



# Sustainable Agricultural Practices And Their Impact On Humans And Environment In Sri Lanka

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## ARTICLE INFO

## ABSTRACT

Sustainable farming methods have emerged as a pivotal concern in Sri Lanka, in light of escalating environmental issues and the rising demand for food security. This study examines the implementation of sustainable agriculture practices and their effects on human populations and the environment in Sri Lanka. The research investigates essential practices like organic agriculture, integrated pest management, crop rotation, agroforestry, and water conservation methods. All of us have found the pandemic and the ensuing economic crisis to be difficult, but farmers have also faced numerous difficulties because of the ban on the importation of chemical fertilizers, the scarcity of agrochemicals, the difficulty in selling their produce at a fair price, and the disruptions brought on by the fuel shortage. In Sri Lanka, the preservation of the environment, the sustenance of rural populations' livelihoods, and the guarantee of long-term food security depend heavily on sustainable farming methods. Due to its long agricultural heritage, the island nation has concentrated more on striking a balance between social and environmental sustainability and agricultural output. The research examines data from many agricultural regions, demonstrating how these techniques enhance soil health, decrease greenhouse gas emissions, preserve biodiversity, and alleviate the negative impacts of climate change. The study evaluates the socio-economic advantages of sustainable agriculture for farmers, encompassing improved livelihoods, increased food security, and less reliance on chemical inputs. The results indicate that although sustainability offers considerable advantages, obstacles such as early expenses, insufficient technical expertise, and limited market access impede broad implementation. This study offers proposals for policy interventions, capacity-building initiatives, and market incentives to advance sustainable agriculture in Sri Lanka, seeking a balanced approach to environmental protection and socio-economic growth. The proposed methods handle social and economic issues while promoting food security, better human health, and environmental sustainability.

**Keywords:** Seasonal agriculture, organic agriculture, pesticides, sustainable agricultural practice

## 1. Introduction

Sri Lanka has developed a wide variety of crops because to its ideal climate, rich soil, and plentiful water supplies. These crops not only support the country's population but also make a substantial economic contribution through both local and foreign trade. Currently, agriculture employs over 27% of the workforce and contributes roughly 7-8% of Sri Lanka's GDP, making it a crucial sector of the country's economy. Important agricultural exports that are important sources of foreign exchange are tea, rubber, and coconut products. In particular, the tea business is well-known throughout the world, with Sri Lankan tea being highly valued. Even though agriculture is a significant industry in Sri Lanka, traditional farming methods have created a number of environmental and socioeconomic problems.

- **Soil quality:** The soil's long-term fertility has decreased due to nutrient depletion brought on by monocropping and the ongoing use of chemical fertilizers.

- **Water pollution:** Water pollution is a consequence of overusing agrochemicals, which has an impact on ecosystems and human health. This is especially important in rural areas where groundwater is essential for community survival.
- **Climate limitation:** Sri Lanka is extremely susceptible to the effects of climate change. Crop production have been greatly impacted by the rising frequency of droughts, floods, and erratic rainfall patterns.
- **Biodiversity damage:** Many regions have experienced a decline in biodiversity due to the move toward monoculture and deforestation for agricultural growth, which has an effect on ecosystem resilience.
- **Farmer Debt:** A major source of social and economic strain in rural areas, the high cost of chemical inputs and the volatility of crop prices have left many farmers deeply in debt.

The Sri Lankan government has stepped up its efforts to encourage more environmentally friendly and sustainable farming methods throughout the nation in recent months. The Sri Lankan government authorized a ban on the importing of chemical fertilizers and agrochemicals in April 2021 in an effort to become the first nation to have all of its agricultural output certified as "organic." Although it has been widely acknowledged that Sri Lanka wants to adopt a more sustainable agricultural approach, questions have been raised regarding the feasibility of such an abrupt ban and the absence of policies, processes, and other resources to effectively transition the vast majority of Sri Lankan agricultural practices to comply with these new mandated policies [1-2].

According to some scholars, sustainable agriculture is a complex and dynamic ecosystem that is adaptable to both economic and environmental change and can meet food needs within reasonable social, economic, and environmental costs [3]. In the process of looking for ways to lessen the negative consequences of heavily production-oriented modern agricultural methods, governments, the business sector, and civic society have been trying to conserve economic, biological, cultural, and aesthetic capital for future generations [4]. Governments have begun figuring out new ways to deal with these problems. Some of these include developing strategies for sustainable agrotourism, integrating agricultural developments in plans for rural development, offering subsidies for organic farming, and utilizing community-supported agriculture programs [5-7].

