International Journal of Trade and Commerce-IIARTC
January-June 2024, Volume 13, No. 1, pp. 113-121
ISSN-2277-5811 (Print), 2278-9065 (Online)

COSMOS (Germany) JIF: 5.135; ISRA JIF: 7.249; ISI JIF: 3.721

Sustainable Agriculture in India: Issues and Challenges Ahead

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Abstract

In India, agriculture sector contributes about 20.02% of the country's GDP (2020-21). Much diversity is found in Indian agriculture such as cropping, climate, irrigation pattern etc. There are many opportunities to take advantages of these diversities to meet the sustainable needs of the population. Sustainable agriculture is the way of farming according to location specific ecosystem and study of relationships between the organism and their environment. The Liberalization, Privatization and Globalization (LPG) model adopted in 1991 has adversely affected the agriculture in India. The viability of the agriculture should be enhanced which could significantly improve the growth prospects of the economy. The agricultural production in India is also adversely affected by the climate change due to global warming. India has attained self-reliance in food grains production but the future demand for food grain and raw material will not be satisfied from the current agriculture production. Increased demand and low production will create the burden on the agricultural production and will give rise to food inflation in India. The agricultural productivity and the income of the small and marginal farmers have declined. These problems can be overcome with the help of sustainable agricultural development.

Key Words: *Sustainable agriculture, Global warming, Economic viability, Social equity.*

PAPER/ARTICLE INFO
RECEIVED ON: 27/03/2024
ACCEPTED ON: 30/04/2024

Reference to this paper should be made as follows:

Vats, Dhananjay (2024), "Sustainable Agriculture in India: Issues and Challenges Ahead", *Int. J. of Trade and Commerce-IIARTC*, Vol. 13, No. 1, pp: 113-121.

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DOI: 10.46333/ijtc/13/1/6

1. INTRODUCTION

In India, agriculture is the major occupation practiced by the peoples for earning their livelihood. Agricultural sector contributes about 20.02% of the country's GDP (2020-21). Several steps have been taken by the government for the sustainable development of agriculture. Observing the importance of agriculture in India. The Hon'ble Prime Minister Mr. Narendra Modi (2015) renamed the Ministry of agriculture as the Ministry of Agriculture and Farmers Welfare. The Government of India is regularly putting some efforts to improve the condition of agriculture. To improve the fertility of soil on sustainable basis, the Government of India launched various schemes i.e. Soil Health Card Scheme under Rashtriya Krishi Vikas Yojna (RKVY) for Soil Testing and Soil Heath, Pradhan Mantri Krishi Sinchayi Yojna (PMKSY) with slogan " Har Khetko Pani" for increasing the access to irrigation and water efficiency, Paramprgat Krishi Vikas Yojna (PKVY) for supporting organic farming and Pradhan Mantri Fasal Bima Yojna (PMFBY) for minimizing the agriculture farming risk etc. (Source: www.agriculture.gov.in) Inorder to promote the economic and social equity, many sustainable agricultural practices have been adopted for economic profitability and balancing environmental health. This is the reason why both natural and human resources have been given the utmost importance. Sustainable agriculture aims to meet present food and resource needs without compromising the ability of future generations to meet their own needs. It involves practices that maintain soil health, conserve water, minimize pollution and promote biodiversity among other things. Sustainable agriculture strives for long term viability and resilience in food production system.

Agriculture has been an important sector in the economic contribution in India. The dependency has not decreased on agriculture but the proportionate contribution of agriculture in the GDP has declined since independence. Earlier, near about 75% (1947) of the population of the country was dependent on agriculture which declined to 58% (2009-10) and the contribution to the GDP declined to 20.2% (2000-21) from 58% (1950). India's population represents 16% of the world's total population but it has only about 2% of the world's total land area. Our national average is less than the world's available resources. This creates pressure on the agriculture. (Source: NABARD Annual Report, 2012-17) The present cropping intensity is 143.6% which grows more than 25% from last seventy-five years. The major source of irrigation is ground water which has been exhausted to its full and is hampering the growth of agriculture. In India these situations influence the productivity of agriculture negatively. So there is need for a permanent and long term solution of the existing challenges of agriculture, much diversity is found in Indian agriculture such as cropping, climate irrigation pattern etc. There are many opportunities to take advantages of theses diversities to meet the sustainable needs of the population. One such way is sustainable agriculture development.

