Ethiopian Biodiversity Institute (EBI)

Traditional Pollinator Conservation Practices in Southwestern Ethiopia

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CABES Capacity Development for Biodiversity and Ecosystem Services experts in West, Central & East Africa

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1. Introduction

Ethiopia has unique ecosystems and biodiversity that contribute considerably to people at local, regional, and global levels. Forests are vital in ensuring food security and sustainable livelihoods for millions of households in the country. Ethiopia's forests generate economic benefits in the form of cash, and in-kind income equivalent to USD 16.7 billion, or 12.9% of the measured value of GDP. Southwest Ethiopia, is one of the biodiversity hotspot areas of the country (Figure 1) that harbors relatively the largest blocks of undisturbed Afromontane Forest vegetation (Wiersum and Endalamaw, 2012). Altitudinally the area covers from 900 to 2700 m.a.s.l. and has a major role in conserving biodiversity resources. The area has many endemic and wild plants including economic-value plants like *Coffea arabica, Aframomum corpora, and Piper capense*. The local communities of Southwest Ethiopia have historically been highly dependent on forest resources for their livelihoods. Some of the farmers are still in the hunting/ gathering lifestyle, however, most of them are engaged in mixed farming, including not only agricultural cultivation and animal keeping but also forest exploitation. Moreover, some forests in the area are conserved in their natural conditions for producing either wild coffee or honey.

The rich forest ecosystem plays a vital role in supporting pollinator populations. The diversified forests act as homes for pollinators, providing a continuous source of food, nesting sites, and protection from agricultural pesticides. The emphasis on traditional knowledge aligns perfectly with the growing recognition of the importance of local and indigenous knowledge systems in sustainable development. The scientific community can study deeper into traditional beekeeping techniques, the impact of home garden plant diversity on pollinators, and the socioeconomics of honey production to inform future conservation efforts. Inspired by this success story, policymakers can strengthen forest conservation policy, support research and education for beekeepers, promote pollinator-friendly agriculture, and leverage local honey branding to empower beekeepers and ensure the region's environmental well-being. Recognizing the value of tradition overlays the way to sustainable development in the area.

Figure 1. Diversified forest ecosystem types of southwestern Ethiopia (Photo: upper Gebreegziabher Hailay, 2016; lower NABU, 2020).

2. The Importance of Pollinators

Pollinators, like bees, birds, and even some mammals, are crucial for plant reproduction. They transfer pollen between flowers, allowing for seed and fruit production. This process is vital for most flowering plants (90%) and contributes significantly to global food security and agriculture, with an estimated annual value in the hundreds of billions USD. In Ethiopia, pollinators contribute about $ 815.2 million, which is about 6.24 % of the total value of the agricultural GDP impacting key crops like coffee and legumes. Honeybees alone contribute 80% of the pollination services, estimated to be 4.58 times higher than that of honey production (Alebachew, 2018). The country's rich biodiversity offers a prime

opportunity to leverage this natural service. By protecting pollinators through sustainable farming and habitat restoration, Ethiopia can increase agricultural productivity, ensure food security, and promote ecosystem health benefiting both the local people and the environment.

Figure 2. Different insect pollinator types (butterflies, bees, and beetles) feed on different plant species (photo: Hailay & Misganaw).

3. Traditional Practices for Pollinator Conservation

3.1. Forest Protection

Southwestern Ethiopian communities actively participate in reducing deforestation and promoting sustainable forest management practices. Selective logging ensures responsible wood use while promoting biogas or improved stoves and reducing reliance on firewood. Reforestation with native plants

restores degraded areas and maintains biodiversity. These communities further benefit by sustainably harvesting forest resources (fruits, medicinal plants, non-timber products), managing fire risks, and promoting forest health.

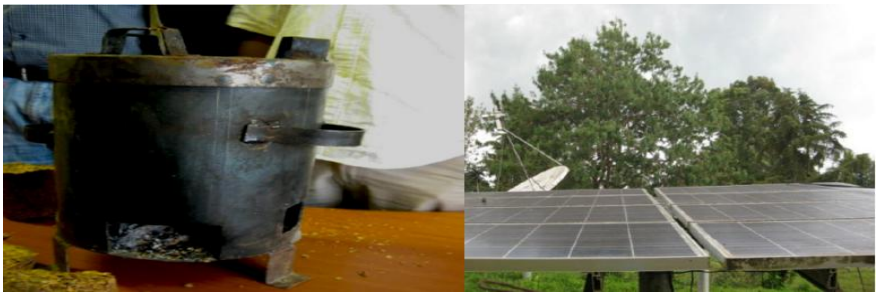

Figure 3. Alternative energy sources used by the local community (Photo: NABU).