Under Imports and Exports (Control) Regulation No. 07 of 2021, the Sri Lankan government also abruptly changed the possibilities for the import and use of chemical fertilizers as of May 6, 2021. In order to make agricultural systems environmentally and financially viable, the legislation prohibited the import of chemical fertilizers (CF), pesticides, and herbicides (Finance Ministry of Sri Lanka, 2019 and 2020). In addition, the government has made plans to reward research and innovation for the development of environmentally friendly organic fertilizer (OF) that is tailored to the specific environmental circumstances of the region. The government's hasty decision to convert Sri Lankan agriculture to 100% organic farming has severely disrupted the environment supporting rice cultivation. This ecology, which has developed over the past 60 years, is based mostly on the heavy usage of chemicals. This proposed change was expected to result in a 30–35% yield reduction in annual paddy output, according to the National Science Foundation of Sri Lanka. This suggests that there will soon be a catastrophe affecting the nation's food security and farming [8].

### **Shift Towards Sustainable Agriculture:**

To address these issues, there has been a rising realization in Sri Lanka in recent years that more sustainable agricultural methods are required. Degradation of the environment, decreased fertility of the soil, and increased worries about the health effects of chemical-based agriculture have all contributed to this change. Furthermore, as the risks posed by climate change become more widely recognized, farmers and the government are being forced to investigate more robust and sustainable farming practices.

## **2. Work Initiation**

In this research paper, authors are talking about modern sustainable agricultural system which is adopted by the Sri Lankan government. The aspects of the agricultural system and its optimal solutions are the centre of the research topic. Few approaches are discussed in this paper that leads to the guaranteed results.

Although traditional methods could not meet the rapidly growing need for food, and human ingenuity has produced more solutions than the natural process. Due to a lack of sustainable practices, it has now surpassed the environment's natural bounds and had numerous negative repercussions. Because of the detrimental effects on the environment and ecosystem, the cost of maintaining environmental quality cannot be sustained in the long run. Resources are scarce, but human needs and goals are boundless. Additionally, healing or regeneration might take millions or even thousands of years. Thus, the main reasons for becoming interested in sustainable farming were widespread environmental degradation, including contamination of the land, water, and air, poverty, and worries about a high standard of living.

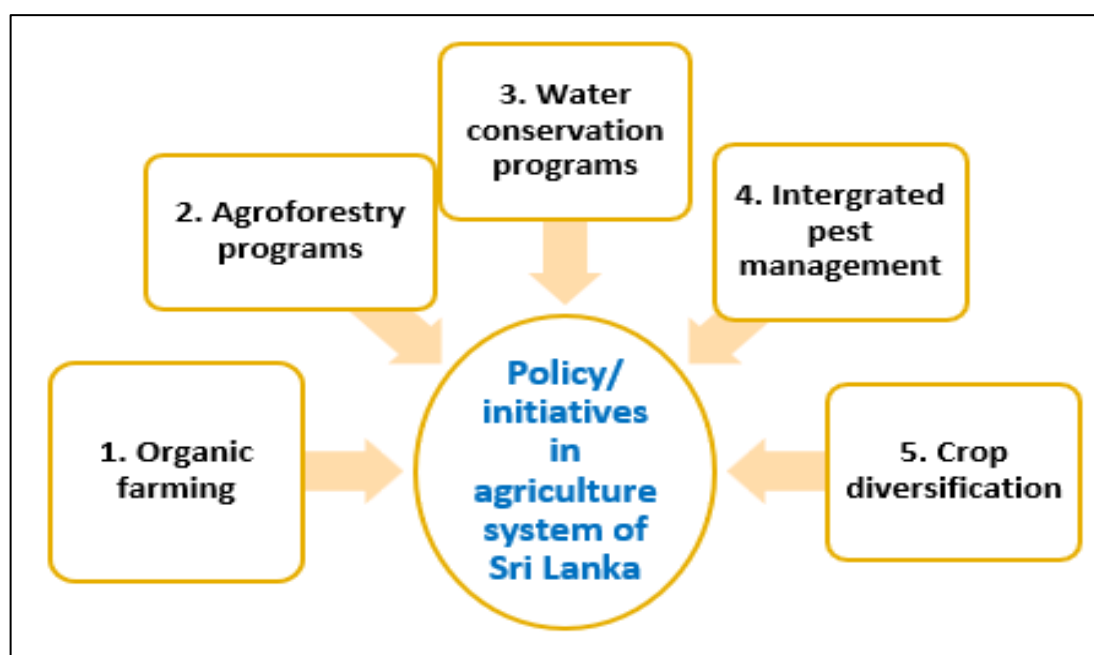
The Department of Agriculture in Sri Lanka presented sustainable agricultural concepts as a substitute strategy to address issues related to traditional agriculture. Despite over 20 years of extension initiatives, there has been