2. OBJECTIVES OF THE STUDY

[i] To study challenges and issues related to sustainable agriculture in India.

[ii] To study the existing agricultural situation and challenges faced earlier related to sustainable agriculture in India.

[iii] To find out the future prospects and opportunities related to sustainable agriculture and suggest remedial measures for improvement in future.

3. SUSTAINABLE AGRICULTURE IN INDIA

Sustainable agriculture is the way of farming according to location specific eco-system and study of relationships between the organism and their environment. In simple terms, sustainable agriculture is indeed a form of farming aimed at meeting the needs of the present population without endangering the resource base of future generation. This approach emphasizing practices that promote environmental health, economic viability and social equity. In other words, the production of food, fiber and other allied products using the various techniques of farming protecting the environment, human communities, public health and welfare of animals.

4. CONTRIBUTION OF VARIOUS SECTORS IN GROSS DOMESTIC PRODUCT (GDP) OF INDIA

The progress in the agriculture in India has been quite low since the year 2000.It has been unsustainable in case of employment but was able to achieve satisfactory income. The contribution of agriculture to the GDP declined continuously. (Source: P. Balakrishnan) The population continued to depend on agriculture which leads the social and economic problems like poverty and unemployment. The table below shows the sectoral contribution in India's GDP from the year 2011 to 2023.

Table 1: Sectoral Contribution in India' GDP (2011-2021)

Years	Agriculture & Allied Sector (% of GDP)	Industry (% of GDP)	Service (% of GDP)
2011-12	14.37	28.22	57.42
2012-13	13.95	27.27	58.79
2013-14	13.94	26.13	59.93
2014-15	16.50	31.30	2.20
2015-16	15.40	31.60	53.00
2016-17	15.30	31.50	53.20
2017-18	14.80	31.00	54.20
2018-19	16.10	29.60	54.30
2019-20	18.40	26.70	55.00
2020-21	20.30	25.92	53.89
2021-22	19.00	28.25	50.00
2022-23	18.30	30.67	54.20

Source: Economic Survey of India, 2011-12 to 2022-23.

There are different trends of the three sectors in the GDP of the country. The agriculture has been continuously contributing in the GDP from 2011 to 2022.The New Economic Policy adopted in the year 1991 has adversely influenced the agriculture in India. This is very difficult to face the competition at the global level by the average Indian farmers. The increasing competition of the industrial and the service sector had also brought a downfall in the contribution of agriculture in the GDP of the country. Due to some important issues like lack of basic infrastructure development, low rate of investment, lack of employment opportunities, use of traditional technology, lack Knowledge of farming, less income, asymmetric market information and existing

global competition, the agriculture sector has lost the interest among the people. (NABARD Annual Report 2012 to 2017) In case of the marginal farmers, the rate of net profit had become negative although they hold 85% share in total farming. These hurdles collectively affected the Indian agriculture adversely and declined the share in the GDP of the country.

5. PRODUCTION OF FOOD GRAINS IN INDIA

To give more importance of natural resources and large scale production, Hon'ble Prime Minister Mr. Narendra Modi Ji gave a slogan "Per Drop More Crop". After the green revolution in India the availability of food grains has increased. According to the second Advanced Estimates for 2021-22, total food grains production in the country estimated at record 316.06 million tones which are higher by 5.32 million tones than 2020-21. But inversely India has upgraded its rank in global hunger index, India rank 111st out of 125 countries in 2023. (Source: www.globalhungerindex.org.). India is far behind from its neighboring countries like Nepal (69), Bangladesh (81), Sri Lanka (60) and Pakistan (102). To fulfill the needs of food grains for the fast growing population, more growth is necessary. The area under food grains production has decreased marginally. The average yield of agriculture has increased as productive capacity of agricultural sector has improved.

