

Sustainable Farming Management in India

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U. Arumugam

Assistant Professor, Department of Corporate Secretaryship
Alagappa University, Karaikudi, Tamil Nadu, India

M. Manida

Assistant Professor, Department of Commerce
Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India

 <https://orcid.org/0000-0002-2605-1645>

Abstract

Agriculture has historically had a significant negative impact on the environment, primarily due to practices aimed at increasing yields to meet the growing demands of the population. These practices have led to consequences such as deforestation, soil degradation, biodiversity loss, irrigation issues, and pollution. To tackle these challenges, the concept of sustainable agriculture has emerged as a new approach. Sustainable agriculture aims to meet the present food and resource needs of society while ensuring the ability of future generations to meet their own needs. It emphasizes the use of agricultural practices that minimize negative environmental impacts, promote resource efficiency, and ensure long-term sustainability. To effectively implement sustainable agriculture, it is crucial to adopt practices that align with its principles. Examples of such practices include organic farming, integrated pest management, crop rotation, agroforestry, conservation tillage, and water management techniques. By adopting these practices, farmers can reduce reliance on synthetic inputs, preserve soil health, conserve water resources, protect biodiversity, and mitigate the impact of agriculture on climate change. However, the adoption of sustainable agricultural practices is influenced by various factors that can vary across regions and contexts. These factors may include economic considerations, access to resources and knowledge, policy support, market demand for sustainable products, social norms, and farmer attitudes and beliefs. Understanding these factors is essential for promoting widespread adoption of sustainable agriculture. Research has been conducted to explore the drivers and barriers to the adoption of sustainable agricultural practices. By identifying these factors, policymakers, researchers, and agricultural stakeholders can develop targeted strategies to incentivize and support farmers in transitioning towards sustainable practices. Although progress has been made in understanding the factors influencing adoption, there are still gaps and challenges in the existing literature. Further research is needed to deepen our understanding of the complex interactions between different factors and their effects on adoption outcomes. This will contribute to the development of more effective policies, programs, and interventions to promote sustainable agriculture and address the environmental challenges associated with conventional farming practices.

Keywords: Land, Fertilizer, Pesticides, Biodiversity, Irrigation Issues, and Pollution.

Introduction

Agriculture is a vital component of human survival, impacting various aspects of our lives. As such, the development of sustainable agriculture is crucial for the future of humanity. Sustainable agriculture refers to ecological sustainability and addresses the negative impacts of conventional farming on natural resources. While agricultural advancements have allowed us to meet the increasing demand for food, they have often overlooked the detrimental effects on natural resources. The need to prioritize agricultural sustainability has become evident due to the strain on resources caused by population growth and economic development. Sustainable agriculture aims to balance economic, environmental, and social aspects of farming.

It seeks to minimize environmental harm while maximizing productivity and profitability. This involves implementing practices that promote soil health, conserve water resources, protect biodiversity, reduce pollution, and mitigate climate change. It also emphasizes social equity and the well-being of farmers and rural communities. To achieve agricultural sustainability, various approaches and strategies are necessary. This includes adopting agro ecological principles, precision farming, conservation agriculture, organic farming, and integrated pest management. It also entails sustainable land and water management, climate resilience, biodiversity conservation, and responsible resource use. Collaboration among stakeholders is essential, including farmers, researchers, policymakers, consumers, and the private sector. Sharing knowledge, technologies, and best practices is crucial, along with supportive policies, incentives, and investments.

Review of the Study

G. Nedumaran *et al.* (2021) in their paper entitled “Sustainable Organic Farming Practices” concluded that Agriculture continues to play a crucial role in economic development, and it is important for a country to achieve self-sufficiency in cotton and food production. This paper highlights the importance of organic farming as a sustainable approach to crop cultivation. It emphasizes the need for modern agriculture to adopt more sustainable practices in India. Sustainable agriculture focuses on maintaining a balanced nutrient profile in the soil and promoting biological processes. This approach offers several benefits for farmers and society at large. One of the advantages of sustainable agriculture is its convenience for farmers. It can lead to improved yields, reduced input costs, and long-term soil fertility. By minimizing the use of harmful chemicals and adopting organic fertilizers, farmers can enhance the quality of their crops while ensuring environmental sustainability. Sustainable agriculture also has broader societal benefits. It creates employment opportunities, contributing to rural development and economic growth. By adopting sustainable farming practices, communities can build resilience, conserve natural resources, and

reduce the environmental impact of agricultural activities. Looking to the future, sustainable farming holds great promise. As the importance of environmental conservation and resource management becomes increasingly recognized, the adoption of sustainable agricultural practices is likely to grow. By prioritizing sustainability, we can ensure the availability of agricultural resources and contribute to a more resilient and prosperous future for farmers and communities.

