

## AWARENESS AND ADOPTION OF GOOD BEEKEEPING PRACTICES BY BEEKEEPERS

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### ABSTRACT

*Beekeeping is an art and skill of maintaining the bees in modern movable frame hives for hobby or fascination, production of hive products, and pollination services. The study was intended to check the awareness and adoption of Good Beekeeping Practices (GBPs) in Gujarat state. A total of 100 beekeepers were selected by employing the snowball sampling method from Gujarat state. Frequency and tabular method were used to furnish the result. The result revealed that only 12 percent of beekeepers were aware of the guidelines of GBPs were declared by NBB while 100 percent of beekeepers were aware about particular parameters of GBPs. The majority of beekeepers have adopted the GBPs parameters to sustain the beekeeping. The Majority i.e. 74 percent of beekeepers who have occupied the colonies for pollination purposes have domesticated the Apis Cerana while only 26 percent of beekeepers have domesticated the Apis Mellifera species for commercial purposes.*

**Keywords:** beekeeper, good beekeeping practices, awareness, adoption

### INTRODUCTION

The word Apiculture has been derived from the Latin word apiscultura, which means “Cultivation of bees through education”. It is a high-profit enterprise and can be taken up both as a subsidiary industry as well as a whole-time profession. Beekeeping does not require ownership of land (Sivaram, 2007). It is not constrained for other agricultural activities, provides handsome income, and is helpful for pollination of agricultural/ horticultural crops which increases the quantity as well as the quality of yield. It plays a great role in agricultural diversification by producing various kinds of bee products and pollinating crops. Beekeeping is vitally essential for agricultural well-being as it symbolizes the natural biotic interdependence that arises from insects, pollination, and the production of seeds (Debroy, 2019). The study of Good Beekeeping Practices (GBPs) is significant highlight the gap in adoption which can be covered with the help of a training program or awareness campaign.

### OBJECTIVE

To identify the Good Beekeeping Practices (GBPs) followed by the beekeepers

### METHODOLOGY

The study was confined to Gujarat state. Total 100 beekeepers were selected by deploying snowball sampling method from Gujarat state. The result was furnished by using

a frequency and tabular method. The study was dependent on primary data. The data were collected with the help of structured questionnaire and field survey. The GBPs considered for the study was taken from guidelines declared by National Bee Board.

### RESULTS AND DISCUSSION

Good Beekeeping Practices are a collection of parameters to select and maintain healthy honey bees for sustainable agriculture and to harvest the maximum yield of honey through beekeeping. The study was intended to identify the GBPs awareness among beekeepers and adoption of GBPs parameters. Good Beekeeping Practices taken for the study were declared by National Bee Board (NBB). Mainly forty-three GBPs parameters are specified by NBB for sustainable beekeeping farming. GBP parameters regarding the selection of apiary site, selection of quality bees, management of apiary during different seasons *i.e.* winter, summer, monsoon, and off flora season, as well as artificial food during off flora time, migration of colonies, use of pesticides, and time of spraying the pesticides, extraction of honey, management of healthy colonies and diseased colonies, etc. are listed under GBPs guidelines by NBB. A survey was conducted of 100 beekeepers about GBPs declared by NBB to know the awareness of GBPs and adoption of specific GBPs parameters by beekeepers.

Table 1: Awareness and adoption of good beekeeping practices by beekeepers

(n=100)

