Sustainable Development of Agricultural Produce in Tirunelveli District

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Abstract

Sustainable development of agriculture means producing agricultural products in a way that meets present needs while protecting natural resources for future generations. It focuses on efficient use of land, water, technology, and environmentally friendly farming practices. Tirunelveli district in Tamil Nadu has a strong agricultural base with diverse crops and irrigation systems, making sustainable agriculture essential for long-term productivity and farmer welfare. Agriculture plays a vital role in the economic development of Tirunelveli District, providing employment and livelihood to a large section of the rural population. The district produces various agricultural commodities such as paddy, pulses, millets, oilseeds, banana, and coconut. However, in recent years the agricultural sector has been facing several challenges such as water scarcity, climate change, soil degradation, increasing production costs, and fluctuating market prices. Micro irrigation methods such as drip irrigation and sprinkler irrigation are widely promoted under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). These systems improve water efficiency, increase crop productivity, reduce labor costs, and control weeds. Organic farming practices are promoted through schemes like Paramparagat Krishi Vikas Yojana (PKVY). Farmers are encouraged to use bio-fertilizers, compost, and natural pest control methods to reduce chemical usage and maintain soil health. Integrated farming combines crop cultivation with livestock, fisheries, horticulture, and agro-forestry. This system improves farm productivity, increases income, and ensures sustainable livelihood for farmers. These issues create obstacles to the sustainable development of agricultural production in Tirunelveli District. The study aims to

analyze the factors influencing sustainable agricultural production and suggest measures for improving productivity, environmental protection, and farmer income in the district.

***Keywords**: agriculture, Tirunelveli, PKVY*

Introduction

Sustainable development of agriculture means producing agricultural products in a way that meets present needs while protecting natural resources for future generations. It focuses on efficient use of land, water, technology, and environmentally friendly farming practices. Tirunelveli district in Tamil Nadu has a strong agricultural base with diverse crops and irrigation systems, making sustainable agriculture essential for long-term productivity and farmer welfare.

Sustainable development in agriculture refers to the use of farming methods that increase productivity while protecting the environment and conserving natural resources for future generations. It focuses on maintaining soil fertility, efficient water management, reducing chemical inputs, and promoting eco-friendly farming techniques. Sustainable agriculture also aims to improve farmers' income and ensure long-term agricultural productivity.

Tirunelveli District, located in the southern part of Tamil Nadu, is known for its diverse agricultural activities. The district has fertile lands supported by the Tamirabarani River and several irrigation tanks and canals. Farmers in this region cultivate a variety of crops such as paddy, millets, pulses, groundnut, cotton, banana, coconut, and other horticultural crops. Agriculture plays a vital role in the livelihood of the rural population in the district.

Despite its agricultural potential, Tirunelveli faces several challenges such as irregular rainfall, water scarcity, declining soil fertility, and increasing production costs. In addition, the excessive use of chemical fertilizers and pesticides can negatively affect the environment and long-term agricultural productivity. These issues highlight the importance of adopting sustainable agricultural practices in the district.

Agricultural Profile of Tirunelveli District

Agriculture is one of the major occupations in Tirunelveli district. The cropping pattern is influenced by soil type, climate, and irrigation facilities. Major crops grown in the district include:

- **Paddy** (major irrigated crop)
- **Millets** such as cholam and cumbu
- **Pulses** like black gram, green gram, and cowpea
- **Oilseeds** such as groundnut and gingelly
- **Cash crops** like cotton, sugarcane, and chillies
- **Horticultural crops** including banana, coconut, fruits, vegetables, and spices

Large areas are cultivated under irrigation through rivers like **Tamirabarani**, wells, tanks, and canals, while rainfed farming is common in many parts of the district.

Importance of Sustainable Agricultural Development

Sustainable agriculture in Tirunelveli is important for several reasons:

- **Food security:** Ensures continuous production of crops.
- **Environmental protection:** Prevents soil degradation and water depletion.
- **Economic development:** Improves farmers' income and employment opportunities.
- **Climate resilience:** Helps farmers adapt to droughts and changing rainfall patterns.