little spread of sustainable agriculture methods in Sri Lanka. This study's primary goal was to ascertain extension educators' opinions about the obstacles to and potential solutions for promoting sustainable agricultural practices in Sri Lanka. The main factor promoting sustainable agriculture in Sri Lanka is national agricultural policy. Part of a plan to remove obstacles to the adoption of sustainable agriculture techniques is the provision of research-based knowledge and sufficient in-service training programs [9].

The main factor promoting sustainable agriculture in Sri Lanka is the country's agricultural policy. A plan for removing obstacles to the adoption of sustainable agriculture techniques should include the provision of research-based information and sufficient in-service training programs. Other crucial measures in spreading sustainable agricultural practices in Sri Lanka include elevating the importance of sustainable agricultural practices like Integrated Pest Management (IPM) and soil conservation, training female farmers in sustainable agriculture, and incorporating sustainable agricultural ideas into curricula in schools.

The key initiatives taken by the Sri Lanka government to participate in sustainable and successful agricultural system are well known in recent decade. Figure-1 is showing several policies which are conducted by the government to develop the agricultural system and mentioned as under.

1. **Organic farming:** Sri Lanka has advanced organic agriculture with notable success. In 2021, the government banned the use of chemical pesticides and fertilizers in an effort to promote organic farming across the country. The suddenness of the prohibition caused agitation and disturbances, but it also highlighted how crucial sustainability is to the nation's agricultural policies.
2. **Agroforestry Programs:** In order to improve soil and water conservation, boost carbon sequestration, and restore biodiversity, these government- and non-governmental organization-supported programs encourage the incorporation of trees and shrubs into agricultural landscapes.
3. **Water conservation program:** In dry zones, the implementation of drip irrigation and other contemporary methods, together with traditional irrigation systems, is assisting in the fight against water shortages and guaranteeing a more effective use of available water resources.
4. **Integrated pest management:** By employing mechanical techniques, crop rotation, and biological controls to manage pests, IPM programs seek to lessen reliance on chemical pesticides. This protects the crops and lessens the impact on the environment.
5. **Crop diversification:** Encouraging farmers to cultivate a range of crops improves soil health, increases food security, and lowers the hazards connected with monoculture.



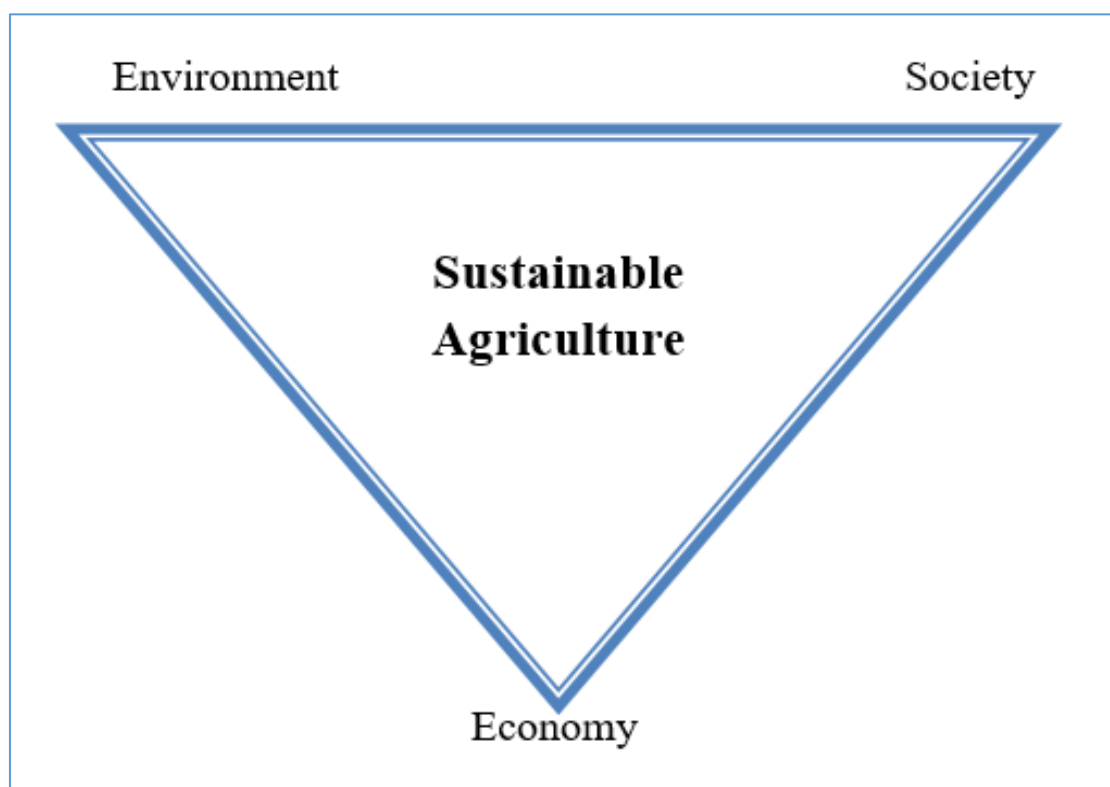
**Fig.1 Popular policies for sustainable agriculture system in Sri Lanka**

