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Sustainable agriculture is a stimulator to stretch out sustainable development goals

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ABSTRACT

Sustainability is a universal call to protect the planet and people to enjoy peace and prosperity.to ensure sustainable development goals, Sustainable agriculture should be practiced as it serve as a base for Sustainable Development Goals. It induces the researchers to assess whether sustainable agriculture is a stimulator to stretch out Sustainable development goals. The Primary data collected from 132 farmers within Tenkasi district. The opinion and the correlation of sustainable agriculture association with sustainable development goals were analyzed using Weighted average score and Structural Equation Modeling. The influence of sustainable agriculture with sustainable development goals was tested using regression analysis. The result revealed that SDG's goal has high correlation with sustainable agriculture. It is understood that if sustainable agriculture is practiced in a full-fledged mode then it is easy to attain Sustainable Development Goals within the year of 2030.

Key Words: Sustainable Agriculture, stimulator, Sustainable Development Goals.

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Introduction

சுழன்றும்ஏர்ப் பின்னது உலகம் அதனால்
உழந்தும் உழவே தலை

Wherever it whirls, the world must follow the farmer.
Despite of hardships farming is the best.
Thiruvalluvar

In this world with emerging population, it is necessity to meet the needs of present without compromising the standard of living of the future generation by sustaining resources. The need of sustainable resource management is increasingly urgent. Thus keeping it in mind, the United Nations Organization has announced the Sustainable Development Goals that is to be achieved by the year 20301. All those SDG's have deep connection with agriculture and agriculture has been a conversation around the globe as it comprises world economy, human society and biodiversity within it.

The 9th London International Conference also took part in the conversation along with the globe by providing a chance to address on the topic "Humanities and Social Sciences" The humanities and social sciences are the study of human behavior and interaction with social, cultural, environmental, economic and political contexts. This will provide a broad understanding of the world in which we live, and how can we act as a responsible and informed citizens to create more just, equitable and peaceful society.

Statement of the Problem

Tenkasi district is one of the prominent agriculturist districts among southern districts where cropping Pattern varies from Taluk to Taluk. Factors such as type of soil, climate conditions, irrigation facilities determines the cropping pattern. Managing those resources in an effective way is what that matters most in agriculture. Due to the climate change, decrease in ground water level and soil fertility, agricultural sector is facing a controversy. Moreover, in the 2022 Global Index of SDGs, India ranked 121 out of the 163 countries2. With seven years left to meet the global goals on sustainable development, India is in off-track. Thus, to bring India on track, it is necessary to bring changes in agriculture through sustainable practices. To ensure SDG's it is necessary to invest in sustainable agriculture as it gives equal weight to environmental, social, and economic concerns.

This induces the researchers to think critically to answer the following question

- Is Sustainable Agriculture act as a stimulator to stretch out Sustainable Development Goals?

Objective of the study

The objective of this study is

- To assess the opinion of farmers on the statement - "Sustainable Agriculture is a Stimulator to Stretch out Sustainable Development Goals"

- To eestimate how far sustainable Agriculture associated with Sustainable Development goals on the basis of opinion of farmers.
- To test how Sustainable Agriculture influence Sustainable Development Goals from the perspective of farmers.

Literature review

A review of previous studies on Sustainable Development Goals highlights the traits of perception of youth and agriculturist towards Sustainable Development goals. The main conclusions of some earlier studies are given below.

Dr.Somanchi Hari Krishna, Dr. G.Ilankumaran, Dr.C.Balakrishnan, Dr.Kailas Aute, Dr.Surekha Rohidas Patil (2022)[3] handled a study on "Knowledge, perception and awareness about Sustainable Development Goals among students of Indian Public University" have concluded that for a better and sustainable future the objective of sustainable development goal should be focused on and students opined that decent Labour and economic growth , partnership for goals and responsible consumption and institutions are the three least sustainable development goals.

