

**IMPACT ASSESSMENT OF BEEKEEPING  
IN SUSTAINABLE RURAL LIVELIHOOD  
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**ABSTRACT:** Beekeeping or apiculture is the preservation of honey bee colonies to get pure honey and helps in pollination. 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 Sargodha and Chakwal district. Capacity building of rural women in beekeeping was the focus and fifteen trainees' beekeepers were selected randomly from each 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 colonies 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. There are some problems identified by the beekeepers. Finally the authors have drawn some recommendations for future beekeeping trainings. In not shell there was no positive impact of beekeeping training of rural women.

**Key words:** - *Beekeeping, Livelihood, Capacity building and Rural women*

**INTRODUCTION**

Beekeeping is an applied science of rearing honeybees for man's economic benefits. (Nwali, L. 1996) 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. Yet Pakistan is not able to export honey and its product on large scale because it is not self sufficient in this field. 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 (Admin, 2011).

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 Pakistan. Three are indigenous and one is imported and established in Pakistan. These species are present in different ecological areas of the country. The indigenous species are *Apis dorsata*, *Apis cerana*, and *Apis florea*. The occidental species is *Apis mellifera*. Beekeeping is a profitable business in Pakistan. 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 in Pakistan 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 supplements the income of beekeepers (Ashfaq. M., 2006).

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. The European bees were first introduced some 30 years ago and after consistent efforts now it has more than 33 00,000 colonies being managed by 4,000 beekeepers. Women can easily adopt the profession as an income generating activity, as it does not require big investments or infrastructure. The best time for beekeeping/honey production from October to November and the spring season, however, honey can be produced throughout the year by planting some special species of plants and moving colonies to different natural floral belts. The beekeepers should encourage bees to get their food from natural sources like flowers and plants instead of using sugar in rainy or cold season (Daily Times, 2006).

Rural women in Pakistan 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 in Pakistan. 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 Pakistani 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 (PIDE, 2001).

Beekeeping emerged as cottage industry in Pakistan. Rural women are successfully generating income from beekeeping and about 7000 beekeepers, trained included women by Honey Bee Research Programme (HBRP), NARC. These activities provide an opportunity for rural women to participate in economic activity is also very rare. Keeping in view for the betterment of rural women different training programs are organized for skill improvement and enterprise development for rural mass. These trainings and techniques of skill development become fruitful when they are applied properly in the field. Trainings in honeybee are one aspect which helps in promoting women's business ownership, microfinance efforts, and financial markets. Honey Bee Research Institute (HBRP), Society of Trainers and Facilitator (SOFT), Agriculture poly technique Institute, (API) and other Non Governmental Organizations NGOs are playing major role in the empowerment of women through different activities. Furthermore, the export impact assessment of such training programs provides valuable information not only on the returns to investment on such programs but also gives information on the issues, constraints and future opportunities. Such information also play vital role in future resource allocation. Therefore the present study is designed to assess the impact of training on beekeeping (Apiculture) for women.

## **MATERIAL AND METHODS**

This study was designed to streamline the research and development efforts done by the SOFT. A 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 namely Chakwal and Sargodha will be purposively selected on the basis of

the training given by SOFT (Society of Facilitators and Trainers) on beekeeping and beekeepers was 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 (FAO, 2011).

## **RESULTS AND DISCUSSION**

### **1. 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:

**1.1 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.

**1.2 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.

**1.3 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 land-based 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.

**1.4 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.

**1.5 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 1below shows the clear picture of household.

**Table. 1Average Household Sizes**

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	274646
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

**1.6 Household assets:** - Results of the study predict household assets and their living standard situation. It shows that in Sargodha most of the houses were made of brick whereas in Chakwal it was made of mud which shows the poor and

marginalized group of respondents. Sargodha was more developed as compared to Chakwal. They have access to piped water in the house while in Chakwal it was very few but both of them have availability of electricity, have paved toilets, very few have availability of their own stoves, most of them have TV but no access to cable and most of the household lack of advanced technologies like washing machine, computer etc.

**2. Effectiveness of Beekeeping:** - Capacity building of rural women in beekeeping was the focus. The training curriculum involved Modern Beekeeping, Types of honeybees in Pakistan, 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 in Pakistan, 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.

**2.1 Practice of beekeeping:** - The practicing scenario of beekeeping, most of them practices 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. 2Beekeeping Training Profile and Effectiveness**

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

**2.2 Major constraints and suggestions:** - Results of the study predicts the constraints faced by respondents in the beekeeping activity. The major problem was disease and pest's incidence it was difficult for respondents to overcome this issue. Second issue or problem was marketing, if they can produce some quantity of honey then it's very difficult to market and also to get good price of honey in the area. Absconding of honey bees and time management was a big constraint to manage beekeeping because it's a time consuming activity and not possible for female to give proper care and maintenance in the social setup. As results shows many other constraints but some suggestion were also highlights. In the table given below it was suggested that with the involvement of male members it can be successfully practiced. They were interested in trainings like stitching, embroidery work or any other which they have been doing in the households. Very few show their interest and want to get more training on beekeeping.

**Table. 3 Major constraints and Suggestions**

<b>Major constraints</b>	<b>%</b>	<b>Suggestions</b>	<b>%</b>
Absconding of honey bees	14.55	Difficult to manage beekeeping	17.39
Disease and pests	32.73	Not suitable for females	26.09
Death of colony	7.27	Marketing issues	8.70
Marketing problem	16.36	Not interested in beekeeping	17.39
Reduction of honeybee colony	10.91	Need more hives	13.04
Time constraint	16.36	Training in Livestock	4.35
Transportation	1.82	Interested in more training	13.04

**3. 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 in Sargodha district. While in Chakwal colonies replacement and honey extraction were male tasks whereas, supplement feeding and grading/packing were done by females. According to the results of 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.

**3.1 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. 4**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

#### 4. Impact of Beekeeping

**4.1 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.

**4.2 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.

#### 5. Recommendations

? Project needs to be gender balanced because without the involvement of male it can't be successful;

? Technical assistance should be provided to 1 male member of the household for a sustainable development of beekeeping activities;

? Females should be targeted for other skillful trainings like handicrafts, baskets making, stitching and dying of cloths etc;

? Develop market linkages for honey production in the area.

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