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## **Awareness of apiculture technologies and its relationship with the income of rural women in agriculture**

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### **Abstract**

The meaning for apiculture is the preservation of honey bee colonies to get pure honey and helps in pollination. Apiculture is an agro-based industry and one of the prominent enterprises involving a series of On-farm, off-farm and industrial activities. It can provide full time employment to entire family offering high income and better standard of living. Beekeeping is a useful mean of strengthening livelihoods because it creates a variety of assets. The main focus of the study was to assess the impact of beekeeping training given by Society of facilitator and Trainer (SOFT) to females in Cuddalore district. Capacity building of rural women in beekeeping was the focus and fifteen trainees' beekeepers were selected randomly from the district for survey to assess the impact of beekeeping in their livelihood. The analysis suggests that there are some social and cultural barriers which restrict women to go out in the fields for the management practices of beekeeping. For future selection criteria of participants have to be focused and without the involvement of male member they can't manage this whole activity in a better way. For young females it was very difficult to handle bees, proper colony management, their supplement feeding, honey extraction, movement of hives etc. Economically, beekeeping increased keepers' income but this ratio was very low in the targeted area. Training had to be gender based for sustaining livelihood. In nut shell, there was no positive impact of beekeeping training of rural women.

**Keywords:** Beekeeping, livelihood, capacity building and rural women

### **Introduction**

Beekeeping is an applied science of rearing honeybees for man's economic benefits. (Garikipati, 2008) <sup>[1]</sup>. Beekeeping or apiculture is the maintenance of honey bee colonies, commonly in hives, by humans. A beekeeper keeps bees in order to collect honey and beeswax, to pollinate crops, or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary or "bee yard". It is concerned with the practical management of the social species of honey bees, which can live in large colonies of up to 100,000 individuals. Depending on the part of the country and other environmental factors, a typical colony of bees can produce 36.28 to 54.43 kg of surplus (harvestable) honey and 4.53 to 8.16 kg of pollen in an average year. Besides selling honey and other bee products, such as beeswax, pollen, royal jelly, propolis, bee venom, or queens beekeepers can also provide pollination services (hive rentals) to farmers and orchardists.

Honey is an important nutritive food containing various kinds of sugar, protein, free amino acids, minerals, trace elements, enzymes and vitamins with a fairly high caloric value. Its main sugars Fructose, glucose and dextrose are absorbed directly into the blood and provide rapid energy. Four species of honeybees are found in India.

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These species are present in different ecological areas of the country. The indigenous species are *Apis dorsata*, *Apis cerana*, and *Apis florea*. The European Species is *Apis mellifera*. Beekeeping is a profitable business and about 7,000 beekeepers are now rearing exotic species, *Apis mellifera* in the modern beehives. There are about 300,000 colonies producing 10,000 ton honey annually. Congenial climate conditions and bee flora in the country provide excellent opportunities for the expansion of beekeeping. Honeybee flora is present on vast areas in all the provinces including Northern areas, FATA and AJK and can support 1,000,000 honeybee colonies. The share of honeybees in crop pollination is 80%. It improves the quality of fruits, vegetable and yield of seed crops. Honey production from occidental bees is up to 24 kg per colony per annum. The sidder honey fetches maximum price. Royal jelly, pollen and propolis are used as health food and beeswax in cosmetics. Beekeepers are maintaining a fairly large number of honeybee colonies and are capable of producing royal jelly, pollen propolis and bees wax. The production and value addition of by-products would supplement the income of beekeepers (Kabeer, 1999) [2].

Development of new bee management techniques, production and distribution of genetically superior honeybee queens are vital to achieve significant progress. Honeybee Research Institute provides training to people in beekeeping through different courses because inexperienced people squeeze the unripe nectar from beehives and extract honey mixed with bee parts, which could be hazardous for consumption. They are striving for promotion of use of honeybees for pollination of vegetables, seeds, fodder and fruit crops for higher yield and development of a low-cost comb foundation locally to replace costly and imported wax or plastic sheets. Besides, establishment of a processing unit is essential for demonstration and training in collaboration with provincial research and extension by providing colonies training.

Rural women particularly face the looming threat of eroding livelihoods, increased migration, scarcity of food and water. Yet, these women are not passive or inactive despite the adversities faced by them. In fact women in the country have always been integral to the major sectors of production and economic activity. Their contribution in agriculture, animal husbandry and handicrafts production is particularly significant. Moreover, women are the caregivers in these societies and therefore a disproportionate burden of maintaining health and well being of families rests upon their shoulders. Despite the inaccuracy of statistics, there is ample research to support the claim that rural women contribute significantly to household income through farm and non-farm activities, particularly through cottage industry. Cottage industry is one of the major areas of involvement of rural women. Weaving cloth and rugs, and sewing constitute important components of rural women's non-routine tasks. Women also generate cash income through the sale of livestock products and now beekeeping is also becoming common among them. Women have active, intensive involvement in forest product harvesting.

