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Farming with Alternative Pollinators (FAP) Increases Production, Farmers' Incomes and Protects Pollinators and Biodiversity

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Abstract

Globally pollinator diversity decreases due to habitat fragmentation, habitat loss and agricultural practices. Several climate change effects fuel the decline. The loss of pollinator diversity can significantly endanger food security, biodiversity and ecosystems. Pollinators have four key-functions which make them indispensable for mankind: 87 out of 115 most important food crops, mostly high value crops, require pollinators; 60–90 % of plants need pollinators; most ecosystem services rely on pollination services to a certain extent; and cross-pollination promotes higher genetic diversity supporting climate change resilience by potentially better adapted varieties. Wild pollinators provide about 85 % of all pollination services and honeybees cannot compensate the losses. As most wild pollinators depend on the quality of an area of 300–2000 m around their nests pollinator protection requires a mass basis of intrinsically motivated local people on nearly the entire terrestrial area. Thus pollinator protection is almost impossible to obtain with subsidies, donations, Payments for Ecosystem Services or good-will groups. We suggest Farming with Alternative Pollinators (FAP; 2012), a low-cost agro-ecologic approach focusing on highest income gain by optimal crop-based habitat enhancement on fields and in corridors. FAP is based on (1) the TEEB-approach requesting to show the economic value of ecosystem services and (2) broad evidence, that wild pollinators can significantly enhance the harvest of many crops (quality and quantity); diversity of pollinators is more important than abundance and distance to the nesting area often is the main limiting factor. FAP fields use 25 % of the area for habitat enhancement and 75 % for the main crop; control sites use 100 % for the main crop. FAP assesses the insect diversity on fields and compares the net income from FAP- and control fields. The high additional income gain makes FAP self-sustaining: farmers get an economic interest in protecting pollinators. FAP allows increase of horticulture production without enlarging the area, which is important as 9.6 billion people are forecasted for 2050. We present the FAP-methodology and promising first field results (cucumber, sour cherry) as an alternative to seeding wild-flower strips promoted by entomologists. The approach addressing farmers' interests best will have the highest potential for global adoption and pollinator protection.

Keywords: Agriculture, food security, low-cost, pollinator protection, scalable, TEEB

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