The following table and bar chart describes the production of food grains and land area under its production.

Table 2: Food Grains Area and Production in India (2011-12 to 2017-18)

Years	Area (million hectares)	Production (million tons)	Production per hectare (kg.)
2011-12	124.75	259.29	2078
2012-13	120.78	257.13	2129
2013-14	125.05	265.05	2120
2014-15	124.30	252.03	2028
2015-16	123.22	251.54	2041
2016-17	129.23	275.11	2129
2017-18	127.56	284.83	2233

Source: Directorate of Economics & Statistics DAC&FW

Graph 1: Food Grains Area and Production in India (2011-12 to 2017-18)

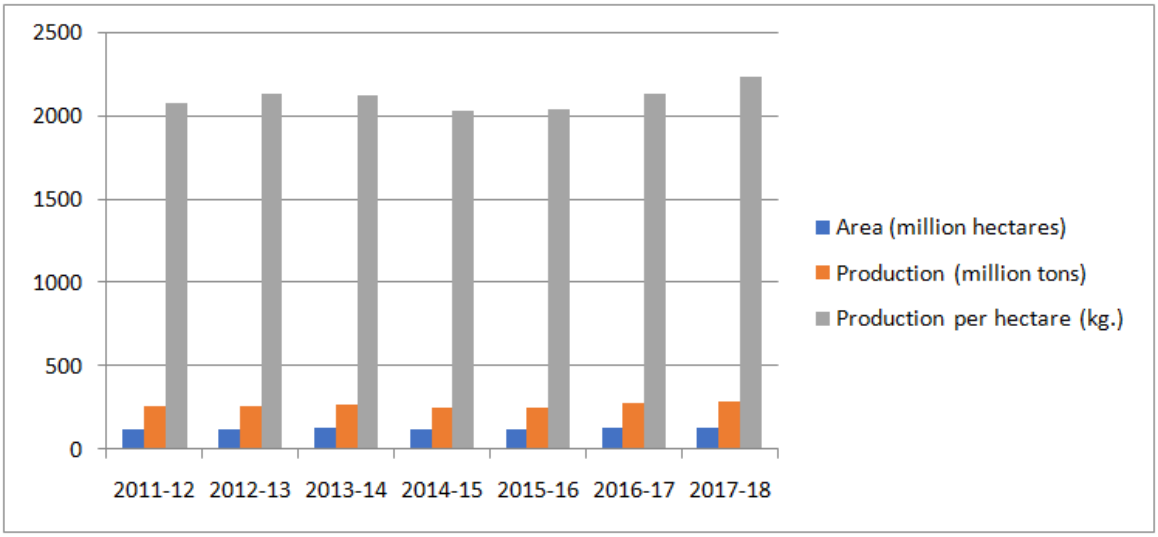

Table 3: Food Grains Area (million hectares) and Its Production in India (million tons), 2011-12 to 2020-21

Year	Food Grains Production (Million Tons)	Area under Food Grains Production (Million Hectares)
2011-12	259.28	124.75
2012-13	257.13	120.70
2013-14	265.04	126.04
2014-15	252.00	122.00
2015-16	251.60	123.21
2016-17	275.68	128.02
2017-18	277.50	129.20
2018-19	285.01	127.50
2019-20	297.50	127.00
2020-21	305.44	129.30

Source: Economic Survey from the years 2011 to 2021.

The food grain production is largely influenced by the first and second green revolution. The availability of food grains in the year 2001 was 196.87 million tones and continuously increased from the year 2015-16 onwards. The trend of the production of food grains became positive afterwards and increased gradually. According to the second advance estimates for the year 2021-22, the total production of food grains in the country is estimated at record 316.06 million tones which is higher than the production of food grains during the year 2020-21. The total land area under the food grain production in India by the end of the year 2021 was above 129 million hectares while it was 127 million hectares in the year 2020.