Balamuralithra Balakrishnan, Fumiihiko Tochinai & Hidekazu Kanemistu (2019)[4]Conducted a study on "Perception and attitudes towards sustainable development among Malaysian Undergraduates" has been reported that higher education institutions plays a critical role in promoting sustainable development and developing a future workforce who maintains a sense of responsibility towards sustainable development that will ensure the next generations will able to live a quality life in an environment conductive to comfort and safety**.**

Shabana Anjam and Md. Tarique (2017)[5] published an empirical study on "Agriculture and poverty reduction in India" with a aim to find a relative impact of GDP growth on agriculture and non - agricultural sector on poverty reduction in India. The result of the study indicates that there is a need to restructure, resurrect and transform our agriculture sector so that it can able to meet the growing challenges and can realize its full potential

Adeola, R.G. and Adetunbi, S.I (2015)[6] on their study "Farmers perception of sustainable agriculture in South- Western Nigeria: Implications for rural economy" examined that farmers were favorably disposed to the practice of sustainable agriculture and realized its potential as an alternative to industrial agriculture, a profitable venture and a capability of providing a healthy family that would improve rural economy.

Tutu felix, Boamah Darkwa and lawerence Amponasah (2013)[7] has inducted a study on "Attitude towards sustainable agricultural: A survey of agricultural science students in Sunyani Polytechnic, Ghana, West Africa" examines that the respondents have positive attitude towards sustainable development and believes that sustainable agriculture can protect agriculture and environment. The study suggests that more education and training must be given to farmers so that they can adapt sustainable agricultural practices.

A large number of researches have been conducted on sustainable development goals and sustainable agriculture with reference to geographical locations in India and abroad. Till date,

none of the studies has bridged the gap between all seventeen sustainable development goals with sustainable agriculture especially in the perspective of the master eye – the farmers.

Scope of the study

The following are the scope of the study

Geographical Scope

The study covers the farmers in Tenkasi District which is located in the Southern District of Tamil Nadu, India.

Analytical Scope

This study tries to attain its objectives by analyzing the opinion of farmers on the statement "Sustainable Agriculture is a Stimulator to Stretch out the Sustainable Development Goals". Besides, it also attempts to find out the association and influence of sustainable Agriculture with Sustainable Development Goals.

Functional Scope

By highlighting Sustainable Agriculture association with Sustainable Development Goals, this study acts a reminder that the **local action** on practicing sustainable agriculture will guide towards the **global action** of Sustainable Development Goals.

Linkage of Sustainable Development Goals with Sustainable Agriculture

The attitude of farmers towards the linkage of Sustainable development goals with sustainable agriculture were collected through Likert five- point scale, Strongly Agree (SA), Agree (A), Neutral (N), Disagree (DA), and Strongly Disagree (SDA). The responses were converted into scores by giving 5 points for strongly agree, 4 for agree,3 for neutral,2 for disagree and 1 for Strongly disagree for the positive statement and vice versa. Seventeen sustainable goals statement in linkage with Sustainable agriculture are given to the respondents to obtain the opinion about the linkage of SDG's goal with sustainable agriculture. The statements and the number of respondents who have strongly agreed, agreed, neutral option, disagreed and strongly disagreed statements were given in the following table 1.1.

Table 1.1

Opinion of Farmers on the Statement "Sustainable Agriculture act as a Stimulator to Stretch out Sustainable Development Goals"