3.2. Traditional beekeeping

In southwestern Ethiopia, communities have developed a sustainable beekeeping practice that benefits both people and the environment. They craft beehives from local materials and strategically hang them in trees, averaging 53 hives per household (Fekadu et al., 2021). The local hives are hanged after fumigating with the leaves of a tree with a good smell to attract the bee colony. The traditional hives are advantageous for the bees through improved ventilation, lower price, and produce organic honey for the community. While individual hives produce less honey as compared with modern ones, the number of hives used by these communities significantly increases overall honey production which in turn enhances pollinators and pollination.

Beekeepers rely on ecological cues and minimize intervention in the hives. Importantly, beekeepers prioritize sustainability, harvesting only a portion of the honey to ensure the colony's health. Beekeeping knowledge and skills are traditionally passed down through generations, ensuring the continuation of traditional practices and the associated benefits for pollinators. This balanced approach, combined with minimal intervention and forest conservation benefits both the pollinators and the community. This creates a harmonious relationship between the community and nature.

Figure 4. Traditional bee hives (Photo: Left (NABU), climbing for hanging; right (Misganaw), traditional beehives hung on the tree)

3.3. Home gardening

The communities of Southwestern Ethiopia satisfy human needs and ecological responsibility through their traditional practice of home gardening. These gardens serve as a direct source of food, providing an abundance of tubers, fruits, vegetables, spices, and other essential crops for their families. But the benefits extend beyond, as the diverse plants within these home gardens act as homes for pollinators,

offering a rich buffet of nectar, pollen, and resting sites. This traditional practice exemplifies a harmonious relationship between humans and the environment, ensuring food security while nurturing different pollinators that contribute to a resilient ecosystem.

Figure 5. Home gardening activities in Southwestern Ethiopia (Photo: NABU).

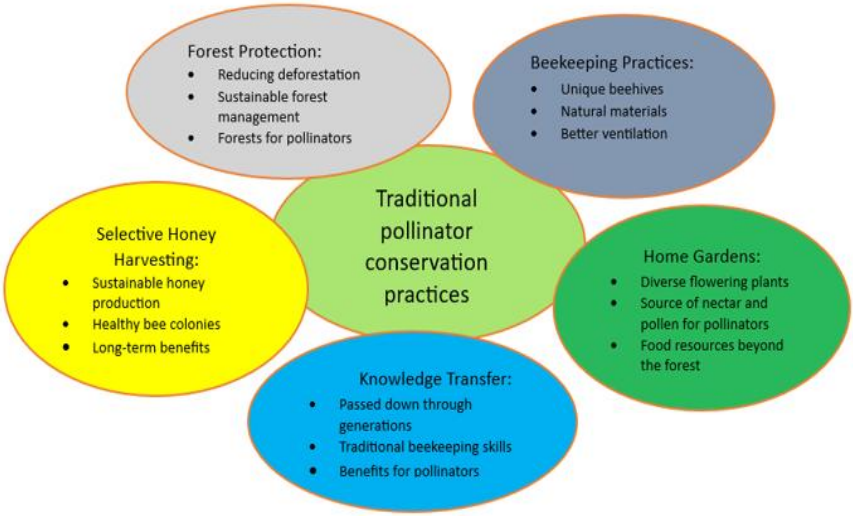

Figure 6. Traditional practices of pollinator conservation activities in southwestern Ethiopia.

3.4 Enhanced Food Security

By traditionally conserving forest habitats, local communities in southwestern Ethiopia have fostered healthy pollinator populations, creating a resilient agricultural ecosystem. This success comes from their commitment to organic farming practices. These practices include cultivating a diversity of food crops and shade-grown coffee. Additionally, they harvest organic honey, a valuable source of income and traditional medicine. As a result, food security has significantly improved, with communities getting a more diverse and nutritious diet (NABU, 2020).

Figure 7. Variety of food sources used by Local communities (Photo: Gebreegziabher Hailay)

3.5 Increased Income

Traditional practices in Southwestern Ethiopia generate significant income for local communities. This is achieved through organic farming and traditional beekeeping. The region is renowned for its organic honey production. On average, households maintain 53 hives, each yielding 7-10 kilograms of honey annually (Bayissa et al., 2024). Considering the current market value of honey at 300 birr per kilogram, a single household can potentially earn between 111,000 and 159,000 birr per year from honey production alone (53 hives * [7-10 kg/hive] * 300 birr/kg). Furthermore, southwestern Ethiopia is a center for organic coffee and spice production. This sector also contributes significantly to the community's income. The production and sale of these organic products create additional employment opportunities for men and youth within the region. In conclusion, traditional practices and organic farming have

demonstrably increased overall income and employment opportunities for communities in southwestern Ethiopia.

