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RESEARCH ARTICLE Bhartiya Krishi Anusandhan Patrika

Towards Sustainable Agriculture: Evaluating the Feasibility and Perception of Natural Farming in Vizianagaram District of Andhra Pradesh, India

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10.18805/BKAP664

ABSTRACT

Background: The Indian agricultural industry has faced numerous challenges, including heavy reliance on chemical inputs, declining soil quality, rising cultivation costs and farmer distress. Natural farming, which emphasizes organic and agroecological practices, has emerged as a viable alternative to address these issues and promote environmental and economic sustainability. This research article explores the potential of natural farming as a pathway to sustainable agriculture in India.

Methods: The study focuses on the state of Andhra Pradesh, specifically in the Vizianagaram district, where the adoption of Zero Budget Natural Farming (ZBNF) has been significant. A comprehensive economic analysis is conducted, comparing natural farming with conventional farming methods. Primary data is collected through surveys and interviews with farmers practicing natural farming and conventional farming methods.

Result: The results highlight the perception and attitudes of farmers towards natural farming. While both Natural Farmers and Conventional Farmers acknowledge the feasibility and benefits of natural farming, they differ in their views on complexity, scalability, input preparation and the challenges of acquiring and maintaining Desi cows. Based on the findings, policy recommendations are provided to promote and support the adoption and expansion of natural farming practices. These recommendations include awareness and education campaigns, training and capacity building, financial support, research and development initiatives, collaboration and networking, policy integration, market support and monitoring and evaluation mechanisms.

Key words: Agroecological practice, Conventional farming, Natural farming, Sustainable agriculture, Traditional farming.

INTRODUCTION

Since ancient times, the agricultural industry has been crucial to the nation's economic growth and has helped to shape its identity. Agriculture has always been a key component of the Indian economy. Currently, the agriculture industry provides a living for more than 50% of the country's inhabitants. According to Economic Survey-2020-21, the agricultural industry would contribute 18.8% of the country's Gross Value Added (GAV) in 2020-21, up from roughly 16.8% in 2010-11. Indian agriculture has advanced to the point that it has started both exporting food grains abroad and reducing the nation's reliance on foreign sources of food grains. According to this sequence, commercial farming in India replaced subsistence farming in the agricultural sector (Tripathi, 2018).

To increase food production, the nation followed the Green Revolution paradigm in the 1960s. This strategy required a lot of input and chemicals and it was heavily focused on creating new varieties of seeds and fertilizers (Rena, 2004). In order to enhance food production, this also led to more irrigation infrastructure. The Green Revolution in India significantly increased self-reliance and provided a solid foundation for food security. But since the Green Revolution, Indian agriculture has become incredibly dependent on imported, privatized inputs like pesticides and artificial fertilizers (Gupta, 2020). This resulted in sustainability issues and had a negative impact on natural resources, such as declining soil quality, water scarcity, biodiversity loss and worries about human and animal health (Kumar, 2021). Unexpected consequences such as loss of soil fertility, merciless use of chemical fertilizers and excessive water use were caused by careless use of privatized agriculture inputs. Suri (2006) all of this led to rising cultivation costs, falling farm product prices, and eventually smaller land holdings, all of which had a significant negative impact on the Indian agriculture industry.

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How to cite this article: Kumar, C.P. (2023). Towards Sustainable Agriculture: Evaluating the Feasibility and Perception of Natural Farming in Vizianagaram District of Andhra Pradesh, India. Bhartiya Krishi Anusandhan Patrika. DOI: 10.18805/BKAP664

Submitted: 14-07-2023 **Accepted:** 31-10-2023 **Online:** 08-12-2023

The Indian agricultural industry is currently experiencing an existential, economic and ecological crisis. The National Crime Record Bureau estimates that 0.29 million farmers killed themselves between 2000 and 2018. One of the key factors contributing to farmer suicide in this nation is debt. According to the 2013 National Sample poll Organization (NSSO) poll, 52% of farm households nationwide were in debt. Farm earnings and non-farm incomes differ significantly from one another. The price of farming products has increased significantly while the expense of cultivation has increased much more. Similar to this, they end themselves in debt since their expenses exceed their income. However, climatic crises like harsh weather conditions worsened crop losses and made the already precarious situation of farmers much worse.

