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“Reconcile land system changes
with planetary health”

Improving beekeeping using a landscape approach to maintain ecosystem health, agricultural yield, and promote agroecology

MICHAEL ELIAS MGALULA

University of Dar es Salaam, Mkwawa University College of Education, Tanzania

Abstract

Bees are an integral part of ecosystems. They make major contributions to biodiversity protection, plant survival, forest regeneration, climate change adaptation, and enhanced agricultural production systems. Beekeeping provides benefits that go beyond honey production. It is believed that more than 80 % of our crops rely on these pollinators. As pollinator populations are decreasing around the world, improved beekeeping practice is essential for agroecological practices. However, the question is, how can beekeeping be mainstreamed in agroecology to increase food production and a healthy environment? A transdisciplinary co-production approach was used to gain an understanding of beekeeping practices, and the survey was conducted with 120 farmers in the Western Miombo of Tanzania. The qualitative data obtained from beekeepers was evaluated via descriptive statistics from IBM Statistics. The findings demonstrate that beekeeping remains a traditional practice, with only 3.6 % receiving basic instruction and the vast majority, 96.4 %, inheriting or learning it informally. As a result, 95.8 % of beekeepers use conventional hives, with 57.9 % made of tree bark and 42.1 % from wood logs. Tree bark hives have a lifespan of 3 to 4 years, whereas log hives last 10 to 20 years. Repeatedly harvesting tree bark to make hives accelerates the loss of forest. Modern wooden box hives account for only 44.2 % of the total. The research indicated that most farmers employ smoke (74.3 %) and bush fires (25.7 %) to displace bees from hives and extract honey. Fires and smoke have direct effects such as dispersing bees, destroying habitats, limiting pollination capability, and resulting in biodiversity loss. As a consequence, 80.8 % of farmers admitted that honey production had been falling for over one and a half decades due to a lack of flower diversity. The farmers indicated that the reduction of flowers in the Miombo, the application of herbicides on cattle, chemicals for food crops, and tobacco cultivation have led to the fall of pollinators. Bee pollinators play an essential role in agricultural production and biodiversity; therefore, beekeeping practices can be integrated into agricultural landscapes to increase food security, biodiversity, and ecological stability.

Keywords: Beehives, ecological fragility, habitat loss, harvesting, pollinator decline, Tanzania