1% of the global agricultural land is devoted to organic farming, making it one of the fastest-growing agricultural industries. This agricultural style emphasizes practices like crop rotation and companion planting and uses organic fertilizers including compost manure, green manure, and bone meal [10]. Although organic

farming is often thought to be more sustainable than conventional farming, it has its own set of challenges and advantages. In terms of its impact on the environment and climate change, organic farming is less polluting than conventional farming [11].

### 3. Sustainable agriculture system in Sri Lanka

Sustainable agriculture means to produce food and livestock for long term with least negative effects on the surrounding atmosphere and environment. To provide food for growing human populations with the consideration of welfare for surrounding ecosystem is the main objective of sustainable agriculture. Figure-2 is showing picture of sustainable agricultural system of the country that has covered environment, society and economic factors.

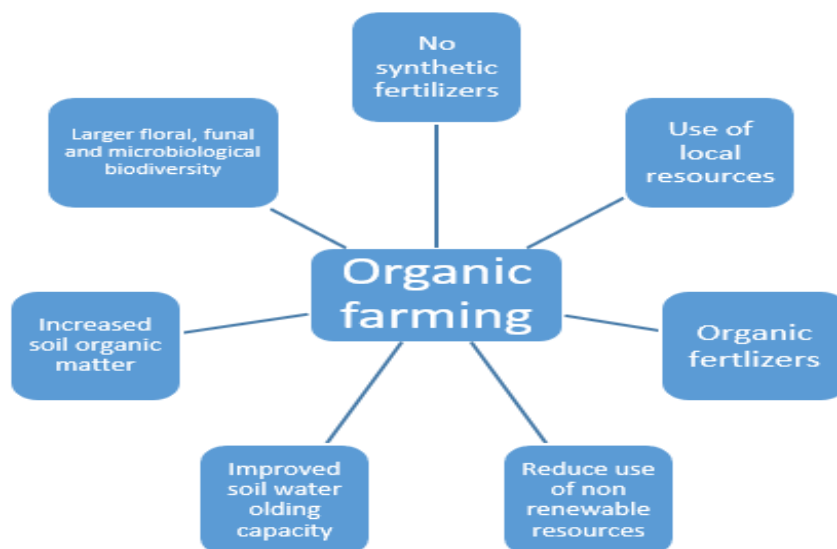


**Fig. 2 Sustainable agricultural system**

The primary goal of sustainable agriculture is to meet current requirement of food and resource needs with no compromise the ability of future generation requirement. It is a novel approach of farming that producing food, fiber, or other plant and animal products along with protection of environment, public health, human communities and animal welfare.

- Certain key features are following while doing this.

- 1) Environmental Health:** Sustainable farming helps to reduce pollution, conserve water, improvement in soil health. With this also one can achieve crop rotation, organic farming and reduction of using chemical components as a fertilizers and pesticides.
- 2) Economic Viability:** To ensure farmer's livelihood farms need to remain economically sound. By improving efficiency, more use of renewable resources and fair-trade practice help to farmers.
- 3) Animal welfare:** With the less use of antibiotics and free range of farming animal welfare can be made in practice.
- 4) Social Equality:** By providing facility of fair wages, safe working atmosphere to all farm workers and local community people.