Sr. No.	Parameters of good beekeeping practices	Are you aware of GBPs parameter?		Adopted GBPs parameter or not?	
		Yes (%)	No (%)	Yes (%)	No (%)
<b>A</b>	<b>Selection of good apiary site</b>				
1	Apiary at a clean, open, dry place	100	0	100	0
2	Apiary in shade	100	0	99	01
3	Away from the power station, brick kilns, highways, and train tracks but easily accessible road	100	0	99	01
4	Fresh running water available near an apiary	100	0	93	07
5	windbreaks	100	0	99	01
6	The site receives early morning and afternoon sunshine	100	0	100	0
7	Area in rich flora	100	0	100	0
<b>B</b>	<b>Selection of good quality bees</b>				
8	Which species are domesticated?				
	A. <i>Apis Cerana</i>		74		
	B. <i>Apis Mellifera</i>		26		
9	Buying of diseases free bee colonies from existing beekeepers	100	0	100	0
10	Selection and multiplication of colonies only from diseases resistant, high honey yielding, young, healthy, and high egg-laying capacity queen, etc.	100	0	99	01
<b>C</b>	<b>Management of apiary</b>				
11	Hives made from locally available seasoned lightweight wood with BIS/ISI specification	100	0	100	0
12	Row to row and box to box distance is 10 and 3 feet, respectively	100	0	95	05
13	Avoiding nailing from a bottom board with brood chamber and over-stocking <i>i.e.</i> , not more than 50-100 colonies	100	0	100	0
14	Adoption of the general colony and personal hygiene in an apiary	100	0	99	01
15	Check the colonies periodically for any abnormalities or changes in the behaviour of bees	100	0	100	0
16	Inspect colonies on a clear sunny day between 20° C - 30° C temperature and not on cold, windy and cloudy days	100	0	100	0
17	Use of smoker, protective dress, and veil during inspection of colonies	100	0	98	02
18	Handle colonies gently, avoid jerks and crushing bees	100	0	100	0
19	Isolate diseased colonies from healthy ones and handle them separately	100	0	100	0
20	To maintain adequate humidity in a colony	100	0	93	07
21	The mixture of honey and pollen with water to feed bees	100	0	85	15
22	Watering while the temperature in apiary increases beyond 37° C	100	0	97	03
23	Provide percent sugar syrup without mixing honey in a lean shallow vessel and provide fresh water near a colony	100	0	85	15
24	Feed the colony in the evening preferable after sunset and to be given to all colonies at one time	100	0	100	0
25	Artificial food	100	0	85	15
26	Use of honey extractor, containers, and other tools/equipments made from stainless steel/ food grade plastic	100	0	100	0

Sr. No.	Parameters of good beekeeping practices	Are you aware of GBPs parameter?		Adopted GBPs parameter or not?	
		Yes (%)	No (%)	Yes (%)	No (%)
27	Selection of frames only with 75 percent sealed cells with ripened honey for extraction and extract honey in a closed room to avoid robbing	100	0	100	0
28	Migration during non-availability of flora	100	0	27	73
29	Close the entrance gates in the evening	100	0	27	73
30	Packing of colonies in such a way that the entrance side should face the front side of the vehicle and avoid jerking	100	0	27	73
31	Start migration in the late evening and reach the destination within 10-12 hrs.	100	0	27	73
32	Keep the colonies in the hick shade using wet gunny bags over top cover and sprinkling water	100	0	99	1
33	Keep the surroundings clean and provide artificial feeding as per requirement	100	0	100	0
34	Unite weak worker colonies and control predatory wasps, ants, frogs, lizards, etc.	100	0	99	1
35	Strengthening the colonies to stimulate drone brood rearing and control mites, wax moth, and wasps	100	0	100	0
36	Extraction of autumn honey before the winter	100	0	100	0
37	Shifting of the colonies in a sunny place and unites the weak colonies with stronger	100	0	100	0
38	Provide stimulative sugar/ pollen substitute and extra frames to be raised by providing comb foundation sheets	100	0	94	6
39	Manage the colonies to prevent swarming and extract honey frequently during the season	100	0	100	0
40	Persuade the farmers not to use pesticides or use selective pesticides that are less harmful to bees and avoid the use of dust formulations	100	0	100	0
41	Avoid spraying of pesticides during the flowering of the crop and peak foraging time	100	0	100	0
42	Spraying may be done in the evening after sunset	100	0	100	0
43	Isolate colonies from healthy ones and handle separately if any diseases observed	100	0	100	0
44	How you manage the following bee diseases	12			
a	Wax moth	Separate from healthy colonies and extract wax moth from infected colonies/ Isolate infected frames from colonies and manage them separately			
b	Mites	Cow dung and cow urine before mites and sulphur/ Sulphas after infected			
c	Foulbrood	Maintained cleanness and hygiene of beehives			
d	Birds like bees eater and black drongo	Migrated the boxes to another place from hilly area/ Manually management by a catapult (gofan)			
e	Any other	Use of Sulphas tablet to remove the pest/ disease from frames			

