Sustainable Agriculture Increases Crop Yields

Unsustainable agricultural practices have been recognised as key drivers of environmental degradation at the global scale. Thus, promoting agricultural sustainability by the use of technologies and practices that improve food productivity without causing environmental damage is crucial in our pursuit for a more sustainable and equitable development in Europe and globally.

In one of the largest analysis of sustainable agricultural practices in developing countries, an international group of scientists has examined 286 completed and ongoing sustainable farming projects in 57 countries. In total, 37 million hectares (3% of the cultivated area in developing countries) and some 12 million farmers were engaged in transition towards resource-conserving agricultural practices. These included integrated pest and nutrient management, conservation tillage, agroforestry, water harvesting, and livestock and aquaculture integration in farming systems. Questionnaires and published reports by project have been used in order to assess adoption of sustainable practices and changes in yield production over time.

For the 360 reliable yield comparisons, the analysis has shown an average increase in crop yields by around 64% since the 1990s. Half of the projects have shown yield increases between 18 and 100% and 25% of the projects showed 100% increase in yields. However, important differences have been noted between various crops. Cotton and rice showed the lowest increases, while maize, potatoes and some legumes (beans, pigeon peas, and others) demonstrated more than 100% increases.

Though many technologies and practices have been used in these “success projects”, the authors suggest that the following three types of technological improvements have probably played substantial roles in food production increases:

- More efficient water use;
- Improvement in organic matter accumulation and carbon sequestration; and
- Reduced pesticide use.

The paper notes that all crops showed water use efficiency gains with the highest improvement observed in rainfed crops. This is due to increase in water productivity (i.e. kg of food per unit of water) as a result of certain sustainable agricultural practices, viz. removing limitations on productivity by increasing soil fertility; reducing soil evaporation through conservation tillage; using more water efficient varieties; reducing water losses to unrecoverable sinks.

By increasing carbon sinks in soil organic matter and above-ground biomass, the farmers have increased the amount of sequestered carbon by an average of 0.35 tonnes C/ha per year.

Regarding the analysis of pesticide-use practices, 77% of projects with reliable pesticide-use data have shown a decline in pesticide application by 71% while crop yields grew by an average of 42%.

The authors agree that in spite of the fact that sustainable agriculture alone will not solve the problem of hunger and poverty in developing countries, their findings give grounds for optimism. They also recall that the challenge lays in finding the ways to improve the farmers’ access to resource-conserving practices through international collaboration and support.


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