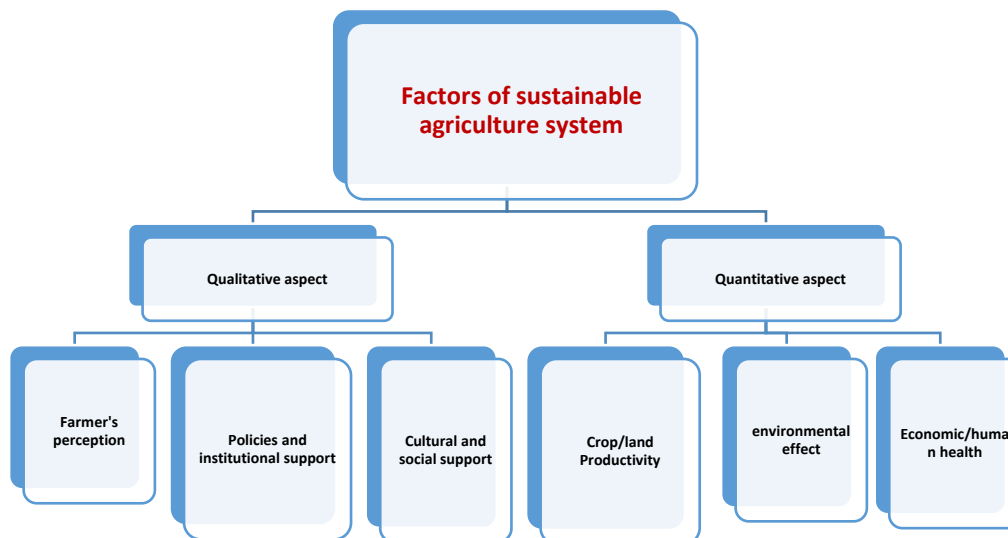
**Fig.3 Organic farming**

Organic farming is one type of agriculture method. It uses of natural process, biodiversity and ecological balance to grow crops. It may become more labor intensive as it requires more concern. It may give less profit compare to conventional farming. But it is environmentally friendly, provide health benefits and provide food without synthetic chemicals. Soil health is very important aspects for this type of farming. Organic fertilizers enhance the soil structure and nutrient content. Also, variety of crops can be available which makes agriculture ecosystem in rotational matter. By reducing pollution, conserving water and protecting natural habitats it provides environmental protection as well as animal welfare.

#### 4. Analysis of sustainable agriculture system

The analysis of sustainable agricultural system is divided in main two parts: qualitative aspect and quantitative aspect. Figure-4 is showing various measurement or analysis pattern of the sustainable solution of the agricultural system. The detail classification is depicted as below.

- **Farmer's perception:** Farmers' reasons for embracing sustainable agricultural methods like organic farming, agroforestry, or integrated pest management (IPM) can be gleaned through focus groups and interviews with them. A number of elements, including custom, expertise, market demand, and policy influence, can be examined in this approach. Important insights can be gained from farmers' perspectives on the advantages of sustainable practices, such as increased soil fertility, reduced input costs, and enhanced health, in comparison to the drawbacks, such as lower initial yields, labour intensity, and limited market access.
- **Policies and institutional support:** Qualitative analysis can investigate how successful government initiatives, such as subsidies for biological inputs or instruction on water conservation, are in reality. The examination of the functions played by NGOs in encouraging farmers to use sustainable practices may also be a part of this analysis.
- **Cultural and social support:** It is imperative to comprehend the ways in which cultural variables impact the uptake of sustainable farming practices. Numerous sustainable practices, like agroforestry and organic farming, complement conventional agricultural methods used in Sri Lanka. But contemporary economic pressures frequently drive farmers toward non-sustainable methods.



**Fig.4 Structural analysis of sustainable agricultural system**

In quantitative aspect, several factors considered in point of view of overall sustainable development of agricultural system which are related to the practical implementation also. These factors are discussed as below.

- **Crop/land productivity:** Comparing the yields of conventional and sustainable agricultural systems—such as organic farming, agroforestry, etc.—is known as quantitative analysis. Over time, sustainable methods like crop rotation and agroforestry frequently lead to increased land use efficiency. When compared to monoculture, agroforestry systems can yield more items per hectare, increasing productivity per hectare. Fruits, wood, additional items like honey, and rubber are examples of these many products.
- **Environmental effect:** Changes in nitrogen content, organic matter content, and other indices of soil quality can be measured to get insight into how sustainable agricultural practices are over the long run. Crop rotation and organic farming generally lead to better soil health over time than chemical-intensive monocropping. Farms that use drip irrigation, collect rainfall, and store water can provide quantitative statistics on how efficiently they use water. These methods usually preserve or even boost productivity while using less water. Increased biodiversity can be attributed to IPM and agroforestry systems. The comparison of flora and fauna species variety in agroforestry vs monoculture plots yields information about the ecological advantages of sustainable methods.
- **Economic/ human health:** The cost of inputs like seeds, fertilizers, pesticides, and other inputs is compared quantitatively with the revenue from sustainable versus traditional farming operations. Although the initial expenses of implementing sustainable practices can be significant, sustainable systems frequently result in lower input costs. Health surveys conducted among farming communities that have embraced integrated pest management (IPM) or organic farming practices can yield quantitative data regarding the decline in illnesses linked to pesticide use. Crops with higher nutritional value can be produced using sustainable farming methods. A comparison of the nutrients in crops grown organically and those cultivated with synthetic inputs can provide information on the health advantages for consumers.

