

The Uses and Challenges of Sustainable Methods in Organic Agriculture

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What is Sustainable Agriculture?

Organic farming refers to agricultural practices that do not use inorganic pesticides or fertiliser and prevent environmental damage by relying on local conditions. It leads to higher nutrient availability, carbon storage and increased biodiversity¹. The field of organic agriculture is growing around the world, but in many countries, including India, there is a lack of incentives to encourage farmers to go organic, meaning it has not been widely adopted. Demand for food is growing, but it is not evenly distributed. Sustainability in agriculture is key to the future as it ensures that the land is not degraded of nutrients and can be used again, in contrast to conventional farming².

Methods of Sustainable Agriculture

Globally, there has been a shift to organic agriculture through a variety of methods. In the global North, this often includes traditional organic methods and more scientific processes, with research into using chemical compounds and greenhouses to achieve the highest yields. Comparatively, in the global South, organic agriculture tends to follow smaller scale approaches using local resources.

High productivity is associated with pesticides and fertilisers, so in organic agriculture there has been increasing use of fertilisers made from composting organic material. Brazilian farmer, Ana-Zilda Coutinho, buries manure in cow horns before combining it with crop remains to use as fertiliser, enabling higher carbon sequestration, fertility and productivity³. She sells directly to people,

minimising the additional costs of organic agriculture as there is no intermediary. In Nepal, Sudarshan Chaudhary uses biodynamic fertilisers to grow richer and healthier crops, and this is expanding across smallholder farms worldwide since it is inexpensive and promotes self-sufficiency⁴.

More often in the global North, nutrient cycling principles have been used to reuse fertilisers from wastewater as part of the Organic 3.0 scheme. This is the next stage of IFOAM's (International Federation of Organic Agriculture Movements) plan for organic agriculture and involves the transitioning of organic food into the mainstream market, integrating it into society⁵. The use of biochar, a carbon rich product of incomplete combustion of organic material, as a soil amendment reduces the amount of N₂O released in nitrogen cycles of plants. This is important to sustainability because N₂O is a potent greenhouse gas that contributes to climate change.

Agroecology, by which trees are grown alongside crops, is increasing in popularity as a way of increasing biodiversity,

promoting livelihoods and maintaining soil quality⁶. It is becoming more important because of climate change since the amount of land available for agriculture is decreasing.

In Australia, Rob Fenton is a farmer who is adapting to climate change through the design of his farm, whilst maintaining high productivity. He uses livestock and crop rotation and diversity to prevent the permanent removal of nutrients in the soil, alongside internal inputs like worm farms to feed the chickens and the creation of swales to prevent flooding and efficient watering of the whole system⁷.

Organic agroecology in Bolivian cacao production has been shown to deliver high yields with the same labour intensiveness as conventional agroforestry, whilst also protecting the environment and encouraging biodiversity. Agroecology builds on the use of the whole of the farming system, including waste, to power the farm and become self-reliant. Shivkumar, an Indian farmer, does this by multi-cropping alongside trees, using wild fruits for medicine and food, harvesting rainwater to increase water availability in

the summer and managing local waste through clearing plastics⁸. However, agroforestry cannot necessarily be applied to all situations as not all vegetation performs the same.

Education is important in sustainable agriculture as teaching of organic methods to local communities influences future farming. Organic farmers are engaging with local communities, particularly in the developing world, to empower young people and other farmers to choose organic, via courses and workshops.

In Brazil, Ana-Zilda Coutinho focuses on empowering women to join the organic movement, reducing some of the barriers she faced in becoming a farmer, such as the financial cost to learn the methods and the difficulty in getting certified. In India, smallholder farmer Chandran-Nila employs local people in organic farming, encouraging sustainable techniques, and getting children involved in organics from a young age. As part of this, he has developed a more efficient irrigation system using canals with dung and neem cake to reduce the amount of water needed to irrigate his farm from 100 to 30

litres⁹. Another Indian farmer, Shivkumar, works with his community and NGOs to increase organic agriculture in local gardens, helping the population become more self-reliant and preventing environmental degradation.

The Problems

An issue associated with organic agriculture in the global South is pest control when chemical pesticides are not used. To combat this, biofertilisers and biopesticides have been created from natural products to prevent diseases and repel insects and animals, such as against weevils in banana plantations. This method has been adopted by the Government of Kerala, India, in order to create a more organic state.

Worldwide, the main problem with adopting organic principles comes from a lack of awareness of the benefits to the environment and the perception that it always brings lower yields and is more expensive, thereby making products less competitive in the market. Additionally, many farmers feel there is a lack of incentives to move to organic farming.

Recommendations

In terms of the organic methods, future farming should focus on self-sufficiency through organics as this leads to reduced greenhouse gas emissions from transportation and artificial fertilisers, leading to shorter, more sustainable supply chains. For smallholders, this means that they can save money on transport costs so that the loss from lower organic yields balances out. The use of biodynamic fertilisers leads to less waste and less need for external energy inputs. When combined with crop rotation, it also promotes productivity from richer soil, which helps increase food security. Covering cropland is also an important technique for sustainability as it means that the soil is not eroded by wind or water, or effected by desertification from climate change, therefore loss of agricultural land is reduced.

Overall, in the future, more attention needs to be paid to the influence of education on agriculture. Teaching young people about the benefits of organic agriculture will promote the creation of sustainable livelihoods and, if done on a

small scale, community development and cooperatives that increase income and provide a support network. This is especially important amongst struggling farmers, particularly in India where there is a high rate of suicide. However, in order to make the education successful, investment into organic agriculture is necessary, through the development of biofertilisers and carbon neutral methods.

Investment on a local scale is likely to be more successful as the communities need to be able to benefit more from organic agriculture than conventional so that they wish to maintain it. For this change to occur, there needs to be a significant policy shift that favours sustainable agriculture, instead of intensive conventional methods focused on maximum productivity that lead to the destruction of the environment. For example, the Indian state of Sikkim was declared organic in 2014, after the government reduced all use of inorganic fertilisers and switched to organic methods and principles. Policies need to support the shift to organic agriculture that should lead to sustainable

food production and livelihoods on the local and global scale.

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