Sustainable Agricultural Practices in Tirunelveli

Several modern and eco-friendly practices are adopted in the district to promote sustainable agricultural production.

Micro Irrigation Systems

Micro irrigation methods such as **drip irrigation and sprinkler irrigation** are widely promoted under the *Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)*. These systems improve water efficiency, increase crop productivity, reduce labor costs, and control weeds.

Crop Diversification

Farmers are encouraged to shift from traditional monocropping to diversified cropping patterns including horticulture crops like fruits, vegetables, and spices. Crop diversification increases farm income, reduces risk, and promotes better utilization of natural resources.

Organic Farming

Organic farming practices are promoted through schemes like **Paramparagat Krishi Vikas Yojana (PKVY)**. Farmers are encouraged to use bio-fertilizers, compost, and natural pest control methods to reduce chemical usage and maintain soil health.

Integrated Farming System (IFS)

Integrated farming combines crop cultivation with livestock, fisheries, horticulture, and agro-forestry. This system improves farm productivity, increases income, and ensures sustainable livelihood for farmers.

Soil Health Management

Soil testing, green manuring, and bio-fertilizer application help maintain soil fertility and improve crop yields.

Government Initiatives Supporting Sustainable Agriculture

The Government of India and Tamil Nadu have introduced several schemes to promote sustainable agriculture in Tirunelveli district:

- **National Horticulture Mission (NHM)** – promotes horticulture crop production and productivity.
- **National Mission on Sustainable Agriculture (NMSA)** – supports climate-resilient agriculture and integrated farming systems.
- **Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP)** – encourages crop diversification and water conservation technologies.
- **Pradhan Mantri Fasal Bima Yojana (PMFBY)** – provides crop insurance to protect farmers from crop losses.

Challenges in Sustainable Agriculture

Despite several initiatives, farmers in Tirunelveli face some challenges:

- Water scarcity and irregular rainfall
- Soil degradation due to chemical fertilizers
- Climate change impacts
- Limited access to modern technology
- Market fluctuations for agricultural produce

Statement of the Problem

Agriculture plays a vital role in the economic development of Tirunelveli District, providing employment and livelihood to a large section of the rural population. The district produces various agricultural commodities such as paddy, pulses, millets, oilseeds, banana, and coconut. However, in recent years the agricultural sector has been facing several challenges such as water scarcity, climate change, soil degradation, increasing production costs, and fluctuating market prices.

The Tamirabarani river and irrigation tanks support agriculture in the district, but irregular rainfall and over-exploitation of groundwater have created serious concerns regarding water availability. Excessive use of chemical fertilizers and pesticides has also affected soil fertility and environmental sustainability. In addition, farmers often face difficulties in marketing their agricultural produce due to lack of proper storage, processing, and transportation facilities.

These issues create obstacles to the sustainable development of agricultural production in Tirunelveli District. Therefore, it is important to study the current agricultural practices, resource utilization, and challenges faced by farmers. The study aims to analyze the factors influencing sustainable agricultural production and suggest measures for improving productivity, environmental protection, and farmer income in the district.

Objectives of the Study

- ✓ **To identify the major agricultural crops** cultivated in Tirunelveli District.
- ✓ **To examine the availability and utilization of natural resources** such as land, water, and soil for agricultural production.
- ✓ **To analyze the problems faced by farmers** in producing and marketing agricultural products.
- ✓ **To evaluate the level of awareness and adoption of sustainable agricultural practices** among farmers.
- ✓ **To suggest suitable measures and strategies** for improving sustainable agricultural development in the district.

