

Sikkim sees surge in butterfly biodiversity

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Organic farming breaks the stereotype that agriculture reduces biodiversity From the iconic Kaiser-i-Hind to the recently rediscovered Small Woodbrown butterfly, the state of Sikkim is home to nearly 700 species of butterfly. A new study has found that the indigenous farming systems in this area are not affecting butterfly diversity. In fact, the team from Sikkim University found that organic farming has increased the species diversity. This was even higher than the diversity in the nearby forest ecosystem. 268 species identified The team studied the large cardamom, mandarin orange, farm-based agroforestry and the natural forests in Sikkim and recorded a total of 268 butterfly species belonging to six families in these areas. The butterfly communities included two-third forest specialists, one-third monophagous (feeding only on one type of food), and one-fifth conservation concern species. The paper recently published in *Ecological Indicators* notes that "diversity was determined by tree species richness, tree density, canopy cover, elevation and mean annual temperature." Bhoj Kumar Archarya, the team leader from the university's Department of Zoology explains that this study has helped break the stereotype that agriculture declines the wild biodiversity. The traditionally managed agroecosystems are not only the system for food production but are an important ecosystem that harbours habitats for different species of plants and animals. He adds that it is important to note that Sikkim is a fully organic state and results may vary when studied on farmland that uses chemicals. "To check this we have now started a study to compare the diversity of butterflies in the different agroecosystems in Sikkim and Darjeeling," he adds. Those agroecosystems that still follow the traditional methods of cultivation and use organic manure pesticides "play a complementary role to the protected areas in fostering biodiversity conservation", adds the report. The team points out that most of the farms in Sikkim are small, and there is a mosaic landscape along with forests which creates very less impact on the natural ecosystem and allows various species to thrive. Also, the perfect elevation, cool temperature and ideal precipitation influence the diversity. Monitoring the ecosystem The team also identified 15 indicator species that can be used for long term ecological monitoring of the area. This included 11 habitat specialists, three monophagous, and two species that are protected under the Wildlife Protection Act 1972 (Schedule II). "These species are extremely sensitive and can survive only in a pristine environment. By tracking their numbers and behaviour we can find out if there are any changes in the ecosystem," explains Kishor Sharma, a PhD scholar at the university and first author of the study. In an email to *The Hindu*, Prof. Archarya mentions a few steps that needs to be taken to protect the biodiversity. The agroecosystems need special protection in order to protect the wild biodiversity as there is no scope of extension of protected areas in lower elevation. Two, a synergy between agriculture, horticulture, forest and rural management department along with all stakeholders including farmers is required. Three, farmers should be encouraged and incentivised to maintain the diversity of the farmlands. Finally, more than monoculture systems, the focus should be on growing a variety of crops in a traditionally way and mixed crop farms to better conserve biodiversity. As the Himalayan biodiversity has recently been facing threats from habitat loss, change in land use, forest fragmentation and urbanisation, it is high time the neighbouring states take notes from Sikkim and shift to traditional organic methods to preserve the biodiversity of the region. First published by [The Hindu](#) on 12 Oct. 2019