These negative effects on the agricultural industry led to a global quest for sustainable agriculture alternatives to address issues including the extensive use of chemical fertilizers and pesticides, high production costs, poor returns, and climate change. There are a number of agro-ecological practices, such as organic farming, agroforestry, the System of Rice Intensification, and natural farming, among others. However, natural farming is distinct because it: a) discourages the use of any synthetic pesticides or fertilizers; b) uses only locally available natural inputs and c) preserves the soil's fertility while yielding abundant, nutrient-dense food. According to several researchers, using natural farming methods is similar to using conventional farming methods in this situation.

Meaning and definitions of natural farming

There have been several definitions of natural farming in recent years. Regarding holistic agroecological practices, the validity of these concepts differs depending on the authors and organizations. One thing unites all of these definitions: they all emphasize the need to advance sustainable agriculture.

The Union Government has urged every stakeholder to support a significant mass movement for chemical-free agriculture. In her budget address at the time, the then-Union Finance Minister emphasised the value and necessity of "going back to the roots" farming. Later, the NITI Aayog backed the development of natural farming and urged that other states implement the ZBNF across the nation. The Ministry of Agriculture and Farmers Welfare is focusing more and more on natural agricultural methods. And the Ministry had defined the natural farming on the 10th December, 2019 as follows:

"Zero Budget Natural Farming (ZBNF) is a chemical free natural farming system wherein use of low-cost inputs (cow dung/urine and plant extract based) coupled with recommended agronomic practices like mulching, intercropping is promoted. Organic farming promotes all kinds of chemical free farming systems including ZBNF that benefits soil, environmental and human health".

The NITI Aayog is collaborating with the Ministry of Agriculture and Farmers Welfare to exchange information on potential barriers to the adoption of natural farming in different Indian states. The NITI Aayog started taking action to advance natural farming, including gathering empirical facts and scientific validations for scaling up natural farming in India for the development of sustainable agriculture.

"Natural Farming is a chemical-free alias traditional farming method. It is considered as agro-ecology based diversified farming system which integrates crops, trees and livestock with functional biodiversity".

In his book "The One-Straw Revolutions" (1975), Japanese philosopher Masanobu Fukuoka introduced Natural Farming as an agro-ecological method. The following is how Fukuoka (1985), explained natural farming in his own words.

"Natural farming is a Buddhist way of farming that originates in the philosophy of nothingness, and returns to a "do-nothing" nature." This method of "do-nothing" farming is based on four major principles:

1. No cultivation
2. No fertilizer
3. No weeding
4. No pesticides

The Andhra Pradesh government founded Rythu Sadhikara Samstha (RySS), a non-profit organization, in 2013. This organization started the state-wide Natural Farming project. Prior to being renamed Andhra Pradesh Community Managed Natural Farming (APCNF), this scheme was known as A. P. Zero Budget Natural Farming. Numerous case studies are taken on by this organization and research is being done in this area. RySS defined the natural farming as follows

"'Zero-Budget' Natural Farming (ZBNF) is a holistic agroecological alternative to high-cost chemical inputs-based agriculture that addresses the impacts of climate change, reduces input costs and creates sustainable farming livelihoods in ways that are rooted both in science and Indian tradition".

The concept of organic farming was established by the General Assembly of the International Federation of Organic Agriculture Movements (IFOAM). The agroecological practices, such Natural Farming, are reflected in this term. Here is the definition.

"Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved".

Origin of natural farming

For a civilization based on agriculture like India, agro-ecological practices are nothing new. But the scientific community has known since the 1920s that this practice was part of the grassroots social movement of family farmers for the establishment of sustainable agriculture and global economies. Natural farming is a traditional alternative to the

present chemical farming techniques with high cultivation costs. The natural farming approach has historically been referred to as traditional agriculture or agroecology in various regions of the world (Kumar, 2022). Beyond the farm field, natural farming has grown in popularity in recent years. This strategy, which targets the agricultural system, strives to discover the underlying causes of issues and offer comprehensive, long-term solutions to overcome the agrarian crisis.

Masanobu Fukuoka, a Japanese scientist, developed natural farming by eschewing contemporary agricultural methods. He promoted natural farming as a philosophy in his book, "The One Straw Revolution: An Introduction to Natural Farming," which is about seeing oneself as an integral part of nature. The "Fukuoka Method," "the natural way of farming," or "do-nothing farming" are common names for it. While this farming method makes an attempt, it rejects artificial agricultural inputs.