Review of Literature

Mohammed Ghouse L and Dr. S Nazreen Hassan (2020) "Determinants of crop diversification in Tirunelveli district of Tamil Nadu" This paper analyzes the determinants of crop diversification in Tirunelveli district of Tamil Nadu. Knowing the determinants of crop diversification is important for improving agricultural production and for the well being of farmers. We studied about the determinants of crop diversification in Tirunelveli district of Tamil Nadu using the primary data. Non – Experimental Research design was used for this study purpose. A sample size of 120 respondents was fixed for the study purpose using proportionate random sampling technique. The respondents were asked to express the factors which influence the crop diversification. The information gathered from the respondents were analyzed and tabulated. Crop diversification is nothing but a shift in cropping pattern, shift from traditionally grown less benefit crops to more benefit crops to increase the income as well as agricultural sustainability. By this, farmer can grow variety of crops in a given area in order to increase the production and also to lessen the risk. Indian agriculture facing distress due to disparities in the income of the farmers and non-agricultural workers. Crop diversification can be used as a better strategy to achieve this goal and to reduce the disparities in income of the farmers and non-agricultural workers.

M. Esakkiammal, S. Janaki Kumari, L. Kartheeswari, B. Nivetha, M. Sree Devi (2022) "A Study on Sustainable Development of Agriculture with Reference un Tirunelveli City" Agricultural development Improvements in agricultural productivity create social and economic ripple effects. With increased incomes, small farmers can better feed their families, send their children to school, provide for their health, and invest in their farms. This makes their communities economically stronger and more stable. Over the past 200 years, nearly every part of the developed world has seen an agricultural transformation. As farming improved, so did incomes, health, and economies. More recently, we've seen amazing progress in parts of the developing World. There were also some serious unintended consequences particularly regarding the environment that left us with important lessons for today. In the last several years, the global community has begun to refocus its attention on agriculture. Rising food prices and concerns about feeding a growing population are prompting more and more organizations and governments to understand the urgency of supporting agricultural development.

Methodology

The present study is empirical research and it is based on the survey method. A Structured non-disguised interview schedule was used to collect information. This study is descriptive and analytical in nature based on primary and secondary data.

Research Design

The researcher has been selected on convenience sampling technique and the total number of samples was 150 out of which 120 were selected. The structural interview schedule was used to collect the relevant data.

Sampling Design

The present study is based on convenience sampling method has been adopted 120 sample respondents from Tirunelveli area has been selected on the basis of convenience and get the questionnaire filled in. Excellent opportunity for organized retailers in the area. This study has an academic significance, bearing in mind the new and promising trends in the feel of marketing, specially retailing.

Data Collection Method

- Primary data
- Secondary data

Primary Data

The primary data were collected directly from the sample consumers through a well devised interview schedule method are used to collect data from the respondents. Sample size of 120 respondents has been appended in the report.

Secondary Data

The secondary data were collected directly from the sample consumers through a well devised interview schedule method is used to collect data from the respondents. Sample size of 120 respondent has been appended in the report.

Statistical Tools Used for Analysis

A part from the necessary table chart and like suitable tools is applied for analysis and interpretation.

- ✓ Percentage analysis
- ✓ Chi square test analysis

Limitation of the Study

The following are the limitations of the study:

It is restricted to120 farmers as respondents in the Tirunelveli Taluk. Hence results obtained from the study cannot be generalized to the population as a whole. As the study was conducted for short duration of five months it was difficult to study in depth about the various aspects. This study only covers problem of the famers. Time Constraint.

Data Analysis and Interpretation

General Information of the Farmer	Category	No. of. Respondents	Percentage
Age	Below 20 years	15	13
	21-30 years	22	18
	31-40 years	37	31
	41- 50 years	42	35
	Above 50 years	4	3
Gender	Male	87	73
	Female	33	27
Educational qualification	Below SSLC	42	35
	HSS	21	18
	Graduate	19	15
	Post Graduate	17	14
	Diploma	21	17
Occupation	Private	12	10
	Government	10	8
	Farmer	57	48
	Daily wages	41	34

