

Perception of Farmers on Pollination and Pollinators: Role in Agricultural Sustainability

Marepally Udaya Sindhu

ICAR-SMS, KVK-Lakshadweep, CMFRI

Corresponding Author: marepallysindhu@gmail.com

Introduction

Pollination is a fundamental ecological process, playing a vital role in crop production and food security. Yet, the perception of its importance among farmers varies widely, influencing how agricultural landscapes are managed. Understanding how farmers view pollinators—especially in light of recent declines in pollinator populations—is essential for developing sustainable agricultural practices and ensuring the conservation of these critical ecosystem service providers.

This article explores the concept of perception, the role of pollinators in agriculture, evidence of pollinator decline, and how farmer perceptions can guide institutional efforts and policy reform.

Perception: A Key to Agricultural Communication

Perception is the process by which individuals interpret sensory information, forming a personal understanding of their environment. It is influenced by factors such as personal experience, education, culture, and environmental exposure. In the context of agriculture, perception determines how farmers view and adopt new practices, including those related to pollination services.

Effective communication in agricultural extension relies on understanding and addressing these perceptions. For example, if a farmer perceives pollinators as pests rather than allies, they are unlikely to adopt pollinator-friendly practices.

Importance of Pollination and Pollinators

Pollination is the transfer of pollen from the male anther to the female stigma of a flower, a process necessary for fertilization and seed formation. Pollinators, including bees, flies, butterflies, wasps, birds, and bats, are essential for this process.

Key Contributions of Pollinators:

- **Economic impact:** In India, the direct contribution of insect pollination to agriculture is estimated at ₹1,12,615.73 crores annually (USD 22.52 billion).
- **Food security:** 75% of global crop species depend on animal pollination (Klein et al., 2007).

- **Quality and yield:** Pollination enhances fruit size, shape, taste, and seed development, especially in crops like apples, pomegranates, and cucumbers.

Pollinator Decline: A Global Concern

There is growing evidence of pollinator decline worldwide:

- Wild bee populations are decreasing across Europe and North America (Biesmeijer et al., 2006; Potts et al., 2010).
- Butterfly and bumblebee species are experiencing range contractions due to habitat loss, pesticides, and climate change (Warren et al., 2001; Cameron et al., 2011).
- Tropical regions also face pollinator threats, though data is limited (Aizen and Feinsinger, 1994).

Key drivers of pollinator decline include agricultural intensification, habitat fragmentation, excessive pesticide use, and lack of awareness.

Farmers' Perception on Pollination and Pollinators

Understanding farmers' perceptions is vital for designing successful agro-environmental policies. Research reveals mixed views among farming communities.

Study 1: Cross-Site Comparison (Global)

- 92.7% of farmers acknowledged pollinators are essential for food production.
- 73.4% observed a decline in pollinator populations on their farms.
- Practices such as sowing melliferous flora (97%), maintaining wildflowers (94.6%), and preserving natural edges (85.2%) were seen as beneficial.
- Pesticide use (97.7%) and monocultures (90%) were perceived as harmful.

Study 2: Ethiopia (Gozamin District)

- 60.7% of farmers did not support increasing pollinator diversity.
- Reasons included lack of knowledge, fear of reduced crop yields, and misconceptions that pollinators attract pests.

- 75% felt honeybee benefits were limited to beekeepers.

These differences highlight the importance of education, prior exposure, and institutional support in shaping farmer attitudes.

Institutional Role in Shaping Perceptions

Governments and extension agencies play a critical role in altering perceptions and encouraging pollinator-friendly practices:

- **Training and Awareness:** Continuous education through extension services on pollination importance, biodiversity, and safe pesticide use.
- **Curriculum Integration:** Incorporating pollination science in agricultural education for future farmers.
- **Government Schemes:**
 - *Mission for Integrated Horticulture (MIDH):* Supports beekeeping for crop productivity.
 - *RKVY:* Allows funding of beekeeping projects.
 - *National Bee Board & ICAR:* Conduct training, research, and demonstration through KVKs.
- **Success Stories:** Farmers like Anand from Karnataka saw a 55% increase in pomegranate yield after installing bee hives, boosting income from ₹12 to ₹21 lakhs/year.

Global and Regional Initiatives

- International Pollinator Initiative (IPI):
- European Pollinator Initiative
- African Pollinator Initiative
- Brazilian and Canadian Pollinator Programs.

Recommendations for Policy and Practice

1. **Extension Strengthening:** Provide ongoing farmer training on pollination, sustainable agriculture, and ecosystem services.
2. **Incentives for Conservation:** Financial rewards for adopting pollinator-friendly practices.

3. **Farmer Participation:** Engage farmers in co-developing conservation strategies.

4. **Community-Based Beekeeping:** Promote apiculture as both an income source and ecological tool.

5. **Research and Data Collection:** Fill gaps in tropical pollinator data and impact assessments.

Conclusion

Pollination is a silent service that underpins agricultural success. Farmers' perceptions shape how they interact with pollinators, influencing practices that either conserve or harm them. While awareness is growing, especially among educated and well-connected farmers, significant gaps remain.

By strengthening extension systems, incorporating pollinator education into agricultural curricula, and fostering community participation, institutions can shift perceptions and promote pollinator conservation. Ultimately, supporting pollinators means supporting farmers, food security, and the planet's biodiversity.

References

- Biesmeijer, J.C. et al. (2006). *Parallel declines in pollinators and insect-pollinated plants.*
- Potts, S.G. et al. (2010). *Global pollinator declines: Trends, impacts and drivers.*
- Klein, A.M. et al. (2007). *Importance of pollinators in changing landscapes for world crops.*
- IPBES. (2016). *Assessment Report on Pollinators, Pollination and Food Production.*
- Herzon, I. & Mikk, M. (2007). *Farmers' perception of biodiversity and their willingness to protect it.*
- Meijer, S.S. et al. (2015). *Understanding farmers' motivations for sustainable agricultural practices.*
- Rawluk, A. & Saunders, M. (2019). *Local knowledge and ecosystem service sustainability.*
- Convention on Biological Diversity (CBD), *International Pollinator Initiative.*