Statements	Opinion					WAS
	SA	A	N	D	SD	
SDG 1 - No Poverty Sustainable Agriculture will boost rural income and helps to alleviate poverty	60 (300)	32 (128)	17 (51)	9 (18)	14 (14)	511
SDG 2 - Zero Hunger Sustainable Agriculture provides safe, nutritious and sufficient food all year around	73 (365)	40 (160)	10 (30)	7 (14)	2 (2)	571
SDG 3 - Good Health and Well being Sustainable Agriculture will address the nutritional needs to adolescent girls, pregnant and lactating women, and older persons.	45 (225)	42 (168)	20 (60)	12 (24)	13 (13)	490
SDG 4 - Quality Education Agricultural extension enables farmers to access to the skills, tools, inputs and knowledge they need to thrive.	28 (140)	29 (116)	25 (75)	34 (68)	16 (16)	415
SDG 5 - Gender Equality Equal access of resources between men and women can boost agricultural output.	12 (60)	20 (80)	17 (51)	47 (94)	36 (36)	321
SDG 6 - Clean Water and Sanitation Sustainable Management of water in agriculture ensures availability and sanitation for all.	35 (175)	29 (116)	38 (114)	8 (16)	22 (22)	443
SDG 7 - Affordable and Clean Energy Sustainable Agriculture will helps to reduce the dependent on nonrenewable source of energy.	22 (110)	28 (112)	32 (96)	18 (36)	32 (32)	386
SDG 8 - Decent Work and Economic Growth Agriculture is an engine for economic growth and employment	29 (145)	38 (152)	27 (81)	22 (44)	16 (16)	438
SDG 9 – Industry, Innovation and Infrastructure Sustainable Agriculture promote resilient infrastructure, sustainable industrialization and foster innovation.	19 (95)	10 (40)	13 (39)	43 (86)	47 (47)	307
SDG 10 – Reduced Inequalities Sustainable agriculture will give equal weight to environmental, social and economic concerns thus helps to reduce inequalities.	28 (140)	19 (76)	35 (105)	27 (54)	23 (23)	398
SDG 11 – Sustainable cities and Communities Sustainable Agriculture enhance sustainable human settlement planning and Sustainable Management	12 (60)	27 (108)	22 (66)	30 (60)	41 (41)	335
SDG 12 – Responsible Consumption and Production Sustainable Agriculture prevents the exploitation of soil, Water and other resources.	41 (205)	29 (116)	27 (81)	14 (28)	21 (21)	451
SDG 13 - Climate Action Climate start agriculture helps to guide actions to transform agri-food systems towards green and	45 (225)	27 (108)	30 (90)	14 (28)	16 (16)	467

climate resilient practices						
SDG 14 – Life below Water Sustainable Agriculture prevents water contamination and manages water resources.	32 (160)	14 (56)	35 (105)	29 (58)	22 (22)	401
SDG 15 – Life on Land Sustainable Agriculture will induce Eco-citizenship	42 (210)	34 (136)	29 (87)	12 (24)	15 (15)	472
SDG 16 – Peace, justice and strong institutions Sustainable Agriculture enables citizens to defend their land and resource rights and to engage in environmental advocacy in a nonviolent manner and without fear of intimidation or reprisal	18 (90)	17 (68)	22 (66)	35 (70)	40 (40)	334
SDG 17 – Partnerships for the goals Sustainable Agriculture goals can be achieved with partnership with public sectors, NGO and financial institutions.	8 (40)	12 (48)	26 (78)	48 (96)	38 (38)	300

(SA – Strongly Agree, A – Agree, N –Neutral, D-Disagree, SD – Strongly Disagree, WAS – Weighted Average Score)

Table 1.2

"Sustainable Agriculture is a Stimulator to Stretch out Sustainable Development Goals"- Weighted Average Score from Farmers Perspective.

S. No	Goals	Weighted Average	Mean	Rank
1	No Poverty	511	3.87	II
2	Zero Hunger	571	4.33	I
3	Good Health and Well being	490	3.71	III
4	Quality Education	415	3.14	IX
5	Gender Equality	321	2.43	XVI
6	Clean Water and Sanitation	443	3.37	VII
7	Affordable and Clean Energy	386	2.92	XII
8	Decent Work and Economic Growth	438	3.32	VIII
9	Industry, Innovation and Infrastructure	307	2.33	XIII
10	Reduced Inequalities	398	3.02	XI
11	Sustainable cities and Communities	345	2.61	XIV
12	Responsible Consumption and Production	451	3.42	VI
13	Climate Action	467	3.54	V
14	Life below Water	401	3.04	X
15	Life on Land	472	3.57	IV
16	Peace, justice and Strong institutions	334	2.53	XV
17	Partnerships for the goals	300	2.27	XVII

