90 per cent area of the district was under apple

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plantation. Most of the apple growers use traditional methods for their apple cultivation, so different skills and competencies, where apple growers need special trainings were studied and it has also been observed that the skills and competencies of the fruit growers regarding expert guidance planning, layout planning, weed management, pest and disease management, intercultural operations, soil testing etc. were low and as such fruit growers need trainings mostly in soil and water testing, pest and disease management, physiological disorder management among others.

Keywords: Altitude; apple growers; competencies; Kashmir; skills.

1. INTRODUCTION

Agriculture is the back bone of the Indian economy and plays a vital role in the overall development of the nation and most of the Indian population is directly or indirectly involved in agriculture. Agricultural as well as horticultural sector is considered as one of the effective factors in economic development of India. Achieving food and nutritional security is possible only by making use of new technologies in farm land. Today in most parts of the world, due to limited land and water resources, increase in production and quality food is hardly possible unless need based effective techniques in production system are to be adopted by the farmers. In the state of Jammu and Kashmir, Kashmir valley is endowed with congenial agro-climatic conditions for a wide range of horticultural crops. The growth in area and production of horticultural crops like peach, pear, plum, and apple, is quite impressive. Jammu and Kashmir is rightly known as an apple state of India, contributing 4,200 crore (42000 million) to the state GDP [1].

Apple is one of the most widely cultivated tree fruits. The apple is the fourth widely produced fruit in the world after banana, orange and grapes. India is ranked as the sixth largest world's apple producing country and second largest country in area [2]. Nearly all of the Indian apples are grown in three mountainous states of north India – Himachal Pradesh, Jammu and Kashmir and Uttaranchal, where they are typically grown at an altitude of 4000 to 11,000 feet. Jammu & Kashmir and Himachal Pradesh have almost equal area under apple plantation, but J&K has the highest average yield and accounts for 67 percent of total apple production and 50 percent of its exports in the country, hence a substantial foreign exchange earner for economic growth. India annually exports apple worth Rs. 400 million (Nearly US$ 10 million) out of which Rs. 200 million in apples comes from J&K's (Jammu and Kashmir) North region i.e. Kashmir. The fruit culture in Kashmir valley dates back to the times of King Nara (1000 BC), King Lalitaditya (700 AD) and Harsha (1089 AD). This sector occupies an important position in the farming system of the state and has assumed great importance during the last few decades [3]. As far as apple production is considered, it accounts for 51% of total area of 2.72 lakh hectares under all temperate fruits grown in this state. The annual apple production in the state is 13.73 lakh metric tonnes [4]. So the apple cultivation is an important business in the state of Jammu and Kashmir. Apple production (production as well as productivity) can be increased in the state, when the growers use recommended cultivation practices, for this apple growers need important trainings from time to time, in order to enhance their skills and competencies regarding apple cultivation. Training of the farmers is essential to induce motivation, create confidence and inculcate efficiency in an individual. It has been observed that most crucial competencies where farmers need training are time and method of irrigation, drip irrigation and its operation, management of phytophthora, identification of insect pest and disease symptoms and their control measures, control of fruit drop, management of alternate bearing and fruit thinning. The competencies of growers may be increased through implementation of skill improvement programmes like conducting of demonstrations, orchard visits, organization of farmer's tours and farmers – scientist's interaction groups, training about post-harvest technology and value addition [5]. Training of the farmers largely consists of well-organized opportunities for participants (farmers) to acquire necessary understanding and skill. Farmers' training is directed towards improving their efficiency in farming. Imparting training to farmers does not mean to know more but behaving differently [6]. However it has been stated that marginal farmers were poor accepters of innovations. One of the reasons of poor adoption/acceptance was the low level of knowledge and skill of farmers in growing and managing fruit plants/gardens. This study was, therefore, planned to identify and prioritize

competencies and training needs such as knowledge, skill and attitude of fruit growers in district Faisalabad, Pakistan [7].

Skill development for agriculture rather than TVET (Agricultural Technical and Vocational Education and Training), is worth noting that some research reports have chosen not to include agriculture in their analysis of skills development to produce improved rural livelihoods [8]. The assumption that basic skills of literacy and numeracy can make a difference to productivity in the home, farm or household enterprise has long informed research around skills development and agriculture [9]. Educated farmers were more likely to make better use of technologies (irrigation technology in China, increased fertilizer use in Ethiopia) and move into higher-value crops [10].