From 2002 to 2015, ZBNF began as a social movement in India. The movement was first started in Karnataka and soon spread to other Indian states, notably those in the south (Khadse *et al*., 2019). As of right now, Andhra Pradesh is in charge of state-led initiatives to expand ZBNF throughout the state. It's interesting to note that the ZBNF techniques were developed and became popular in recent years as a result of farmers who are heavily in debt owing to the high costs of seeds, herbicides, fertilizers, and other inputs. The ZBNF farming practices, which dramatically lowers production costs, promises to relieve the tremendous debt load that farmers now experience (HLPE, 2019).

Natural Farming in the Way of Sustainable Agriculture in India

The Sustainable Development Goals (SDGs), established by the United Nations, have been embraced by all of its members. According to Suresh (2019), the SDGs place a strong emphasis on using agricultural techniques that provide higher yields while causing the least amount of environmental harm. Environmental, social, and economic goals are the three fundamental objectives of sustainable agriculture, a farming technique based on ecological principles. An agroecological farming method known as sustainable agriculture uses ecological principles and practices to maintain an agricultural system that is both economically and environmentally sound.

The self-sufficiency of food grains has long been a priority for the Indian government, who does not place much emphasis on the sustainability of agriculture. Agriculture productivity and output rose throughout the 1970s and 1980s, but later growth slowed down in the 1990s (Janaiah, A., et al., 2006). Since 2000, there has been a decline in agricultural productivity growth and production. This decrease in the agricultural industry poses a significant threat to environmental sustainability, human livelihood, and food security. India must now implement a sustainable agricultural growth strategy. In India, Non-Governmental Organizations (NGO) and other middle-class activists have historically spearheaded the sustainable agriculture movement rather than peasant movements (Khadse *et al*., 2019).

Objective of the study

The overall goal of this research is to contribute to the understanding and promotion of sustainable agricultural practices, specifically natural farming, as a means to address the challenges faced by the Indian agricultural industry and promote environmental and economic sustainability. To examine how conventional and natural farmers comprehend natural farming methods, particularly how they view the viability, complexity, scalability, difficulty of preparing inputs, and difficulties in acquiring and maintaining Desi cows. to evaluate farmers' attitudes towards natural farming, including their perceptions of its viability, complexity, scalability and the difficulties involved in the processing of inputs and the upkeep of Desi Cows. In order to encourage and support the adoption and expansion of natural farming practices in India, policy suggestions should be made to the national and state governments, as well as non-governmental organizations. These suggestions can include public relations efforts, educational activities, funding, market assistance, research and development projects and policy integration.

MATERIALS AND METHODS

The research study focuses on conducting a comprehensive economic analysis of natural farming and conventional farming methods in the state of Andhra Pradesh, particularly in the Vizianagaram district. The district is economically disadvantaged, with a majority of the population depending on agriculture and it has shown high adoption of Zero Budget Natural Farming (ZBNF) according to RySS (2019-2020). The study collects both primary and secondary data, including information from various government sources and surveys conducted at the mandal (administrative division) and village levels. A structured schedule is used to collect primary data from sample households practicing natural farming and conventional farming methods. The study covers two sample mandals, each representing the highest (Garividi) and lowest (Merakamudidam) adoption of natural farming (Fig 1). Two villages are selected from each mandal, and a total of 240 sample households are included in the study. Following was a survey using a Likert scale with 200 farmers from two mandals in the Vizianagaram district to examine the aforementioned difficulties. 100 from the Merakamudidam mandals and the remaining 100 from Garividi. Study adopting a Likert scale poll revealed that farmers value both natural and traditional agriculture. The perception of the farmers was determined through the Likert scale questionnaire.

RESULTS AND DISCUSSION

Table 1 presents the perception of two groups of farmers, namely "Natural Farmers" and "Conventional Farmers,"

regarding various aspects of natural farming. The table includes five statements, and for each statement, it shows the number and percentage of farmers who strongly agree, agree, are neutral, disagree, or strongly disagree. The numbers in parentheses represent the corresponding percentages.