Objectives of the Study

1. To examine the National Mission for Sustainable Agriculture (NMSA)
2. To study on Sustainable Agriculture in India
3. To identify the Sustainable Agriculture Methods in India
4. To examine the Benefits of Sustainable Agriculture
5. To identify the Sustainable Livestock Farming in India

National Mission for Sustainable Agriculture (NMSA)

The sustainability of agricultural productivity depends on the quality and availability of natural resources such as soil and water. In India, a significant portion of agriculture is practiced using rain-fed agriculture. It accounts for about 60% of net sown area and contributes to his 40% of total food production. Conserving natural resources and promoting rain-fed agriculture are therefore essential to meet the country’s growing demand for food grains. To address these challenges, the National Sustainable Agriculture Mission (NMSA) was developed as part of the Sustainable Agriculture Mission under the National Climate Action Plan. NMSA focuses on improving agricultural productivity in wetlands through integrated agriculture, water efficiency, soil health management and resource conservation. The mission focuses on improving seed, livestock and fish crops, water efficiency, pest control, improved agricultural practices, nutrition management, agricultural insurance, credit support, markets, access to information and livelihood diversification. The Five Year Plan will integrate these activities into existing and proposed mandates, programs and plans

of the Ministry of Agriculture Cooperation. The architecture of NMSA includes ongoing and proposed activities related to sustainable agriculture, with particular emphasis on soil and water conservation, water use efficiency, soil health management and wetland development. Contains the convergence and integration of this mission aims to promote the wise use of shared resources through a community-based approach. NMSA emphasizes adopting sustainable development pathways through a gradual transition to green technology, energy efficient equipment, conservation of natural resources and integrated agriculture. It also promotes indigenous agricultural practices through the adoption of integrated approaches such as soil health management, water efficiency, and prudent use of chemicals, crop diversification, cultivation, agroforestry and fish farming. It is also intended to In summary, NMSA plays a key role in promoting sustainable agriculture by addressing key aspects of Indian agriculture with a focus on resource conservation, water efficiency, soil health management and rain land development. The mission aims to improve agricultural productivity while ensuring the long-term sustainability of natural resources by adopting environmentally friendly practices and site-specific approaches.

Sustainable Agriculture

Sustainable agriculture involves the utilization of environmentally friendly energy sources such as hydropower, wind energy, and solar power. These energy sources are considered preferable as they have minimal impact on the environment. Solar panels can be used in agricultural systems for activities like water heating and powering pumps, reducing reliance on non-renewable energy sources. Hydropower, derived from the energy of flowing water, can also be harnessed for various agricultural purposes. This can include powering irrigation systems or other machinery required for agricultural operations. The use of swash water, which refers to the water in motion from wave action or tides, can be particularly beneficial for agricultural practices in coastal regions. By adopting sustainable agriculture practices and utilizing eco-friendly energy sources, several benefits can be achieved:

Environmental Preservation: Sustainable agriculture minimizes negative environmental impacts by reducing greenhouse gas emissions, conserving water resources and protecting biodiversity. This helps maintain ecological balance and ensure the long-term sustainability of agricultural systems.

Resource Efficiency: Sustainable agriculture focuses on optimizing the use of resources such as water, energy, and fertilizers. It promotes practices like efficient irrigation methods, organic fertilization, and integrated pest management, which help minimize resource waste and increase efficiency.

Soil Health and Fertility: Sustainable agriculture emphasizes soil health management practices such as crop rotation, cover cropping, and conservation tillage. These practices help improve soil structure, enhance nutrient cycling, and prevent soil erosion, leading to healthier and more fertile soils.

Economic Viability: Sustainable agriculture can contribute to the economic viability of farming systems by reducing input costs, improving productivity, and enhancing market opportunities. It can also provide income diversification through the adoption of sustainable practices such as organic farming or agroforestry.

Resilience to Climate Change: Sustainable agriculture practices are designed to enhance the resilience of agricultural systems to climate change impacts. This includes practices like water conservation, soil moisture management, and the use of climate-resistant crop varieties, which help farmers adapt to changing climatic conditions.

