

Mud hives: A new approach to beekeeping in hilly areas

With little outlay of capital and large payoffs, beekeeping in hilly areas is an attractive source of income. People who live in hilly areas often practice traditional beekeeping by keeping honeybees in khadire, which are mud walls that encase their homes. People used to maintain bees and make khadire more often, but now they mostly live in concrete houses because of modernity and the need to conform to particular norms. It is also difficult to grow bees in these modern constructions due to the lack of knowledge about scientific beekeeping procedures. Bees are presently being kept in wooden hives, but this approach has not worked out so well because it is hard to keep them alive during winter; they swarm or die. Temperatures plummet, and in certain places, snow falls throughout winter. Rearing bees in contemporary wooden hives becomes difficult under such tough conditions. Moreover, mud hives have their uses, especially for beekeeping in the winter. These can help maintain the temperature steady throughout that time, which means they could be useful for beekeeping all year round in hilly areas.

BEEKEEPING encompasses the methodical maintenance and cultivation of bees with the primary objective of procuring valuable byproducts from the hive, such as propolis, honey, beeswax, and royal jelly. Beekeeping is a substantial undertaking that requires the application of a low-cost input with high returns. Mountain people have historically engaged in beekeeping, which is regarded as an ecologically sustainable occupation and an important part of their natural and cultural heritage. Furthermore, it functions as a substantial secondary source of income, providing supplementary employment opportunities for a considerable proportion of rural, hilly, and tribal communities, in addition to the majority of cultivators. Honey bee species, *Apis cerana indica* is widely reared in hilly areas due to its high adaptability. Despite having received training on the subject, beekeepers in mountainous regions continue to employ wooden hives for beekeeping. However, this approach proves ineffective due to the prevalence of challenges such as swarming and bee mortality, which are exacerbated by winter and precipitation in hilly regions.

Need for mud hives

In states such as Uttarakhand and other mountainous areas, there is a significant abundance of bee foraging plants. However, the utilisation of these resources is not being optimised. The varied climatic conditions in hilly places, characterised by substantial fluctuations in both precipitation and temperature, have a direct impact on beekeeping practices. During the winter season, temperatures drop significantly at elevations above 1500 m,

resulting in severe frost and snowfall. The survival of honeybees in wooden hives is greatly affected by these extreme cold conditions, even with all management techniques in place. As a result, the bees either leave the hive in large groups or perish due to the intense cold. In this particular circumstance, the hive composed of mud is deemed most favourable for the honey bees.

Constructing mud hives

The mud hives are made up of a mixture of cow dung, clay and straw. Moreover, bricks or stones and a piece of polythene sheet are also needed for making the platform or stand of the hive along with a wooden or iron frame. The procedure consists of the following phases.

- Choose a suitable region for bee foraging, ensuring hygienic conditions, reliable water supply, minimal wind, and ample sunlight.
- Elevate the hive platform 15 cm above the ground to prevent water damage.
- Prepare the platform with bricks or stones and paste them together with a mixture of cow dung, clay, and water.
- Fill the vacant space between the platform with stones or concrete.
- Place a 1 metre thick polythene sheet over the platform.
- Place a wooden or iron frame on top of the sheet.
- Fill the vacant area of the frame with cow dung, clay, straw, and water mixture to construct the hive wall. Also insert two wood to ensure the frame in future within the hive.



1. Mud hive



2. Construction of a platform using bricks



3. Positioning the iron frame onto the platform following the placement of a polythene sheet



4. Complete filling the frame with a mixture of cow dung, straw, clay, and water



5. Removing the wooden frame the following day



6. Complete coating the whole hive with a mixture of cow dung, clay, and water



7. Placing the inner cover on the hive after allowing the hive to dry in the sun



8. Installation of a super chamber over a mud hive



9. Inspection of beehive

- Allow the hive to rest overnight.
- Remove the frame and create an entrance for the bees.
- Cover the hive with the cow dung, clay, and water mixture then let it dry.
- Place the bee colony using frames and cover it with an inner cover and wooden tin lid.
- Position a wooden super chamber above the hive, with a queen excluder between it whenever needed.

Management

Management of mud hives that is efficacious is essential. It is imperative that the beehive be protected from any and all forms of precipitation and dampness. Regular inspection of the hive is essential in order to

evaluate its strength and to detect the presence of any diseases or pests that may be present. It is essential to do routine maintenance on the hive in order to thoroughly remove any unnecessary wax that may be found on the upper portion of the frame. It is essential to ensure that the gaps between the lid and the hive are suitably plugged-in. Cow urine should be applied to the hives on a regular basis in order to prevent pest issues. When resources are few, it is important to give the bees with sugar syrup on an as-needed basis.

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