### Material and Methods

This study was designed to streamline the research and development efforts done in all beekeeping aspects. Precise survey and analytical procedures were used to determine the real benefit of beekeeping training given to the rural females. The purposive sampling method will be used for the purpose of accurate and detailed comparative analysis by selecting those towns and villages where apiaries are located. The areas

will be purposively selected on the basis of the training given by SOFT (Society of Facilitators and Trainers) on beekeeping and beekeepers were randomly sampled in each area. A structured questionnaire supplemented with an interview schedule was used to elicit information from the beekeepers with the help of trained social scientists. For estimation purpose different statistical techniques were adopted. The software, Statistical Package for Social Scientists (SPSS) and Excel were mainly used to analyze the survey data. Simple descriptive statistics was employed in order to have a summary description of the data collected. This involved the use of percentages, means, frequency distributions, and standard deviations to describe parameters as socioeconomic characteristics and regression model were used for the interpretation of the results.

### Livelihoods approach

Livelihood analysis toolkit was used, which focuses on how individuals, households and groups of households make their living and access to resources to do so. It reveals the activities people undertake to meet the basic needs and to generate income. Gender socio-economic group differences are shown with respect to labour and decision making patterns. Livelihood Analysis answers the questions, who does what? Who uses what? And who controls what? In other words, livelihood analysis helps to learn about the activities of different people and their relative access to resources, both for basic needs and income. We also learn about decision making roles for the use of resources and the distribution of benefits, with a strong focus on differences by gender and social group. The livelihoods approach differs from conventional evaluations in its central focus on people's lives rather than on resources or defined project outputs. As we have gained an improved understanding of poverty in recent years, three key facts have been highlighted. First, well-being is not only about increased income, other dimensions of poverty that must be addressed include food insecurity, social inferiority, exclusion, lack of physical assets, and vulnerability. Second, household poverty is determined by many factors, particularly access to assets and the influence of policies and institutions. Third, livelihood priorities vary; outsiders cannot assume knowledge of the objectives of a given household or group. Project impact assessment must therefore be based upon a prior understanding of people's objectives as well as on an informed view of how their livelihoods are constructed and which factors are the essential causes and manifestations of their poverty (Kantor, 2005) [3].

### Results and Discussion

#### Socio-Economic Conditions of Beekeepers

Some data were collected to know the different aspects about the 20 female trainers and 2 traditional beekeepers were interviewed for case study. The results are given below:

**Age of the beekeepers:** Most of the female beekeepers (50 per cent) of the study areas were in the age group of 26 to 35 years. The young people, age group of 20 to 25 were also engaged in this profession. They were about 50 per cent of the total. It was a good sign of creating self-employment. This enterprise will help to reduce the unemployment and involve youth of the country.

**Educational status of the beekeepers:** Most of the beekeepers were educated. It was found only 20 percent beekeeper of the study areas had primary level education. 33

percent of the beekeepers was up to middle passed, 40 percent was at secondary school certificate and only 7 percent was HSC (higher secondary certificate) and above.

**Own land holding status of the beekeepers:** Landless people (23 per cent) were engaged in beekeeping activities in the study areas. And this is not a landbased enterprise. Most of the beekeepers were small and marginal land holding categories. 76.7 percent of the total beekeepers owned land of 0.06 to 20 acres. Average own land size was 3.91 acres per beekeeper.

**Occupational status of the beekeepers:** - In the study areas, 8 percent of the beekeepers, which were females having an occupation of farming, 18 percent of the trained females were

student of different educational level and remaining 74 percent were having no occupational status. Marital status of 33 percent females was married and 67 percent female beekeepers were single.

**Average household sizes:** Results of the study predict that females were more in number in the average household size as compared to males. Trend shows that females were more interested in education as compared to males and very few young females were involve in agriculture activities, they prefer to work at home but some of them involve in off farm activities with the very low wage rate. Most of the males (bread earner of the family) involve in off farm activities with the minimum monthly income. Unemployment also exists in the area and most of the youth were unemployed.