Feasibility of natural farming

A higher percentage of Natural Farmers (80%) believe that natural farming is feasible in the present situation, with 35% strongly agreeing and 45% agreeing. Among Conventional Farmers, 35% strongly agree and 21.67% agree that natural farming is feasible. However, a larger percentage of Conventional Farmers (30%) are either neutral, disagree, or strongly disagree with this statement.

Complexity and difficulty of natural farming

A majority of natural farmers (66.67%) disagree or strongly disagree that natural farming is complex to adopt and difficult to practice. Only 5% agree and 20% are neutral. In contrast, among conventional farmers, 68.33% agree or strongly agree that natural farming is complex and difficult, with 58.33% strongly disagreeing. Only 5% of Conventional Farmers strongly disagree.

Scalability of natural farming

About 58.33% of Natural Farmers believe that natural farming is possible on a large scale, with 26.66% strongly agreeing and 31.67% agreeing. A significant portion (33.34%) of natural farmers either disagree, strongly disagree, or are neutral on this statement. Among Conventional Farmers, 75% believe in the scalability of natural farming, with 31.67% strongly agreeing and 43.33% agreeing. Only 6.67% disagree with this statement.

Difficulty of input preparation

Among natural farmers, opinions are more varied. While 38.33% agree or strongly agree that the preparation of natural farming inputs is difficult, 36.67% disagree or strongly disagree and 21.67% are neutral. About 66.67% of conventional farmers agree or strongly agree that input preparation is difficult, while 15% disagree or strongly disagree. 10% of Conventional Farmers are neutral.

Challenges in purchasing and maintaining desi cow

Around 70% of Natural Farmers find it difficult to purchase and maintain Desi Cows, with 31.67% strongly agreeing and 38.33% agreeing. Only 8.33% strongly disagree with this statement. Among Conventional Farmers, 60% agree or strongly agree that purchasing and maintaining desi cows is difficult, with 36.67% strongly agreeing. 16.67% of conventional farmers disagree or strongly disagree.

A significant proportion of both Natural Farmers and Conventional Farmers agree or strongly agree that natural farming is feasible in the present situation. However, natural farmers exhibit a higher level of agreement compared to conventional farmers. The perception regarding the complexity and difficulty of adopting natural farming practices differs between the two groups. Natural farmers generally disagree or strongly disagree that natural farming is complex and difficult to practice, whereas a considerable number of Conventional Farmers agree or strongly agree with this statement. Both groups show a positive perception of the possibility of implementing natural farming on a large scale. However, natural farmers tend to exhibit higher levels of agreement on this aspect compared to conventional farmers. Both groups acknowledge that the preparation of natural

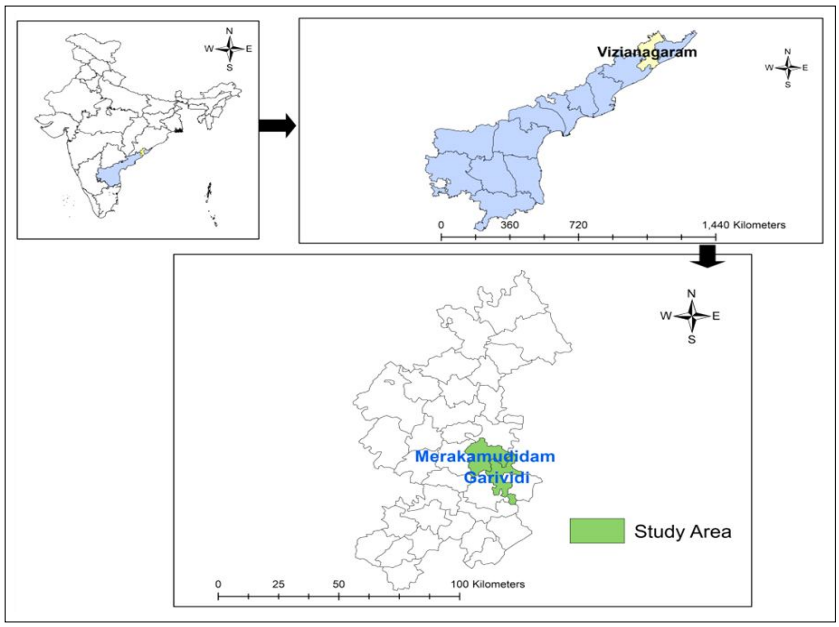

Fig 1: Study area.