EFA Global Monitoring Report (GMR) recommended focusing on three main areas of skill development for rural youth:

- Improving access to primary and post-primary education, especially for girls;
- Expanding training for basic and vocational skills to make up for gaps in the rural labour market; and
- Providing business and entrepreneurial skills training to improve understanding of market opportunities and improve managerial expertise [11].

Training of the farmers provides additional specific items of knowledge, skill or attitude they need to perform up to that standard. Training is conducted whenever an individual engages in an activity that results in the ability to exercise a skill that he does not previously have. The training generally involves four basic components:

a) Acquiring knowledge of the skill.
b) Observing a model to perform the skill.
c) Practicing the skill.
d) Reinforcing the newly acquired behaviour.

Skill development programmes for agriculture, such as farmer field schools (FFS) have received particular attention, although the results reported have been mixed [12]. FFS promoted by the Food and Agriculture Organization (FAO), a specialized agency of the UN, in one study showed that income had increased by 61 per cent, that younger farmers were more likely to participate and that female-headed households benefited the most [13]. Educational approaches used include open-air lectures, demonstration plots and cascade models of training using 'master craftspeople'. Agricultural extension programmes have traditionally adopted top-down centralized approaches to instruction, but some have evolved to empower farmers to seek advice for their specific problems [14]. There are limited examples of programmes offering skill development in new technologies.

Training of the farmer is the most singular factor affecting individuals' attitude, productivity, improvement, minimization of risks and quality of performance in any endeavour [15]. Moreover in the study of Women farmer training needs and their correlates for effective extension programme and poverty reduction, it has been found that women farmers had low knowledge and skills in performing the following farm operations:

a. Chemical weeding.
b. Pest control.
c. Preparation and utilization of organic fertilizer.

Which results poor production and quality of the crops hence need of the training is important for such farmers [16].

Training of the farmers is also inevitable for imparting new knowledge and updating the skills of farmers. Training of farmers had assumed further importance and urgency in the context of the high yielding varieties and improved practices in agriculture and allied fields. In order to make any training meaningful and effective, it is imperative on the part of the training organizers to identify the training needs of the farmers based on which suitable training modules can be developed so that the appropriate training is given to the right people, in the right form, at the right time so that higher degree of productivity and profitability can be achieved [17]. Therefore, training of the farmers is 'an intensive learning activity, assisted by competent trainers to understand and practice the skills required in a deficit situation in the knowledge, skills and attitude level of the practicing farmers as well as the availability of appropriate applicable information, the utilization of which will correct the problems [18].

2. RESEARCH METHODOLOGY

The present study was conducted in the state of Jammu and Kashmir in 2014 comprising extreme

sector of Himalaya's and occupies a central geographical location in the Asian continent. A multistage sampling procedure was adopted for the selection of districts, tehsils, villages and sample respondents. Kashmir valley consists of 10 districts namely Anantnag, Kulgam, Pulwama, Shopian, Srinagar, Bandipora, Baramulla, Budgam, Ganderbal and Kupwara. Among these, district Shopian was selected purposively. District Shopian was purposively selected because of the potentiality for the development of horticulture, mainly because 90 percent area of the district was under apple plantation and prevailing agro-climatic situations were very good for cultivation of horticultural crops especially fruit crops and apple in particular. The study was conducted in three villages of mid altitude areas which were randomly selected in the form of strata. A sample size of twenty farmers from each village was selected randomly, thus making a sample size of sixty respondents from the studied area. An interview schedule was formulated and necessary corrections were made during pre-testing. Area was surveyed and face-to-face interview was conducted with all the family members present and data was collected with utmost care. Statistical design such as percentage of respondents was employed for analysis of data.