Source: Field Data
Neutral Score (132*3= 396)

Table 1.2 indicates that the sustainable goal "Zero Hunger" has more weighted average score than other goals. This clearly states that goal zero hunger has high correlation with sustainable

agriculture. The possible reason for this may be the food which is necessity for the anyone's survival and farmers were the responsible producers to satisfy the basic need of humans. Moreover, Farmers attitude correlates well with our famous Tamil poet Bharathiyar words "Thani oru manithanuku unavillai ennil, Jagaahinai Azhithiduvom" which means if a single person does not have food, then we will destroy this whole world where jagam has two meanings, world and farms respectively. The goal "No Poverty" has second highest weighted average score as agriculture is a prominent force in reducing poverty followed by the third highest weighted average score "Good Health and well being" which stress us that food is medicine. The fourth highest weighted average score was given to "Life on Land" which indicates soil is the most important resource in agriculture without which soil from toil in agriculture is impossible. The fifth score was given to "Climate action" which stresses that partnership with climate leads to a profitable venture. The sixth weighted average score was given to "Responsible consumption and Production". The seventh weighted average score was given to "Clean water and sanitation". The eighth weighted average score was given to "Decent work and economic growth". The neutral score was given to "Quality education" which shows traditional farm tools and education as a powerful tool act as a two side of the same coin in agriculture. "Life below water" and "Reduced inequalities" scored tenth and eleventh weighted average score respectively. All those above Sustainable Development goals are higher than the neutral score, thus having high correlation with sustainable agriculture. But the score is given to the "Affordable and clean energy", "Industry, Innovation and Infrastructure", "Sustainable cities and communities", "Peace, justice and strong institutions", "Gender equality", "Partnerships for the goals" are less than the neutral score which may be the reason that farmers were conventional and self determined.

Figure 1

Sustainable Agriculture association with Sustainable Development Goals.