Village / Location	Rural	94	78
	Urban	26	22
Size of land holding (in acres)	Less than 5 ares	44	38
	5-10 ares	57	47
	Above 10 ares	19	15
Type of farming	Irrigated	23	19
	Rainfed	58	48
	Both	39	33
Major Agricultural Crops Cultivated			
major crops cultivated on your farm	Paddy	44	37
	Millets	12	10
	Pulses	10	8
	Oilseeds	13	11
	Banana	16	13
	Coconut	22	18
	Others (Specify)	3	3
Utilization of Natural Resources			
Main source of irrigation for your farm	River	32	27
	Well	20	16
	Borewell	18	15
	Canal	12	10
	Rainwater	38	32
Do you practice any water-saving irrigation methods	Drip irrigation	26	22
	Sprinkler irrigation	18	15
	Traditional irrigation	58	48
	Others	18	15

Do you conduct soil testing before cultivation	Yes No	36 84	30 70
type of fertilizers do you mainly use	Organic fertilizers Chemical fertilizers Both	22 57 41	18 48 34
Problems Faced by Farmers			
Problems faced in agricultural production.	Water scarcity High cost of fertilizers Pest and disease attacks Labour shortage Climate change Low	45 22 12 41	38 18 10 34
Difficulties do you face in marketing your agricultural produce.	Market price Lack of storage facilities Transportation problems Middlemen interference	47 33 17 23	39 28 14 19
Do you receive adequate support from government agencies	Yes No	57 63	48 52
Awareness and Adoption of Sustainable Practices			
Do you aware of sustainable agriculture practices	Yes No	34 86	28 72

Do you practice of which type of farming	Organic farming Crop rotation Integrated farming Use of bio-fertilizers	32 45 25 18	26 38 21 15
Do you get information about sustainable farming practices	Agricultural officers Farmer groups Training programs Media / Internet	12 38 26 44	10 31 21 36

Findings

- ✓ The majority 35 % of respondents in the age group of 41-50 years
- ✓ The majority 73 % of the respondents are male
- ✓ The majority 35 % of the respondents are studied in below SSLC Level of educational background.
- ✓ The majority 41 % of the respondent's occupation is Farmer.
- ✓ The majority 78 % of the respondents is living to rural areas.
- ✓ The majority 47 % of the respondents are cultivated in 5-10 Acre land for their cultivation work.
- ✓ The majority 48 % of the respondents are used to farming is rainfed
- ✓ The majority 37 % of the respondents are major crops cultivated on farm is paddy.
- ✓ The majority 27 % of the respondents are main source of irrigation for farm is river.
- ✓ The majority 48 % of the respondents are practice water-saving irrigation is Traditional irrigation.
- ✓ The majority 70 % of the respondents are soil testing before cultivation is no.
- ✓ The majority 48 % of the respondents are used the fertilizer is Chemical.
- ✓ The majority 38 % of the respondents are Problems faced in agricultural production is Water scarcity.
- ✓ The majority 39 % of the respondents are Difficulties do you face in marketing your agricultural produce is Market price.

- ✓ The majority 52 % of the respondents are Do you receive adequate support from government agencies is No.
- ✓ The majority 72 % of the respondents are not aware of sustainable agriculture practices.
- ✓ The majority 38 % of the respondents are used to cultivated agricultural produce in Crop rotation.
- ✓ The majority 36 % of the respondents are get information about sustainable farming practices is Media / Internet.

Suggestions for Improvement

To enhance sustainable agricultural development in Tirunelveli district, the following measures are recommended:

- ❖ Expansion of micro irrigation systems
- ❖ Promotion of organic and natural farming
- ❖ Use of modern technologies such as precision farming and IoT-based irrigation
- ❖ Strengthening farmer producer organizations (FPOs)
- ❖ Improving storage, processing, and marketing facilities.

Conclusion

Sustainable development of agricultural produce in Tirunelveli district is essential for ensuring food security, protecting natural resources, and improving farmers' livelihoods. Through government schemes, technological innovations, crop diversification, and eco-friendly farming practices, the district can achieve long-term agricultural sustainability and economic growth.

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