Overall, sustainable agriculture offers a pathway towards a more environmentally conscious and resilient agricultural sector. By prioritizing the use of renewable energy sources and adopting sustainable practices, the agricultural industry can contribute to the preservation of natural resources, ensure long-term food security, and support the well-being of both rural communities and the planet.

Sustainable Agriculture Methods in India

1. Crop Rotation

Crop rotation is the preferred technique of sustainable agriculture. But the aim is to avoid the effects of growing the same crop in the same soil

for years. Many pests prefer certain crops, so this helps control pest problems. Additionally, rotation disrupts the reproductive cycle of insects. Farmers can grow certain crops that supplement the crop's nutrients during crop rotation. Crop rotation breaks the reproductive process of pests. Farmers can plant certain crops that replenish the plants' nutrients during crop rotation. However, these sustainable crops minimize the need for chemical fertilizers.

2. Permaculture

Permaculture is a food production system designed for intelligent agriculture that reduces resource wasteland and improves production efficiency. These design methods also include no-till crop cultivation, herb and plant spirals, keyhole and mandala gardens, horticulture garden beds, and foliage mulching, which serve multiple purposes.

3. Cover Crops

Many farmers choose to always plant crops in their fields and not leave their fields in ruins. Also, doing so may have unexpected results. Cover crops such as clover and oats help farmers achieve their goals of preventing soil erosion, improving soil quality, and controlling weed growth. Using cover crops also reduces the need for chemicals such as fertilizers.

4. Soil Enrichment

Soil is an essential part of the agricultural ecosystem. High-quality soil increases yields and helps produce stronger plants. There are various ways to maintain and improve soil quality. Examples include the release of post-harvest crop residues into fields and the use of composted plant material and animal manure.

5. Natural Pest Predators

A key factor in maintaining effective pest control is thinking of the farm as an ecosystem, not a factory. For example, many animals and birds are natural enemies of agricultural pests. So manage your farm to accommodate populations of these predatory insects. However, chemical pesticides can indiscriminately slay insects.

6. Bio intensive Integrated Pest Management

Integrated Pest Management is an approach dependent on biological instead of chemical methods. The IMP also stresses on the importance of crop rotation to tackle pest management. Once

the pest problem is identified, IPM will ensure that chemical solutions are used only as a last resort.

7. Polyculture Farming

Multi cropping practices are similar to crop rotation and follow the principles of nature to achieve the best possible yields. Therefore, several types of plants are cultivated in one area. Additionally, these species generally complement each other, helping to maximize the use of available resources while producing a greater variety of products on the same plot. High biodiversity makes sustainable multi cultivar systems more flexible to seasonal variations.

8. Agroforestry

Agroforestry has become an effective tool for farmers in arid regions with soils prone to desertification. It also dealt with the growth of trees and shrubs between crops and pastures and agriculture. And they are forestry practices that, when addressed sustainably, lead to sustainable, productive and diverse land uses.

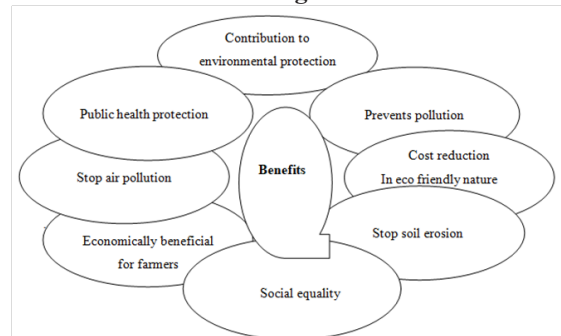
9. Biodynamic Farming

Biodynamic farming involves holistic, organic farming methods based on the philosophy of "anthropology". In addition, there is a focus on implementing practices such as composting animal manure, supplementary crops, or rotating crops. Additionally, these practices create the soil fertility needed for food production.

10. Better Water Management

The most important step in water management is choosing the right crop. Also, local crops adapted to the local weather conditions are selected. Also, in arid regions, it is necessary to choose crops that require less water.

Benefits of Sustainable Agriculture in India



Benefits of Sustainable Agriculture

What is Unsustainable Agriculture?

Unsustainable agriculture is understood to be the adoption of practices that ultimately lead to degradation of the quality of land, soil and other natural resources that are essential for agriculture and optimal for a healthy future.

Sustainable Livestock Farming

Indeed, the sustainability of animal production is heavily reliant on implementing effective practices that improve productivity and optimize input utilization. Some of the most profitable and sustainable animal husbandry practices include:

Staged Feed Resource System

Implementing a staged feed resource system ensures that animals receive appropriate nutrition at each stage of their growth and development. This targeted feeding approach maximizes productivity and reduces wastage of feed resources.