3. RESULTS AND DISCUSSION

3.1 "Planning Skills" of Farmers

Table 1 presents the data regarding planning skills of apple growers of mid altitude areas. It reveals that 11.66 per cent of the apple growers had taken guidance from experts before establishment of their orchard while as 88.34 per cent of apple growers had not taken any guidance from experts; 86.66 per cent of apple growers were of the opinion that they need guidance, while 13.34 of apple growers said that they do not need any expert guidance, 80 per cent of apple growers are of the opinion that they prefer to acquire guidance from experts on priority basis and 20 per cent of apple growers did not prefer to acquire any guidance on priority basis (Apple growers need training immediately as most of them suffer because of the lack of knowledge about a particular practice, which results in the decline of the production). In case of site selection 36.66 per cent of apple growers had properly selected site (agro-ecological characterization of the site, complete soil and water study to check its potential for apple production) prior to establishment of their orchards, while 63.34 per cent of apple growers had established their orchards without any guidance for site selection, 83.34 per cent of them needed trainings how to select site for an orchard in order to have healthy apple orchard, while 16.66 per cent of the apple growers refused to undergo training for selection of site, among these 60 per cent of apple growers preferred to undergo training programmes for such skills on priority basis while rest 40 per cent showed no preference for site selection. In case of selection of varieties, 45 per cent of apple growers had selected recommended varieties for their orchards from authentic and authorised sources, while 55 per cent of apple growers had not selected the recommended varieties (as they have selected wrong varieties) for their orchards from concerned departments authorised dealers), 85 per cent of apple growers needed training, while 15 per cent of apple growers refused to undergo training for this skill, 81.66 per cent of apple growers needed training in selecting varieties on priority basis while 18.34 per cent of apple growers did not prefer it. In case of layout planning, 48.34 per cent of apple growers had planned the layout of an orchard in line with recommendations, while 51.66 per cent of apple growers did not know anything about layout planning, 90 per cent of apple growers needed training, while 10 per cent of apple growers did not need any training for layout planning of apple orchard, 78.34 per cent of apple growers preferred training for this skill on priority basis, while 21.66 per cent of apple growers did not prefer it. In case of soil testing, 21.66 per cent of apple growers had done soil testing prior to the establishment of their orchards, while 78.34 per cent of apple growers had not done soil testing for an orchard, 91.66 per cent of apple growers needed training, while 8.34 per cent of apple growers did not need any training for soil testing, 81.66 per cent of apple growers needed training on priority basis for such skill, while 18.66 per cent had not preferred. In case of pollinizer ratio, 35 per cent of apple growers had maintained the recommended pollinizer ratio in their orchards, while 65 per cent of apple growers had not maintained the pollinizer ratio in their orchards, 88.34 per cent of apple growers were willing to undergo training in this skill, while 11.66 per cent of apple growers refused to undergo training for maintaining the pollinizer ratio in apple orchards, 85 per cent of apple growers prefer to undergo training on priority basis for such skill, while 15 per cent did not prefer training for such skill.

3.2 "Management Skills" of Farmers

Table 2 presents the data regarding management skills of apple growers of mid altitude areas. It reveals that 38.34 per cent of the apple growers had managed the nutrients for the better health of plants in their orchards while as 61.66 per cent of apple growers had not managed the nutrients for the better health, (as most of the apple growers were not applying recommended fertilizers to their orchards as per the recommendations of state agricultural university or department of horticulture) 81.66 per cent of apple growers were of the opinion that they needed training for the maintenance of nutrients in their orchards, while 18.34 of apple growers did not need any training programme for such skill, 70 per cent of apple growers preferred to acquire training on nutrient management on priority basis while 30 per cent of apple growers did not prefer. In case of management of pests and diseases 36.66 per cent of apple growers had managed pests and diseases occurring in their orchards, while 63.34 per cent of apple growers preferred to undergo training for management of pests and diseases, 90 per cent of them had not managed pests and diseases, 93.34 per cent of the apple growers needed training for management of pests and diseases, while 6.66 per cent of the apple growers refused to undergo training for the management of pests and diseases, 85 per cent of apple growers preferred training for such skill on priority basis while rest 15 per cent did not prefer. In case of management of irrigation, 61.66 per cent of apple growers had managed this skill in their orchards, while 38.34 per cent of apple growers had not maintained the irrigation facilities for their orchards, 85 per cent of apple growers needed training, while 15 per cent of apple growers refused to undergo training for this skill, 71.66 per cent of apple growers needed training on management of irrigation in their orchards on priority basis while 28.34 per cent of apple growers did not need any training for such skill. In case of management of weeds 43.34 per cent of apple growers know about the management of weeds in their orchards, while 56.66 per cent of apple growers had not managed weeds in their orchards, 93.34 per cent of apple growers needed training, while 6.66 per cent of apple growers did not need any training for weed management, 68.34 per cent of apple growers preferred training for this skill on priority basis, while 31.66 per cent of apple growers had not preferred. In case of management of stress, 48.34 per cent of apple growers had managed different types of stresses in their orchards, while 51.66 per cent of apple growers had not managed, 86.66 per cent of apple growers needed training, while 13.34 per cent of apple growers did not need any training for stress management, 81.66 per cent of apple growers needed training on priority basis for such skill, while 18.34 per cent of apple growers had not preferred. In case of management of physiological disorders, 58.34 per cent of apple growers had protected their orchards against various physiological disorders, while 41.66 per cent of apple growers had not managed these