#### **Sustainable Agroecology system in Sri Lanka**

By combining the various components of farm like plants, animals, soil, water, climate and people balancing system is formed. They have greatest possible synergetic effects. This system uses the less off farm products and external inputs. Cropping pattern and productive potential improves the match between environmental constraints of climate and landscape. Sustainable agroecology mainly focuses on farming system which work in nature, with long term productivity and on local rural community development. It is one type of holistic approach for food production and farming. It mainly uses natural resources. It concerns about also various category of crops and live-stocks, to improve soil health and reduction of synthetic components. Its main advantage is that it recovers from the disturbances caused by cultivation and harvest.

Following features are very important in this system.

- 1) Biodiversity
- 2) Soil health
- 3) Water management
- 4) Energy efficiency
- 5) Social equity
- 6) Climate resilience
- 7) Circular economy

## 5. Sustainable agricultural policies

Various agricultural policies that existing in Sri Lanka are introduced for better progress in country. Sri Lanka has realized in recent years that sustainable agriculture practices are necessary to solve the social and environmental issues brought about by conventional farming practices. The government has launched a number of laws and programs to support sustainable agriculture, working with non-governmental organizations and foreign organizations. These regulations aim to protect the environment, increase food security, and lessen reliance on chemical inputs while yet allowing farmers to make a living.

**National Agricultural Policies:** National agricultural policies have been formed in Sri Lanka with a focus on smallholder farmer support, protection of natural resources, and sustainability.

### **National Agricultural Policy (2016):**

The National Agricultural Policy prioritizes sustainable and ecologically friendly techniques while raising agricultural productivity. One of the main goals is to encourage organic farming in order to lessen reliance on chemical inputs.

- ✓ encouraging the use of sustainable agricultural methods like agroforestry to protect biodiversity and natural environments.
- ✓ promoting the preservation of soil and the use of practices that preserve soil fertility and lessen deterioration.
- ✓ encouraging the use of contemporary irrigation techniques, such as rainwater gathering and drip irrigation, to maximize the use of available water resources.
- ✓ assisting in the development of sustainable agricultural technology research and development

### **National Organic Agriculture Policy (2019):**

The purpose of this policy is to support organic farming as a vital tactic for boosting environmental sustainability and raising the standard of agricultural output. Its main objectives are as follows:

- ✓ increasing the amount of organic farming done in the nation, particularly for fruits, tea, and other export products.
- ✓ offering farmers technical assistance and instruction in organic farming methods.
- ✓ Creating incentives such as subsidies for organic inputs (compost, bio-fertilizers) to minimize the expenses associated with organic farming.
- ✓ creating domestic and global markets for organic products via export marketing and certification programs.

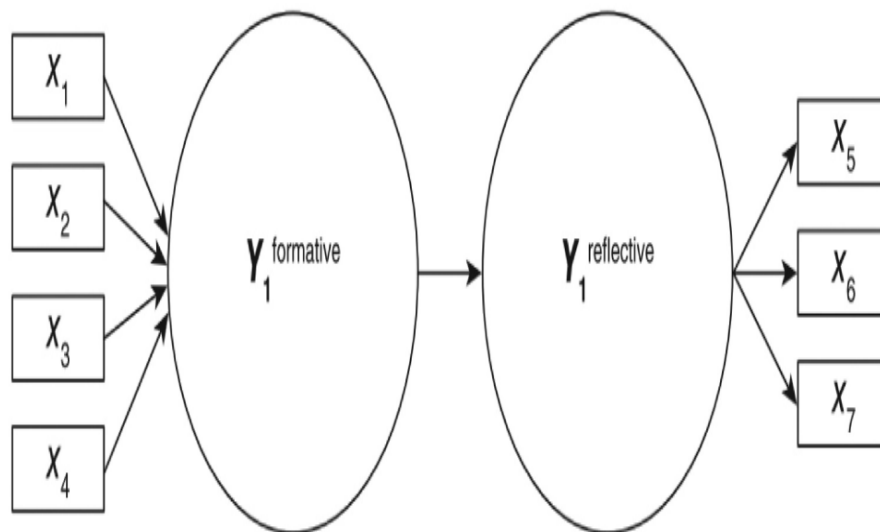
Othe than above said policies; several awareness programs are also initiated by the Government. Few popular policies and initiative programs conducted by the government are listed as below.