3.6 Healthy Ecosystems

Traditional pollinator conservation practices in southwestern Ethiopia offer an example of a win-win scenario for both the environment and local communities. These practices contribute significantly to the ecosystem's overall health by fostering a diverse population of pollinators, leading to a more efficient pollination process. This, in turn, enhances the genetic variability of plants, a crucial factor in maintaining ecosystem resilience. Additionally, the protection of forests promotes improved soil fertility and water quality. These benefit the local communities with increased availability of natural resources and a resilient environment for practices like wild coffee production and beekeeping, which are deeply intertwined with the cultural heritage of the farmers (NABU, 2020).

3.7 Organic and Branding products

Local communities have succeeded for generations in the organic production of coffee, honey, and spices, fostering a deep connection to sustainable practices. The region's historical significance as the origin of Arabica coffee receives modern improvement through government and NGO support. This collaboration empowers communities to obtain organic certifications for their coffee, opening doors to international markets. The renowned organic honey, popular domestically, is also making its mark globally. To further set their economic benefits, these communities are forming cooperatives, enabling increased production

of both honey and coffee alongside improved market access. This region exemplifies a successful balance of tradition, sustainability, and economic empowerment.

Figure 8. Organic products of coffee (A&B (Photo: Lavazza World), and honey (c) (Photo: NABU)

3.8 Home for the diversity of pollinators

The southwestern Ethiopian forests have an excellent diversity of pollinators, flora, and fauna. Research in the Kaffa Biosphere alone reveals a staggering abundance: 400 beetle species, 300 flower-visiting insects, 179 bird species, and 29 bat species. These numbers show the picture of the region's biodiversity, with further studies likely to uncover even greater richness. This remarkable suitability for animal and plant life is a direct consequence of the traditional protection practices employed by local communities (NABU, 2020).

3.9 Cultural services

In southwestern Ethiopia, traditional conservation practices are not just about resource gaining, but a deep-rooted cultural identity linked to coffee and honey production. Ceremonies surrounding these practices emphasize forest protection for healthy pollinator populations, creating a cycle of environmental sustainability that benefits both the ecosystem and local communities. This highlights the potential for cultural traditions to act as powerful tools for environmental protection.

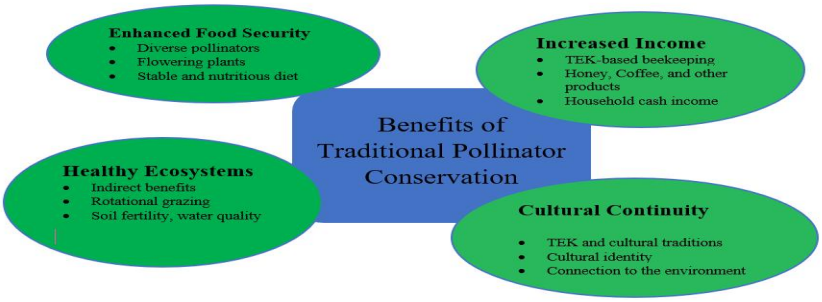

Figure 9. Benefits of traditional pollinator conservation activities

4. Challenges and Opportunities

Southwestern Ethiopia boasts a unique system where traditional practices support a diverse range of pollinators, leading to a healthy ecosystem for coffee and honey production. However, this success story faces challenges that threaten this delicate balance.

Challenges:

- Habitat Loss: Conversion of forests for agriculture and fuelwood collection can reduce nesting sites and foraging grounds for pollinators.
- Climate Change: Rising temperatures and changing precipitation patterns can negatively impact flowering times and plant-pollinator interactions.
- Loss of Traditional Knowledge: The erosion of traditional knowledge related to pollinator conservation practices can weaken the cultural connection to the environment.

Opportunities:

- Strengthening Traditional Practices: Supporting and revitalizing traditional pollinator conservation methods can promote biodiversity and sustainable resource use.
- Organic Coffee Production: Expanding organic coffee certification can incentivize forest protection and sustainable practices that benefit pollinators.
- Community-Based Conservation: Empowering local communities through co-operatives and education programs can foster a sense of ownership and responsibility for pollinator conservation.
- Research and Monitoring: Continued research on pollinator diversity and the impact of environmental changes is crucial for informing effective conservation strategies.

5. Upscaling

Southwestern Ethiopia's traditional pollinator practices, like beekeeping and community forest management, offer an outline for nationwide upscaling. Adapting these methods to other regions could increase biodiversity, enhance crop yields, and create economic opportunities. Successful implementation requires careful planning, and considering local contexts and potential challenges. Sharing knowledge, government support, and community involvement are key for upscaling. Ultimately, Ethiopia can use this success story to create a nationwide network of pollinator havens, benefiting both the environment and local communities.

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