Table 1. Planning skills of farmers

Planning skills	Task performed		Training need		Acquiring this skill on priority	
Task statement	Frequency		Frequency		Frequency	
	Performed	Not performed	Need training	Not need	Acquire	Do not acquire
Expert guidance planning	07 (11.66)	53 (88.34)	52 (86.66)	08 (13.34)	48 (80)	12 (20)
Site selection	22 (36.66)	38 (63.34)	50 (83.34)	10 (16.66)	36 (60)	24 (40)
Selection of varieties	27 (45)	33 (55)	51 (85)	09 (15)	49 (81.66)	11 (18.34)
Layout planning	29 (48.34)	31 (51.66)	54 (90)	06 (10)	47 (78.34)	13 (21.66)
Soil testing	13 (21.66)	47 (78.34)	55 (91.66)	05 (8.34)	49 (81.66)	11 (18.66)
Pollination	21 (35)	39 (65)	53 (88.34)	07 (11.66)	51 (85)	09 (15)

Figures within parenthesis indicate respective percentage

Table 2. Management skills of farmers

Management skills	Task performed		Training need		Acquiring this skill on priority	
Task statement	Frequency		Frequency		Frequency	
	Performed	Not performed	Need training	Not need	Acquire	Do not acquire
Nutritional management	23 (38.34)	37 (61.66)	49 (81.66)	11 (18.34)	42 (70)	18 (30)
Pests and diseases management	22 (36.66)	38 (63.33)	56 (93.44)	04 (6.66)	51 (85)	09 (15)
Irrigation management	37 (61.66)	23 (38.33)	51 (85)	09 (15)	43 (71.66)	17 (28.34)
Weed management	26 (43.33)	34 (56.66)	56 (93.33)	04 (6.66)	41 (68.34)	19 (31.66)
Stress management	29 (48.33)	31 (51. 66)	52 (86.66)	08 (13.34)	49 (81.66)	11 (18.34)
Physiological disorder management	35 (58.33)	25 (41.66)	57 (95)	03 (05)	53 (88.34)	07 (11.66)

Figures within parenthesis indicate respective percentage

physiological disorders in their orchards, 95 per cent of apple growers need training in this skill, while 5 per cent of apple growers refused to undergo in any training programme for managing different physiological disorders in apple orchards, 88.34 per cent of apple growers prefer to undergo training for such skill on priority basis, while 11.66 per cent did not prefer training for such skill.

3.3 "Practical Skills" of Farmers

Table 3 presents the data regarding practical skills of apple growers of mid altitude areas. It reveals that 43.34 per cent of the apple growers had planted wind breaks on the borders of their orchards while as 56.66 per cent of apple growers had not planted wind breaks around their orchards, 65 per cent of apple growers were of the opinion that they needed training for such skill, while 35 per cent of apple growers did not need any training programme, 55 per cent of apple growers preferred to acquire training on priority basis for planting of wind breaks while 45 per cent of apple growers had not preferred any training programme on priority basis for such skill. In case of control of rodents 60 per cent of apple growers had controlled different rodents in their orchards, while 40 per cent of apple growers had not controlled these rodents. 53.34 per cent of apple growers preferred to undergo training for rodent control, while 46.66 per cent of them did not need any training for this skill. Among these apple growers 35 per cent preferred training programmes for such skill on priority basis while 65 per cent did not preferred. In case of intercultural operations, 73.34 per cent of apple growers were having this skill, while 26.66 per cent of apple growers were not performing this skill in their orchards, 78.34 per cent of apple growers needed training on intercultural operations, while 21.66 per cent of apple growers refused to undergo training for this skill, 71.66 per cent of apple growers needed training on priority basis while 28.34 per cent of apple growers did not need. In case of handling of spray equipment's, 31.66 per cent of apple growers were handling these spray equipment's properly, while 68.34 per cent of apple growers were not handling these equipment's properly, 85 per cent of apple growers needed training for handling of spray equipment's, while 15 per cent of apple growers did not need any training for such skill, 81.66 per cent of apple growers preferred training for this skill on priority basis, while 18.34 per cent of apple growers had not preferred. In case of proper weighing of chemicals for spray, 36.66 per cent of apple growers were properly weighing the chemicals for spray, while 63.34 per cent of apple growers had not properly weighed the chemicals for spraying, 95 per cent of apple growers needed training, while 05 per cent of apple growers did not need any training for this skill, 85 per cent of apple growers needed training on priority basis for weighing of spray chemicals, while 15 per cent of apple growers had not preferred any training for such skill. In case of grading and packaging of fruits, 13.34 per cent of apple growers were grading and packaging the fruits in a better way, while 86.66 per cent of apple growers had not graded or packaged apple fruits