**Table 1:** Below shows the clear picture of household.

Average Household Size	Literate (%)	On farm (%)	At home (%)	Off Farm (%)	Off farm income Rs/month
Male (>15years)	37.33	34.79	23.46	45.28	27461.46
Male (<15years)	82.55	0.00	0.00	0.00	0.00
Female (>15years)	40.10	1.04	67.77	9.40	19196.43
Female (< 15years)	72.92	0.00	7.08	0.00	0.00

**Effectiveness of Beekeeping:** Capacity building of rural women in beekeeping was the focus. The training curriculum involved Modern Beekeeping, Types of honeybees, Basic steps in beekeeping for the beginners, Bee Biology, Types of bees in the honeybee colony, morphology of honeybees, beekeeping equipments, economics of beekeeping, honeybee flora, handling of bees, methods of uniting colonies, supplement food, seasonal management of honeybee colonies, honey, its composition, types and uses, honey quality, honey granulation, honeybee diseases, pests, their diagnosis and management practices, value added products from beekeeping, pesticide poisoning of honeybee, preventive measures and elements of good beekeeping. It's 6 days training given by the SOFT. Results of the study analyzed that most of the young female beekeepers were trained but it need to be improved. For females it was very difficult to handle bees, proper maintenance of bees and hives, their supplement feeding, honey extraction, movement of hives etc. It has to be gender based so that it was easy for females to help their

counterpart in beekeeping activity. Because of these reasons females of the community need home based income generating activities in future. As results predicts that most of the females were willing to practice beekeeping but because of domestic issues they can't do longer.

**Practice of beekeeping:** The practicing scenario of beekeeping, most of them practice this activity after training. They were trained but it's really hard to continue this activity any more due to many social concern in the area and most of the females get training but unable to continue this activity after training. Most of them discontinued because of no proper maintenance and time constraint were the main issue for female either they were married or single. There were many other factors which permit them to discontinue beekeeping for future. Most of the trainer's bees were absconding due to different factors; bees were dead due to winter season and mismanagement and in proper maintenance

**Table 2:** Beekeeping Training Profile and Effectiveness

Type/Topic of training	Capacity Building of Rural Women in Beekeeping			
Duration (days)	6			
Effectiveness	Fully trained	Trained Partially	Trained	Useless
Percent	36.4	27.3	15.9	18.2
Effectiveness	Yes		No	
Application in Bee Keeping	26	59.1%	17	38.6%
Continuing Beekeeping in future	26	59.1%	17	38.6%

### Role of Gender in Beekeeping

The study results shows gender role in beekeeping activities. In the district level data, shows variation in the role of gender. According to the perception of respondents the tasks like colonies replacement and queen rearing were done by males and supplement feeding and pest management tasks were easily done by females. According to the results of a study from Tanzania shows beekeeping activities involved both genders at different stages of honey and beeswax processing and marketing. Traditionally, men are responsible for honey harvesting which is normally carried out at night because they are scared of honey bees during the day. Same

situation was observed in the results of this impact assessment study, it is totally gender based activity.

### Beekeeping affects other household activity

According to the results 30 percent of the respondents who got the beekeeping training were affirmative that, beekeeping affects household activities because this activity need time and proper maintenance of bees and hives which was very difficult for female to manage time from household chores. 63 percent respond-No, most of them were students and young girls.

**Table 3:** Role of Gender in beekeeping

Gender role in beekeeping	Sargodha (%)			Chakwal (%)		
	Male	Female	Both	male	female	both
Colonies replacement	33.33	8.60	13.79	38.71	0.00	4.76
Queen rearing	20.00	11.83	17.24	19.35	4.55	23.81
Pest management	10.00	3.23	20.69	6.45	13.64	23.81
Feeding supplement	3.33	22.58	10.34	0.00	27.27	4.76
Honey extraction	10.00	17.20	13.79	22.58	4.55	19.05
products	23.33	7.53	13.79	0.00	13.64	0.00
Grading/packing	6.67	7.53	6.90	0.00	22.73	14.29
Sale/marketing	10.00	6.45	3.45	12.90	13.64	9.52

### Impact of Beekeeping

**Direct impact on beneficiaries:** Economically, beekeeping increased keepers' income but this ratio was very low in the targeted area. One of the beneficiaries buys a Goat from this income but this situation was very rare and it was only possible with the involvement of their family. It was very necessary to give trainings to males also so that we get positive and direct impact on their households.

**Indirect impact on community:** Together involving in beekeeping activities strengthened the support and collaboration between communities. Some of the beekeepers reported that they got a closer relationship to other group members. It was a good team work activity and learns a lot in group besides, the closer neighborhood represented by actions such as visiting sick persons or transferring colonies to whom were new comers to experiment with beekeeping.

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