Associated Management Plan

Developing a comprehensive management plan that covers all aspects of animal care, health, and welfare is essential for sustainable animal production. This plan should include measures to prevent disease, ensure proper housing and sanitation, and promote ethical treatment of animals.

Rotational Grazing

In the case of livestock farming, rotational grazing is an effective practice. It involves moving animals between different grazing areas, allowing pastures to rest and regenerate, thus improving soil health and forage productivity.

Integrated Livestock-Crop Farming

Integrating livestock into crop farming systems creates a symbiotic relationship where crop residues can be utilized as feed for animals, and animal manure becomes a valuable fertilizer for crops. This integration enhances resource efficiency and reduces waste.

Genetic Selection

Breeding animals for desirable traits, such as

disease resistance, feed efficiency, and productivity, can lead to improved animal performance over generations. Selecting and breeding animals with specific genetic traits contribute to sustainable and productive animal production.

Use of Local and Sustainable Feed Sources

Opting for locally available and sustainable feed sources reduces the environmental impact of animal production and supports the local economy.

Responsible Use of Antibiotics

To prevent antibiotic resistance and promote animal health, responsible use of antibiotics is crucial. Proper veterinary guidance and adherence to regulations ensure their judicious use.

Animal Welfare Practices

Implementing animal welfare practices that prioritize the well-being and humane treatment of animals results in healthier and more productive livestock. By adopting these profitable and sustainable animal husbandry practices, farmers can enhance productivity, reduce environmental impact, and contribute to a more resilient and sustainable agricultural system.

Sustainable Goat Farming

Goat farming is a valuable component of sustainable agriculture, as integrating livestock into agricultural systems can improve economic and environmental health.

Sustainable Poultry Farming

Sustainable poultry farming involves creating a closed nutrient loop where plants feed the chickens, and the chickens fertilize the plants, contributing to an environmentally friendly and economically viable system.

Sustainable Seaweed Farming

Seaweed farming is considered highly sustainable in comparison to many other farming practices, making it a pinnacle of sustainable aquaculture.

Sustainable Oyster Farming

Oyster farming has a positive impact on the environment, setting it apart from many other types of food production. It is widely recognized as a sustainable food source.

Sustainable Sheep Farming

Sheep farming in India is primarily focused on raising sheep for meat and wool. While sheep milk consumption is limited to certain areas like Rajasthan, Jammu Kashmir, and Gujarat, sheep farming can still be practiced sustainably in these regions.

There is some other Sustainable Farming-

A. Sustainable Sugarcane Farming

Sustainable sugarcane farming involves making adjustments to farming practices to improve yields and meet demands in an environmentally and socially responsible manner.

B. Sustainable Indoor Farming

Indoor sustainable farming utilizes vertical farms and commercial greenhouses to grow crops in a controlled environment. To be truly sustainable, it needs to be supported by a low carbon power supply.

C. Intensive Sustainable Farming

Intensive sustainable farming is a modern approach that follows the five criteria of sustainable agriculture, emphasizing the use of science to improve food production.

D. Sustainable Urban Farming

Sustainable urban farming involves producing fiber products and food within urban environments using various methods, including emerging, new, and traditional techniques.

E. Sustainable Organic Farming

Sustainable organic agriculture is an efficient and environmentally friendly approach that ensures yield stability and improves soil health. It produces ample food without depleting the earth's resources.

F. Sustainable Rice Farming

With rice farmers being highly vulnerable to climate change, the sustainable rice platform has set the world's first benchmark for sustainable rice farming.

G. Sustainable Cocoa Farming

Sustainable cocoa farming ensures farmers have access to agricultural education and training to improve crop yields while protecting the environment.

H. Sustainable Ocean Farming

Ocean cultivation involves developing fish and other farming products in large water bodies like the ocean, while maintaining environmental sustainability.

Recommendation

- The points outlined above emphasize the importance of promoting sustainable agriculture and transitioning from conventional resource-intensive practices to more sustainable ones:

Expansion in Wet Areas: Focusing on expanding sustainable agriculture in resource-poor and less productive wet areas can bring significant benefits through improved agricultural practices.

Restructuring Government Support: Aligning government incentives with resource conservation and overall farm productivity encourages farmers to adopt sustainable practices.