Table 1: Perception of sample farmers about natural farming.

Natural farmers	Merakamudidam (60)					Garividi (60)				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Agree	Strongly Agree	Neutral	Disagree	Strongly disagree
Natural farming is feasible in present situation	21 (35.00)	27 (45.00)	12 (20.00)	0 (0.00)	0 (0.00)	15 (25.00)	26 (43.33)	19 (31.67)	0 (0.00)	0 (0.00)
Natural farming is complex to adopt and difficult to practice	0 (0.00)	3 (5.00)	12 (20.00)	10 (16.67)	35 (58.33)	3 (5.00)	9 (15.00)	15 (25.00)	11 (18.33)	22 (36.67)
Natural farming is possible in on large scale	16 (26.66)	19 (31.67)	7 (12.34)	13 (21.00)	5 (8.33)	12 (20.00)	25 (41.67)	15 (25.00)	5 (8.33)	3 (5.00)
Preparation of natural farming inputs are difficult	9 (15.00)	14 (23.33)	13 (21.67)	7 (11.67)	17 (28.33)	11 (18.33)	18 (30.00)	15 (25.00)	12 (20.00)	4 (6.67)
Purchase and maintenance of desi cow is difficult	19 (31.67)	23 (38.33)	8 (13.33)	7 (11.67)	3 (5.00)	14 (23.33)	21 (35.00)	13 (21.67)	7 (11.67)	5 (8.33)
Conventional Farmer										
Natural farming is feasible to in present situation	8 (13.33)	13 (21.67)	21 (35.00)	11 (18.33)	7 (11.67)	7 (11.67)	5 (8.33)	11 (18.33)	22 (36.67)	15 (22.00)
Natural farming is complex to adopt and difficult to practice	17 (28.33)	24 (40.00)	9 (15.00)	6 (10.00)	7 (11.67)	3 (5.00)	14 (23.33)	21 (35.00)	17 (28.34)	5 (8.33)
Natural farming is possible in on large scale	19 (31.67)	26 (43.33)	11 (18.33)	4 (6.67)	0 (0.00)	0 (0.00)	21 (35.00)	27 (45.00)	7 (11.67)	5 (8.33)
Preparation of natural farming inputs are difficult	23 (38.33)	17 (28.33)	9 (15.00)	4 (6.67)	7 (11.67)	6 (10.00)	27 (45.00)	23 (38.33)	4 (6.67)	0 (0.00)
Purchase and maintenance of desi cow is difficult	22 (36.67)	14 (23.33)	17 (28.33)	3 (5.00)	4 (6.67)	4 (6.66)	16 (26.67)	24 (40.00)	10 (16.67)	6 (10.00)

Source: Primary data.

Parentheses are percentages.

farming inputs can be challenging. However, the perception of Natural Farmers is more divided, with a notable percentage of farmers being neutral, while conventional farmers show higher levels of agreement. Both groups recognize the difficulties associated with purchasing and maintaining Desi cows, although the perception is more pronounced among natural farmers. This may be attributed to the fact that Desi cows are often considered integral to natural farming practices.

While natural farmers and conventional farmers have different perspectives on a variety of aspects of natural farming, both groups generally acknowledge its viability and acknowledge some of its challenges, such as the preparation of inputs and purchasing and maintaining of Desi cows. These revelations emphasize the need for more research and assistance to solve these issues and encourage the use of natural agricultural methods.

Policy recommendations

Central and State Governments and other non-governmental Organizations may resolve issues raised by farmers, encourage sustainable agricultural practices for the benefit of both farmers and the environment, and create an atmosphere that is conducive to the adoption and spread of natural farming practices.