Table 3. Practical skills of mid altitude farmers

Practical skills	Task performed		Training need		Acquiring this skill on priority	
Task statement	Frequency		Frequency		Frequency	
	Performed	Not performed	Need training	Not need	Acquire	Do not acquire
Wind breaks	26 (43.44)	34 (56.66)	39 (65)	21 (35)	33 (55)	27 (45)
Rodent control	36 (60)	24 (40)	32 (53.33)	28 (46.66)	21 (35)	39 (65)
Intercultural operations	44 (73.33)	16 (26.66)	47 (78.33)	13 (21.66)	43 (71.66)	17 (28.34)
Handling of spray equipment's	19 (31.66)	41 (68.33)	51 (85)	11 (15)	49 (81.66)	11 (18.33)
Weighing of chemicals	22 (36.66)	38 (63.34)	57 (95)	03 (05)	51 (85)	09 (15)
Grading and packaging of fruits.	08 (13.44)	52 (86.66)	54 (90)	06 (10)	47 (78.33)	13 (21.66)

Figures within parenthesis indicate respective percentage

properly, 90 per cent of apple growers needed training in this skill, while 10 per cent of apple growers refused to undergo in any training programme for grading and packaging of apple of fruits, 78.34 per cent of apple growers prefer to undergo training for such skill on priority basis, while 21.66 per cent of apple growers did not preferred training for such skill.

It has also been observed from the study that in all the three altitudes majority of the farmers lack planning, management and practical skills and most of the farmers want to undergo training programmes. Majority of the farmers needed training in soil testing, expert guidance, layout planning and pollination in planning skills, pest and disease management, nutritional management and physiological disorder management in management skills and in proper weighing of chemicals for spray, handling of spray equipment's, grading and packaging in practical skills on priority basis.

4. CONCLUSION

Indian agriculture which occupies a unique position in the country's economy is moving very fast from subsistence to commercial agriculture and from traditional agriculture to science and technology based agriculture. Recent break through has given a new concept of green-revolution which has strengthened the economy and simultaneously paved way to self-sufficiency in food production in the country. Majority of the farmers had not planned prior to the establishment of their orchards. It was seen that most of the apple growers had not taken any guidance from the experts regarding different operations necessary for the apple cultivation viz site selection, selection of varieties, soil testing, maintaining pollinizer ratio, nutritional management, pest and disease management, irrigation and weed management, stress and physiological disorder management, handling of spray equipment's, intercultural operations and grading and packaging etc. This result in the decline of the apple production and productivity in the state, besides the orchards are not healthy to compete with the world apple production and productivity despite of suitable agro-climatic conditions and potentiality for apple cultivation. Farmers usually use the local planting material in their orchards, which are being traditionally raised; special training should be given to the apple growers about the raising and management of quality planting material and using proper ratio of pollinizers. Both extensive and intensive hand on-training programmes should be emphasized for apple growers and rural youth through proper assessment of their training needs in the district. Much emphasis should be paid on integrated disease management, integrated pest and technologies for soil and water conservation while planning and designing training programmes for farmers. It is to be concluded that the farmers in the study area need trainings in particular practices so that they can practice and cultivate well as per the authentic recommendations (State agricultural university and department of agriculture) so that

the productivity as well as production will increase thereby enhance the standard of living of farming community.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://sciencedomain.org/review-history/21037