- The Organic Fertilizer Policy (2021)
- National Program for Food Production (2016-2020)
- Water Management and Irrigation Policies
- Climate Adaptation and Resilience Programs
- Agroforestry and Ecosystem Conservation
- Policy Support for Farmer Cooperatives and Market Development
- Research, Development, and Extension Services
- Support for Organic and fair-trade Certification

By the implementation of several regulations and initiatives, Sri Lanka has achieved significant strides toward the promotion of sustainable farming practices. These programs are aimed at lessening the negative effects of agriculture on the environment, enhancing food security, and assisting smallholder farmers in implementing sustainable practices. There are still issues, nevertheless, such as the requirement for improved market access, farmer education, and infrastructure. To ensure long-term agricultural sustainability in the nation, ongoing efforts to improve legislation, assist farmer transitions, and bolster research with a sustainability focus will be essential.

## 6. Qualitative data analysis

Following the literature survey, the data were translated, transcribed, and meticulously examined, leading to a comprehensive understanding of the information. In the initial stage of data analysis, the interviewed and unstructured data were converted into meaningful and interpretable results or insights. A systematic and iterative procedure was implemented, and the specific data was meticulously managed to facilitate translation at the early stage. Subsequently, the researcher conducted transcription, a laborious process to turn raw data into a format suitable for study. Ultimately, the transcript data was examined and revised to guarantee accuracy, clarity, and completeness. Subsequently, after becoming acquainted with the written data, a systematic coding technique was employed to locate and categorize pertinent areas of the interview responses. Subsequently, the analogous codes were categorized and compared to discern reoccurring patterns or concepts that arise across the dataset. Subsequently, a specific theme was established, and thematic analysis techniques were employed to identify and evaluate reoccurring themes or patterns in interview transcripts, focus group discussions, or open-ended survey data. Organized data into themes and sub-themes to extract qualitative insights regarding the contributions of the Sri Lanka Army.



**Fig.5- Model to measure convergent validity of formative indicators. Source: Hair et al. (2017).**

Sustainable agricultural techniques are crucial for reconciling food production with environmental preservation, especially in Sri Lanka, where agriculture is integral to the economy and the livelihoods of numerous rural communities. These techniques seek to mitigate environmental deterioration, augment biodiversity, and boost the welfare of farmers and local communities. This is an analysis of sustainable agriculture techniques in Sri Lanka and their effects on persons and the environment.

**1. Organic Farming Description:** Organic farming eschews synthetic fertilizers, herbicides, and genetically modified organisms (GMOs), prioritizing natural inputs such as compost, manure, and biological pest management.

- **Effects on Humans:** Enhanced nutrition resulting from the elimination of chemical residues in agricultural produce. Minimized exposure to hazardous chemicals for agricultural workers, enhancing health outcomes. Organic Agriculture frequently yields higher prices, enhancing income for small-scale farmers.
- **Environmental Impact:** Enhanced soil fertility and structure via the application of organic materials. Enhanced biodiversity in agricultural settings resulting from the elimination of detrimental chemicals. Mitigated water contamination resulting from chemical runoff into rivers and lakes.

**2. Agroforestry Description:** Agroforestry is the incorporation of trees and shrubs inside agricultural systems. This approach augments biodiversity, boosts water retention, and aids in erosion prevention.

- **Effects on Humans:** Enhanced food security by agricultural diversification (trees yield fruits, nuts, or lumber). Supplementary revenue derived from forest resources, including medicinal flora, honey, and firewood. Agroforestry enhances climate resilience by diminishing susceptibility to extreme weather events.
- **Environmental Impact:** Enhanced carbon sequestration, contributing to the mitigation of climate change. Improved soil health as tree roots mitigate erosion and enhance soil structure. Establishment of wildlife habitats to enhance biodiversity.



**3. Crop Rotation and Diversification:** Crop rotation entails alternating the types of crops cultivated in a field each season, whereas diversification requires simultaneously cultivating a variety of crops.