Generating Rigorous Evidence: Conducting long-term comparative assessments of conventional agriculture and sustainable agriculture helps build a strong evidence base for the benefits of sustainable practices.

Broadening Stakeholder Horizons: Involving a wide range of stakeholders in agro ecosystems encourages openness to alternative approaches and fosters collaboration for sustainable agriculture.

Providing Transition Assistance: Supporting individuals affected by the transition to sustainable agriculture with short-term assistance helps facilitate a smoother shift.

Integrating Data Collection: Gaining visibility into sustainable agriculture by integrating data and information collection with key state and federal agricultural data systems enhances monitoring and evaluation of sustainable practices.

By implementing these strategies, we can foster the adoption of sustainable agriculture and work towards building a more resilient and ecologically responsible agricultural system.

Conclusion

It seems there may be some confusion in the information provided. Let's clarify some key points: **Fertilizers in Organic Farming:** In organic farming, the use of synthetic fertilizers is prohibited. Instead, organic fertilizers such as compost, manure, and natural amendments are used to provide nutrients to crops. These organic fertilizers are derived from natural sources and are considered safe for crops and the environment when used in appropriate quantities and methods. **Replacing Modern Agriculture with Sustainable Practices:** Modern agriculture has often relied on intensive use of synthetic fertilizers, pesticides, and other inputs, which can have negative environmental impacts. Sustainable agriculture aims to replace these practices with more environmentally friendly and resource-efficient approaches. It focuses on optimizing nutrient management, promoting natural pest control, conserving soil health, and adopting practices that minimize environmental harm. **Convenience for Farmers and Job Creation:** Sustainable agriculture can offer several benefits to farmers. By improving soil health and nutrient management, it can lead to better crop yields and reduced input costs over the long term. Additionally, sustainable agriculture practices can create job opportunities in areas such as organic farming, agroecology, and farm-to-table initiatives. **Future Potential of Sustainable Agriculture:** Sustainable agriculture is gaining recognition and importance worldwide due to its potential to address environmental concerns, promote food security, and support rural development. By adopting sustainable practices, agricultural systems can become more resilient, environmentally friendly, and economically viable in the long run. It's essential to promote sustainable agriculture to ensure the long-term viability of our agricultural systems, protect the environment, and meet the growing demands for food and fiber while preserving natural resources.

Author Details

U. Arumugam, Assistant Professor, Department of Commerce, Alagappa University, Karaikudi, Tamil Nadu, India, **Email ID:** arumugam.uc@gmail.com

M. Manida, Assistant Professor, Department of Commerce, Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India, **Email ID:** manidamcom@gmail.com

References

- Coulibaly, T.P., et al. "Sustainable Agricultural Practices Adoption." *Agriculture*, vol. 67, no. 4, 2021, pp. 166-76.
- Dubey, Rajesh Kumar, and Nidhi Shukla. "Organic Farming: An Eco-Friendly Technology and Its Importance and Opportunities in the Sustainable Development." *International Journal of Innovative Research in Science, Engineering and Technology*, vol. 3, no. 3, 2014.
- Eythorn, Frank. *Organic Farming for Sustainable Livelihoods in Developing Countries?: The Case of Cotton in India*. vdf Hochschulverlag AG, 2007.
- Kaur, Gurmanpreet. "Sustainable Development in Agriculture and Green Farming in India." *International Journal of Sustainable Development*, vol. 6, no. 12, 2013, pp. 61-64.
- Manida, M., and G. Nedumaran. "Sustainable Organic Farming Practices." *International Journal of Agricultural Science & Technology*, vol. 1, no. 1, 2021, pp. 28-33.
- Nedumaran, G., and M. Manida. "Sustainable Development and Challenges of Organic Farming Practices." *Clean India for New India*, 2019.
- NPCS Board of Consultants & Engineers. *The Complete Book on Organic Farming and Production of Organic Compost*. Asia Pacific Business Press, 2021.
- Rani, Meenu. "India's Approach toward Sustainable Agriculture: A Review of Government's Initiatives." *International Journal of Creative Research Thoughts*, vol. 6, no. 1, 2018, pp. 190-95.
- Tiwari, Himanshu, et al. "Sustainable Agriculture A Pathway for Sustainability in India: A Review." *Times of Agriculture*, 2022.

Websites

- <https://agrolearner.com/sustainable-agriculture-practices/>
- www.tractorguru.in/blog/sustainable-agriculture-in-india-types-benefits/
- www.nmsa.dac.gov.in/