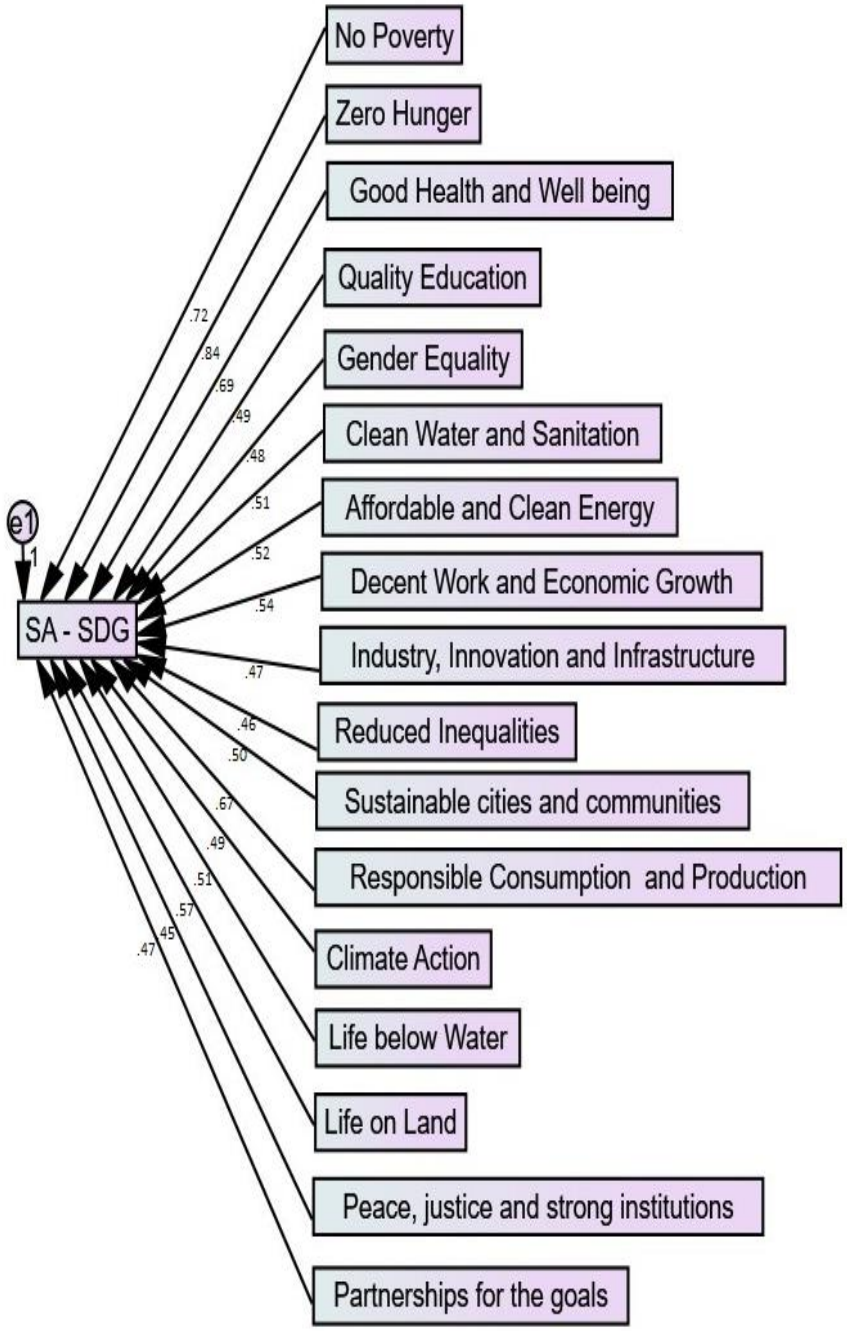

Table 1.3

Standardized Estimates for the relationship between sustainable Agriculture and Sustainable Development Goals on the basis of farmers opinion

Dependent Variable		Independent Variable	Standardized Estimate	Sig. (p – Value)	Result (H_1 Accepted / Rejected)
Opinion	←	No Poverty	0.72***	.000	Accepted
Opinion	←	Zero Hunger	0.84***	.000	Accepted
Opinion	←	Good Health and Well being	0.69***	.000	Accepted
Opinion	←	Quality Education	0.49***	.041	Accepted
Opinion	←	Gender Equality	0.48***	.052	Accepted
Opinion	←	Clean Water and Sanitation	0.51***	.020	Accepted
Opinion	←	Affordable and Clean Energy	0.52***	.002	Accepted
Opinion	←	Decent Work and Economic Growth	0.54***	.032	Accepted
Opinion	←	Industry, Innovation and Infrastructure	0.47***	.048	Accepted
Opinion	←	Reduced Inequalities	0.46***	.022	Accepted
Opinion	←	Sustainable cities and communities	0.50***	.038	Accepted
Opinion	←	Responsible Consumption and Production	0.67***	.000	Accepted
Opinion	←	Climate Action	0.49***	.000	Accepted
Opinion	←	Life below Water	0.51***	.002	Accepted
Opinion	←	Life on Land	0.57***	.000	Accepted
Opinion	←	Peace, justice and strong institutions	0.45***	.010	Accepted
Opinion	←	Partnerships for the goals	0.47***	.023	Accepted

***Significant at 0.05 Level

The standardized regression estimates of opinion about sustainable agriculture linkage with sustainable development goals are shown in Table 1.3 that Zero hunger (0.84. $p = 0.000$) is found to deep connection with the sustainable agriculture and totally six SDGs goals are highly linkage with the sustainable development goals. The path weights explicit that all the seventeen Goals are significant at $p < 0.05$. Hence the hypothesis Ha, the sustainable agriculture is positively influence the Sustainable Development Goals.

