Beekeeping Protocol

Bees are essential pollinators for many flowering plants, including crops. Their pollination services contribute to maintaining biodiversity and ecosystem's health. As ecosystems face threats from climate change and habitat loss, promoting healthy bee populations through beekeeping can enhance pollination and support plant species diversity. Beekeeping provides an alternative livelihood for communities, not only in the rural areas but for urban & peri-urban areas as well. This economic opportunity can reduce dependence on activities that might be detrimental to ecosystems, thus contributing to their climate resilience.

To fully leverage the potential of beekeeping as an EbA strategy, it is important to practice sustainable and responsible beekeeping. This includes avoiding harmful pesticides, providing adequate forage resources for bees, ensuring proper hive management, and collaborating with local communities and experts to develop strategies that align with the specific needs and characteristics of the ecosystem in question.

Integration with international agreements

Sendai: Goal 3 – strengthening inclusive policy implementation through community engagement to improve livelihoods.

Duration

A beekeeping setup can be established within 5-10 days. The durability of the beekeeping infrastructure depends on various factors such as the materials used, the quality of construction, the maintenance provided, and the environmental conditions. Typically, the operational lifespan of such an installation range from 5-10 years.

Place of implementation

The selection of an appropriate location for beekeeping within an urban environment is essential for their success and productivity. Factors to consider when setting up beekeeping include: location & climate, sunlight exposure, available space, water source, forage availability. These elements will ensure the health and efficiency of the bee colonies.

Beneficiaries (~#)

One bee colony (traditional 10 frame deep box) can produce between 80-100 pounds of honey annually; 5 colonies can produce between 100 to 400 pounds of honey. (This depends on the size of the frame, health of the bees & climate.)

Threats Addressed

- High temperatures
- Drought
- Changes in rainfall patterns
- Heavy rainfall

Main climate impacts addressed

Biodiversity Loss

Bees contribute to the preservation of biodiversity by ensuring the survival of flowering plants through pollination. This, in turn, supports entire ecosystems, including a variety of other animals and plants, helping to maintain ecological balance even as climates change.

Agricultural Productivity

Many crops depend on pollination services that bees provide. In the context of climate change, which threatens crop yields due to extreme weather conditions and shifting temperatures, bees help stabilize food production and contribute to food security.

Urban Heat Islands

In urban areas, beekeeping can support the growth of green spaces through the pollination of plants and trees. These green spaces play a critical role in cooling urban environments, thus mitigating the urban heat island effect which is exacerbated by climate change.

Ecosystem Resilience

Pollinators like bees enhance the resilience of natural ecosystems against climate change impacts. By supporting a wide range of plant species, bees help maintain healthy ecosystems that can better withstand and adapt to changing environmental conditions.

Community Engagement and Education

Beekeeping initiatives can serve as practical tools for educating communities about climate change and environmental stewardship. They provide a tangible example of how local actions can have a global impact on climate mitigation and adaptation.

Social and economic co-benefits

Economic

- **Local Honey Production:** One of the most direct economic benefits of beekeeping is the production of honey, a valuable commodity. Honey can be sold locally, regionally, or even internationally, depending on the scale of the operation. This provides a steady source of income for many beekeepers.
- **Sustainable Agricultural Practices:** By enhancing pollination, beekeeping supports more sustainable agricultural practices, which can lead to better crop yields and more stable farm incomes, particularly important in areas dependent on agriculture

Social cohesion

- **Community Projects and Initiatives:** Beekeeping involves community-based projects that require collaboration. Communities that engage in beekeeping projects work together to manage the hives (colonies), share knowledge, and distribute the products. This collective effort enhances community bonds and fosters a sense of shared purpose.
- **Educational Opportunities:** Beekeeping serves as an educational tool that schools, clubs, and community groups can utilize to teach about biology, agriculture, and the environment. Educational programs around beekeeping can bring different age groups and people from various backgrounds together, promoting intergenerational interaction

Education

- **Climate Change Education:** Beekeeping in schools and communities acts as a powerful educational tool for understanding climate change, sustainable agriculture, and environmental stewardship. It offers practical, hands-on learning experiences in subjects like biology, environmental science, and agriculture, thereby enhancing knowledge of sustainability, the lifecycle of pollinators, and local food systems.
- **Research and Innovation:** Research and innovation in areas such as pollinator health, biodiversity, and climate-adaptive practices are essential for developing strategies to adapt to and mitigate the impacts of climate change, leading to innovative approaches in beekeeping and environmental management.

Biodiversity Protection

- **Habitat for Pollinators:** Greenhouses can serve as habitats for pollinators and other beneficial insects, which are crucial for ecosystem health and have been threatened by climate change.
- **Preservation of Plant Varieties:** They offer an environment to grow and preserve a diverse range of plant species, some of which might be threatened in their natural habitats due to changing climate conditions.

Implementation stages

Phase 1. Initial Setup and Installation

1 **Time Frame:** Setting up your beekeeping (apiculture) operation can take a few weeks. This includes:

- **Preparation:** Gather all necessary equipment, such as hives, bee suits, smokers, hive tools, and bees.
- **Installation:** Install the hives in your selected location. Placement should ensure adequate sunlight, wind protection, forage, and accessibility. Installing the hives and introducing the bees into them can be completed in 1-2 days. (Full colonies can also be purchased from an established Apiary).

Phase 2. Monitoring and Maintenance

2 **Routine Monitoring**:

- Weekly Checks: Inspect the hives weekly to monitor the health of the queen, the progress of the hive, and any signs of disease or pests.

3 **Maintenance Tasks:**

- Manage pests and diseases
- Ensure hives are not overcrowded to prevent swarming. Add supers (extra boxes for honey storage) as needed.

Phase 3. Dividing the Colonies

4 **Identifying Strong Colonies:** Choose strong colonies that show signs of overcrowding.

5 **Creating New Colonies:** Transfer frames with eggs, larvae, and some honey stores into a new hive box. Introduce a new queen or allow the bees to raise one from a young larva.

Phase 4. Extracting Honey

6 **Checking Honey Supers:** Ensure the honey is ripe (capped by the bees).

7 **Harvesting:** Remove the frames, brush off bees, and extract honey using an extractor.

8 **Processing:** Strain and bottle the honey for consumption or sale.

9 **Post-Extraction Tasks**

Returning Frames: Once extracted, frames can be returned to the bees to clean and refill, saving energy and resources for the bees.

Phase 5. Annual Review

10 At the end of each year, review the health and productivity of each colony. Plan adjustments for the next season based on the colony's performance and any challenges faced.

Costs and inputs

Description	Total
Materials for a complete hive	$200.00 per colony (full) $45.00 per empty box
Protective equipment for the beekeeper	$40.00-130.00
Equipment (smoker, hive tools, bee brush, excluder, feeder, seeds)	$150
Labour to deliver the boxes (depends on location)	**50.00-70.00 per colony**

Indicators

Implementation	Number of bee colonies of established
Quantitative impact	• Amount of honey produced per hive annually • Level of participation of students or community members in NBS knowledge building activities within urban and peri-urban areas
Qualitative impact	• Percent of schools which have applied targeted improved NbS practices or technologies in their curricula • Percent change in sustainable practices and behaviors in the community or school as a result of established Apiary's

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