- **Effects on Humans:** Enhanced nutrition and dietary diversity from access to a variety of crops. Minimized likelihood of complete crop failure, ensuring a more consistent revenue and food supply. Reduced dependence on chemical inputs, leading to diminished production expenses.
- **Environmental Impact:** Improved soil fertility by the rotation of nitrogen-fixing crops (e.g., legumes) with nitrogen-depleting crops. Diversified cropping disrupts pest and disease cycles by interrupting the lifecycle of pests. Reduced water consumption and enhanced water retention, especially crucial in arid areas of Sri Lanka.

**4. Conservation Tillage:** Conservation tillage minimizes soil tilling frequency, maintaining crop remains on the surface to safeguard against erosion.

- **Effects on Humans:** Decreased labour and fuel expenditures for farmers, due to diminished machinery requirements for tilling. Enhanced yields over time attributable to enhanced soil health. Conservation tillage technologies are suitable for small-scale agriculture, providing advantages to marginalized communities.
- **Environmental Impact:** Diminished soil erosion, which is essential in Sri Lanka's hilly regions, where agriculture frequently leads to considerable land degradation. Augmented organic matter in soil, improving fertility and water retention. Reduced carbon emissions resulting from less utilization of machinery and fossil fuels.

**5. Integrated Pest Management (IPM) Description:** IPM amalgamates biological, physical, and chemical strategies for pest management, minimizing dependence on detrimental chemicals.

- **Effects on Humans:** Decreased health hazards for farmers resulting from diminished pesticide exposure. Enhanced food safety for consumers, as diminished chemical residues are detected in produce. Lowered input expenses for farmers by decreasing reliance on chemical pesticides.
- **Environmental Impact:** Preservation of advantageous insect species that aid in natural pest management. Minimized water and soil pollution due to chemical pesticide runoff. Augmented biodiversity, especially of pollinators like bees and butterflies, is vital to the agricultural ecology.

**6. Sustainable Water Governance:** Efficient water management include techniques such as drip irrigation, rainwater harvesting, and mulching to minimize water consumption in agriculture.

- **Effects on Humans:** Enhanced accessibility to water supplies, particularly during arid periods. Enhanced productivity and yields by guaranteeing sufficient water supply for crops. Drip irrigation minimizes labour requirements for crop irrigation, which is particularly significant for female farmers in Sri Lanka.
- **Environmental Impact:** Decreased water wastage, promoting the sustainability of freshwater supplies. Mitigation of soil salinization, especially in regions with limited water resources or excessive irrigation practices. Improved groundwater recharge resulting from less water runoff, advantageous for both ecosystems and human communities.

Sustainable agricultural practices in Sri Lanka have the potential to significantly improve food security, enhance livelihoods, and protect the environment. By promoting organic farming, agroforestry, crop diversification, and sustainable water management, the country can ensure that its agricultural sector becomes more resilient to climate change while protecting its rich natural resources for future generations.

## 7. Conclusion

Many nations started implementing sustainable agricultural concepts as they realized how important it was to achieve desired social, economic, and environmental goals through sustainable agriculture. Early in the 1980s, the Department of Agriculture of Sri Lanka began introducing ideas related to sustainable agriculture, such as integrated pest management. Extension agents have received training to conduct sustainable agricultural farmer education initiatives. Through extension programs around the nation, the Department of Agriculture's modified training and visit extension system was used to teach farmers about the concepts of sustainable agriculture. The rate of adoption of sustainable agricultural methods is still not high enough, even after 20 years of extension assistance. Many farmers continue to use pesticides without giving IPM methods enough thought.

The appropriate strategy for achieving the SDGs is a hotly contested issue. Research and reasoning support the need for sustainable agriculture and food systems to provide enough wholesome food for all people while minimizing harmful environmental effects and preserving the ability of farmers to earn a living. It is understandable that in order to accomplish several SDGs while staying within environmental restrictions, agriculture and food systems must adapt quickly and rapidly.

To lessen the constraints and difficulties of organic farming, a combination of enhanced sludge, biochar with

organic fertilizer, biofertilizers, organ minerals, and digital technology is essential. Organic farming is a creative and sustainable method that improves many farmers' lives and agricultural output while also being environmentally beneficial. Organic farmers may monitor and improve crop and animal health, increase resource usage efficiency, lessen their impact on the environment, and increase farm income with the use of digital technologies and tools. In organic farming, digital technology can be applied to tillage, irrigation, fertilization, postharvest, product storage, and transportation. For most smallholder farmers worldwide, digital technology has the ability to end poverty and food insecurity.

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