

## Recent practices for Sustainable farming

Harmanpreet Kaur Gill<sup>1\*</sup>, Vinay Kumar Mashkey<sup>2</sup>, Diksha Choudhary<sup>3</sup>

<sup>1</sup>Department of Agronomy, Lovely professional university, Phagwara, Punjab

<sup>2,3</sup>Department of Horticulture, Lovely professional university, Phagwara, Punjab

### How to Cite this article

Gill *et al.* 2024. Recent practices for Sustainable farming. *Sabujeema-An International Multidisciplinary e-Magazine* 4(3): 12-14



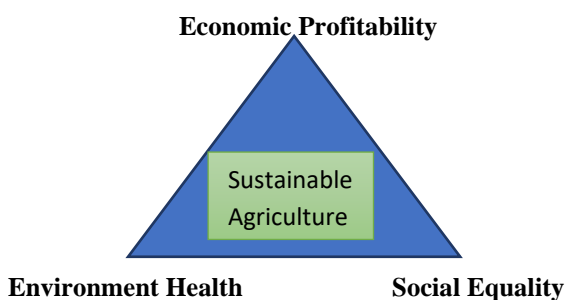
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### Abstract

#### What is Sustainable agriculture?

- Fulfil human demands for food and fibre.
- Improve the environment's quality as well as the natural resource base that supports the agricultural sector.
- Utilize nonrenewable resources and farm resources as effectively as possible, incorporating natural biological cycles and restrictions as necessary.
- Maintain the farm operations' ability to make a profit.
- Raise the standard of living for farmers and society at large.

The "three legs" of the sustainability stool, or environmental health, economic profitability, and social and economic equality, are the fundamental aims of sustainable agriculture.



#### Objectives

- Make the most of the resources at your disposal.
- Reduce your reliance on nonrenewable resources.
- Safeguard the wellbeing and security of farmworkers, neighborhoods residents, and society.
- The preservation and improvement of the environment and natural resources.
- Safeguarding the profitability of farming activities.
- Give the farmer a substantial cash compensation to enable them to continue producing and make a positive impact on the community's well-being.
- Produce enough wholesome and safe food.
- Invest in existing technology, knowledge, and skills in ways that are appropriate for local conditions and resources.

#### Practices

- **Agroforestry:** Involves the development of trees and shrubs on land used for grazing or farming.



When approached sensibly, agroforestry systems can incorporate both agricultural and forestry techniques for a long-lasting, fruitful, and varied land use. In agroforestry systems, trees generate a beneficial microclimate that keeps crops protected from wind and heavy rain while maintaining a comfortable temperature and soil humidity. There is still more value in trees. They enhance soil structure, stabilize soils, and reduce nutrient discharge. This is why agroforestry has emerged as one of the most effective tools for farmers in dry areas with soils at risk of desertification.

- **Crop rotation:** It is one of the most effective methods for sustainable farming. Its goal is to prevent the negative effects associated with repeatedly growing the same crops in the same soil. Since many pests like certain crops, it aids in the fight against pest issues. The population of the pests can grow significantly if there is a consistent supply of food.
- **Permaculture:** It is a method of producing food that minimizes resource waste and boosts production effectiveness through design, planning, and smart farming. Growing grain without ploughing, spiraling plants and herbs, hugelkultur garden beds, keyhole and mandala gardens, sheet mulching, plants that serve many uses, and making swales on contour to keep water high in the landscape are all examples of permaculture design techniques.
- **Biodynamic farming:** Based on the "anthroposophical" idea, biodynamic farming integrates ecological and holistic growth approaches. It focuses on putting principles into effect, such as composting, applying animal manure from farm animals, rotating complementing crops, or using cover crops, to create the soil fertility and health required for food production.
- **Cover crops:** Many farmers decide to always plant crops in a field and never leave it bare; this decision may have unforeseen repercussions. The farmer can accomplish his objectives of reducing soil erosion, inhibiting the growth of weeds, and improving the soil quality by planting cover crops, such as clover or oats. Utilizing cover crops also lessens the demand for fertilizers and other chemicals. It also improves soil condition.
- **Crop diversity:** Varieties of the same crop can be grown, producing plants with subtle but noticeable changes. It lessens the financial burden. Crop diversity is the mechanism in question, and it is becoming less and less useful in real life.
- **Hydroponics and aquaponics:** These cutting-edge agricultural methods allow plants to grow without soil and are fed with water that has been enriched with specific nutrients. Crops are grown in hydroponic systems with their roots either directly in a mineral solution or in an inert media like gravel or perlite. Aquaponics is the practice of keeping aquatic animals, such as



fish, while also cultivating hydroponic plants.

- **Irrigation techniques:** Irrigation is a crucial component of crop cultivation that uses a lot of energy and water. Sustainable development attempts to fulfil plant hydration requirements while maximizing water and energy use. Smart irrigation practices and the cultivation of less water-intensive crop species are two ways to ensure sustainable water use in agriculture. Particularly, drip irrigation uses 20–40% less water than furrow (flood) irrigation while producing 20–50% more crops.
- **Integrated Pest management:** In addition to chemical pest control, integrated pest management (IPM) uses additional strategies that, when combined, are even more effective. IPM's function in sustainable agriculture is to reduce damage to non-target animals, humans, and the environment as a whole. Therefore, biological and cultural control are the mainstays of integrated pest management in sustainable agriculture. For example, utilizing predators like ladybugs to eliminate aphids or using chickens to consume pests, their larvae, and eggs are examples of biological approaches (e.g., ants, bugs, flies, woodlice, etc.).
- **Urban agriculture:** We must cultivate food considerably closer to home, even in cities, in order to localize our food system. The majority of the world's population is expected to reside in cities in the future, which presents a huge opportunity for urban agriculture to

have a substantial positive impact on how we produce food globally in the future. Numerous cutting-edge and environmentally friendly growing methods are currently in use in cities today, including rooftop farms, community gardens, backyard farms, indoor hydroponic farms, rooftop farms, urban greenhouses, and potentially even future urban farm skyscrapers.

. These advancements empower farmers to optimize crop yields, minimize resource usage and address environmental concerns. By incorporating big data and data-driven technologies into farming practices, agricultural systems can achieve higher levels of productivity while maintaining sustainability. However, the adoption of these technologies necessitates careful consideration of regulatory, ethical and societal factors. This article highlights the potential of disruptive technologies to revolutionize agriculture and enhance global food security