Table 1.4

Model Summary-Influence of Sustainable Agriculture with sustainable development goals from farmers opinion

Model	R	R square	Adjusted R Square	Std.Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df 2	Sig.F Change
1	.955[a]	.913	.900	.123	.913	70.075	17	114	.000

a. Predictors: (Constant), Partnerships for the goals, Zero Hunger, Clean Water and Sanitation, Industry, Innovation and Infrastructure, Good Health and Well being, Quality Education, Sustainable cities and communities, Affordable and Clean Energy, Gender Equality, Decent Work and Economic Growth, Life on Land, Climate Action, Life below Water, Peace, justice and strong institutions, No Poverty, Responsible Consumption and Production, Reduced Inequalities
b. Dependent Variable: SA – SDG

Table 1.4 reveals that R value was 0.955. It measures the degree of relationship between the sustainable agriculture and the sustainable development goals (17 Goals). R Square value was 0.913. It means that about 91% of the deviation in sustainable agriculture is analyzed by seventeen independent SDGs. Adjusted R-Squared value was 0.900. It adjusts the statistic based on the number of independent variables in the model. It shows the fitted model is good. Durbin – Watson (DW) statistic shows 1.143. It indicates no auto correction in the analysis. F value was 70.075 and p value was significant at 95% level. Hence there is significant relationship between the dependent and independent variables.

Findings

1. Farmers opinion towards sustainable Agriculture in association with Sustainable Development Goals

The Farmers opined that all the seventeen Sustainable Development Goals linked with agriculture but the level of correlation varies from high to low (0.84 to 0.45).

2. Correlation of Sustainable agriculture with Sustainable development goals

The goal Zero Hunger have high correlation with Sustainable agriculture ($0.75 \geq$ Standardized estimate). Goals like No poverty, Good health and wellbeing, Life on land, Climate action, Responsible production and consumption, Clean water and sanitation, Decent work, Economic growth, Quality Education and Life below water have moderate correlation with sustainable agriculture ($0.75 \leq 0.5$) respectively. SDG's like Reduced inequalities, Affordable and clean energy, Industry, Innovation and Infrastructure, Sustainable cities and communities, Peace, justice and Strong Institutions , Gender Equality and partnership for goals have low correlation with Sustainable Agriculture ($0.5\leq$ Standardized estimate) respectively.

Influence between Sustainable Agriculture with Sustainable Developments Goals.

The prediction model is statistically significant with $F=70.075$, $p<0.001$. Further, it accounts for 95% of the variance on the influence of Sustainable Agriculture with Sustainable Development Goals.

Suggestions

The following suggestions are emanated from the findings of the study.

SDG 5: Gender Equality

- Monitory support can be given to women farmers in order to encourage them to enter in the field of agriculture.

SDG 7: Affordable and Clean Energy

- Awareness related to crop residue management utilization of agriculture wastages in the construction can support renewable source of energy.

SDG 9: Industry, Innovation and Industry Infrastructure

- Engagement of youth leads to innovation in Agri entrepreneurship. Thus, it can extend helping hands to farmers.
- Subsidy can be provided on Green House farming that can lead a profitable farming and can cope up with unfavourable weather.

SDG 11: Sustainable cities and communities

- Encouragement of urban agriculture will help to promote sustainable cities and commodities and helps to promote the sense of responsibility to people other than farmers.

SDG 17: Partnership for the Goals

- More Training and Education can be given to farmers about Sustainable Agricultural Pratices.
- The Government can build the partnership with farmers to create the common market for the agriculture products.

Conclusion

This study ensures that if farmers Practices sustainable agriculture then the sustainable development goals can be achieved automatically. Thus, Sustainable agriculture is acting as a stimulator to stretch out Sustainable Development goals. It is not only a responsibility of the farmers but also the responsibility for every citizen to protect our mother Earth and to inherent the social responsibility. If the urgent call of sustainability is not answered then it will be difficult to live and thrive. Let us stand together to create a sustainable future so that we can leave no one behind.

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