1. **Awareness and education:** Develop and implement awareness campaigns and educational programs to provide information about the benefits, feasibility and practices of natural farming. This will help address misconceptions and build trust among both natural farmers and conventional farmers.
2. **Training and capacity building:** Offer training programs and workshops on natural farming techniques, including the preparation of inputs, for both natural farmers and conventional farmers. This will equip farmers with the necessary knowledge and skills to adopt and practice natural farming effectively.
3. **Financial support:** Provide financial support and incentives to encourage farmers to transition to natural farming methods. This can include subsidies for purchasing organic inputs, promoting the maintenance of desi cows, and investing in infrastructure for natural farming practices.
4. **Research and development:** Allocate resources to support research and development in natural farming, focusing on the development of locally suitable techniques, inputs and crop varieties. This will contribute to the refinement and adaptation of natural farming practices to the specific agricultural contexts of different regions.
5. **Collaboration and networking:** Foster collaboration and networking among natural farmers, Conventional Farmers, agricultural experts and relevant stakeholders. This can be achieved through the establishment of farmer cooperatives, knowledge-sharing platforms and exchange programs to facilitate learning, experiences and best practices in natural farming.
6. **Policy integration:** Integrate natural farming practices into agricultural policies and programs at the regional and national levels. This can include incorporating organic farming targets, setting standards for organic certification, and creating supportive regulatory frameworks that facilitate the adoption and scaling up of natural farming methods.
7. **Market support:** Develop and strengthen market linkages and value chains for natural farming produce. Promote organic certifications and facilitate access to markets that value and reward natural farming practices. This will provide farmers with better market opportunities and incentives for adopting natural farming.
8. **Monitoring and evaluation:** Establish monitoring and evaluation mechanisms to assess the impact of policies and programs related to natural farming. Regularly review and update these policies based on feedback from farmers, experts and outcomes achieved. This will ensure continuous improvement and effective implementation of natural farming initiatives.

CONCLUSION

This study emphasizes how important natural farming is in guiding Indian agriculture towards sustainability, especially Z ZBNF. Deeply exploring the perspectives of Natural Farmers and Conventional Farmers in the Vizianagaram district, the study reveals complicated opinions regarding viability, intricacy, scalability, input preparation, and the difficulties involved in obtaining and caring for Desi cows. Both parties recognize the feasibility of natural farming, although having different points of view, which highlights the need for focused interventions. The policy proposals presented here are intended to raise awareness, support markets, integrate policies, stimulate research, offer financial support, offer training and create strong monitoring procedures. This study adds insightful information to the conversation about sustainable agriculture and provides stakeholders and policymakers with practical suggestions for expanding the use of natural farming methods in India.

Funding

This research received no external funding.

Data availability statement

Data is contained within the article.

Institutional review board statement

Not applicable.

Informed consent statement

Not applicable.

Conflict of interest

The authors declare that they have no conflict of interest regarding the publication of this paper.

REFERENCES

Andhra Pradesh Community Managed Natural Farming, Rythu Sadhikara Samstha, Department of Agriculture, Govt of Andhra Pradesh. https://apcnf.in/.

Fukuoka, M. (1985). The Natural Way of Farming. Tokyo: Japan Publications.

Gupta, N., Tripathi, S. and Dholakia, H.H. (2020). Can zero budget natural farming save input costs and fertiliser subsidies? Report. The Council on Energy, Environment and Water. 1-30.

HLPE (2019). Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome, 42.

Janaiah, A., Hossain, M., and Otsuka, K. (2006). Productivity impact of the modern varieties of rice in India. The Developing Economies. 44(2): 190-207.

Khadse, A. and Rosset, P.M. (2019). Zero Budget Natural Farming in India-from inception to institutionalization. Agroecology and Sustainable Food Systems. 43(7-8): 848-871.

Kumar, C.P. (2021). Trends and status of zero budget natural farming in Andhra Pradesh, ZBNF impact in District of Visakhapatnam. Ind. J. Pure App. Biosci. 9(4): 54-60.

Kumar, C.P. (2022). Sustainable agriculture in India-Natural farming spreads roots in Andhra Pradesh. Humanities. 10(2): 16-21.

NITI Ayog, Government of India, Web: https://www.niti.gov.in/natural-farming-niti-initiative.

Rena, R. (2004). Green revolution: Indian agricultural experience-A paradigm for Eritrea. Eritrean Studies Review. 4(1): 103-130.

Suri, K.C. (2006). Political economy of agrarian distress. Economic and Political Weekly. 1523-1529.

Suresh, K. (2019). Can current Indian health system achieve health related SDG's. Open Journal of Pediatrics and Child Health. 4(1): 13-30.

Tripathi, S., Shahidi, T., Nagbhushan, S. and Gupta, N. (2018). Zero budget natural farming for the sustainable development goals. Council on Energy, Environment and Water, New Delhi, India.