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Incidence of Pollinators Decline on the International Trade: Social Welfare and Food Security Analysis

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Abstract

In the 2014 Rome declaration on nutrition, countries together reinforced their common understanding on food security connectivity to nutritious food consumption. In fact, countries have spent far too long looking solely at calories as the answer to food security; though, if we look at the factors that genuinely contribute to addressing malnutrition and stunting, it is not just calories production alone, but also the production of diverse non-staple foodstuffs. Indeed, ecological and agronomic scientists have alerted the links between the nutritional content of non-staple crops and their full or partial dependence on insect pollination services for their natural process of production. The insect pollination, in general, accounts around 60 % of the world production volume of crops and 35 % of world crop species. The contribution of this service to the value of the world agricultural sector is evaluated between 153 and 260 billion euros representing about 9.5 % of the value of the world edible crops production. Moreover, pollinator dependent crops contribute up to 40 % of the world's supply of nutrients.

Unfortunately, pollinators' population and density are declining globally, while the demand of crops that are dependent on pollinators has been steadily increasing since 1960. In parallel, international trade of agricultural commodities increases which can be seen as one of the ways society adapt to this decline effects.

We propose to consider international trade mechanism into the economic evaluation of pollinators decline impacts on both crops productivity and their nutrients content. For that we simulate precisely changes that may occur in market prices, supply and demand of crops and thus truck the variation in nutrients intake due to the new crop market equilibrium if pollination services declines. To specifically 1) quantify variations in the social welfare and thus 2) quantify the variation in the provision of nutrients embedded. Our main findings showed that progressive loss in pollinators' density induces continuous increase in relative marginal cost and market prices, consequently decreases social profit. Moreover, heterogeneity of pollinator loss and dependence by sub-regions might create dynamic comparative advantage for countries.

Keywords: Economic evaluation, ecosystem services, international trade, pollination

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