Table 1 states the result regarding awareness of GBPs parameters and adoption of the GBPs parameters by beekeepers in Gujarat state. The study revealed that the majority of beekeepers *i.e.* 88 percent of beekeepers are unaware of GBPs guideline specified by NBB and only 12 percent of beekeepers are aware that the GBPs parameters that they are following are specified by NBB. Whereas in case of specific GBPs parameter, 100 percent of beekeepers are aware of specific parameter. Beekeepers developed awareness about GBPs parameters from training conducted by different SAUs, NGOs, and fellow progressive beekeepers as well. The result discloses that two species are domesticated *i.e.* *Apis Mellifera* and *Apis Cerana* by beekeepers. The majority of *i.e.* 74 percent of beekeepers have domesticated *Apis Cerana* while 26 percent of beekeepers have domesticated *Apis Mellifera* species for beekeeping. 7 percent of beekeepers are not following GBP related to fresh running water near colonies and maintenance of adequate humidity in the colony because according to them due to humidity in nature and natural sources of water, it is not required to serve fresh water nearby colony. 15 percent of beekeepers are not following GBPs related to artificial food, sugar syrup, and a mixture of honey and pollen during off flora season because beekeepers do not extract the pollen from beehives. So, bees consume pollen during off flora which does not require artificial food or sugar syrup and a mixture of honey and pollen. 73 percent of beekeepers are not following GBPs related to migration *i.e.* packing of colonies, closing the entrance gate of colonies as well as migration in the late evening and within 10-12 hours as they are not migrating the colonies due to less number of beehives which generate higher migration cost. Only 12 percent of beekeepers found bee diseases/ pests like a wax moth, mites, foulbrood, and birds like bees eater and black drongo or any other. In the case of wax moth beekeepers used to isolate the infected frames from healthy frames and maintain them separately after removing the wax moth. Beekeepers used to spray the cow dung and cow urine before infection of mite or any other pests. But if beehives got infected with mites or any other pest, beekeepers remove the mites by using the salfas or celphos insecticide. Beekeepers used to maintain the cleanliness and hygiene in the hive to escape the effect of the foulbrood. To save the honey bees from birds like bees eater and black drongo, they are using manual catapult or migrate the colonies far away from the hilly areas.

## CONCLUSION

The guideline of beekeeping that was taken for the study was declared by National Bee Board (NBB). The study of GBPs revealed that only 12 percent of the beekeepers were aware of the guidelines listed by NBB. Though 88 percent of beekeepers were unaware of the guideline, 100 percent of beekeepers were aware of the GBPs parameters about beekeeping. The majority of the beekeepers followed the GBPs parameters and kept the honeybee healthy, manage the honeybee colonies during different seasons, and harvest the hygiene honey from hives.

## RECOMMENDATION

Beekeepers should attend more training programs to develop awareness about the GBPs guidelines declared by NBB and adopt 100 percent parameters for sustainable beekeeping.

## ACKNOWLEDGEMENT

Authors are thankful to the Post Graduate Institute of Agri-Business Management, Junagadh Agricultural University, Junagadh, 362 001, Gujarat. The authors are also thankful to the beekeepers who were visited during the study for their appreciable response and to the UTMT NGO for its cooperation by providing the necessary information to fulfil the research purpose.

## CONFLICT OF INTEREST

The authors of the paper declare no conflict of interest

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Received : January 2022 : Accepted : April 2022