These data emphasize on the need of the expansion of the agricultural sector. Out of the total land holdings, 85 % of them constituted of small and marginal holdings which is biggest challenges in front of the Indian agriculture. The viability of the agriculture should be increased which could be significantly improved the growth prospects of the Indian economy. It can be said that the goal of the food security in the country can be achieved if the sustainable agriculture pattern is adopted through reforms in the agricultural policies and practices.

6. FOOD GRAINS AVAILABILITY IN INDIA

There is a huge difference between the food grain production and food grain availability for the growing production in India. The food grain availability in India per person was 507 grams per day in the year 2021, which increased significantly since 2015. (Source: Statistical Research Development, 2022). The increase in food insecurity by 3.8% in India between 2014 and 2019, as reported by the United Nations is indeed a concerning trend. This indicates that a large portion of the population was experiencing difficulties in accessing an adequate and nutritious diets during this period. The fact that an additional 62 million people were living with food insecurity in 2019 compared to 2014 highlights the scale of the challenges. The total food grain availability in the year 2018 was 180.5 Kg per year while it was 187.1 Kg per year in the year 2020 (Source: Economic Survey of India 2020) These data reveals that the production targets should be revised and increased for the sustainability availability of food grains in India.

Table 4: Patterns of Agricultural Trade in India (Rs. in Crores)

Year	Agriculture Exports	Agriculture Imports	Balance of Agriculture Trade	Agriculture Export-Import Ratio
1990-91	6013	1206	4807	499
1995-96	20398	5890	14508	346
2000-01	28657	12086	16571	237
2005-06	45711	15978	29733	286
2010-11	113047	51074	61973	221
2015-16	215396	140289	75107	154
2020-21	240729	147975	92754	163

Source: (i) Agricultural Statistics at a glance-2020 (MoA&FW)
(ii) Director General of Commercial Intelligence and Statistics, Kolkata.
(iii) Economic Surveys and Agricultural Statistics Compendium (Vol. 1 1996)

The agriculture export-import ratio of India was 499% in 1990-91 and it reduced to 163% in 2020-21. It shows that an export which was nearly 05 times of imports in 1990-91 remained only 1.6 times of imports in 2020-21. The exports show a declining trend in the last three decades. As due the structural changes in Indian economy the agriculture and allied products to foreign exchange earnings has slid down from 44.24% in 1960-61 to 19.9% in 1990-91 and future to 11.15 % in 2020-21. Still due to diverse ecological zones in India there is a huge scope to enhance its agriculture exports through focused interventions.

7. CHALLENGES BEFORE THE INDIA AGRICULTURE

Agriculture is still plagued by several challenges with low productivity. Inadequate capital flow environmental issues and operational gaps. The production in our country is inclined towards cereals centric and resource intensive as a result it raised serious concerning issues. Increasing challenge on water resources along with crop residue burning and demolition of waste are a major concern. Reducing employment, poverty and inequality in both farms as well as in non'-farm still a major challenge before policy makers and for the government. Agriculture sector faces the most of the economic, social and environment challenges in India. This sector also faces many traditional as well as growing global challenges, some of the challenges are as follows:

I. The predominance of small and marginal land holdings in India which contribute around 80% of all land holdings indeed presents unique challenges for agricultural production. These small scale farmers often face difficulties in accessing resources, technology, credit and markets which can hinder their productivity and profitability.
II. The income of the farmers is hampered by the low agricultural productivity as per unit area productivity is low as compared to other main agricultural countries of the world. Lack of irrigation facilities further puts more pressure on the agricultural development in India.
III. Indeed, conservation of the natural resources such as land, water, biodiversity and forests is crucial for sustainable agriculture. Rapid urbanization and non-agricultural uses of land can exert significant pressure on agriculture land leading to land degradation, loss of bio-diversity and water scarcity.
IV. Indian farmers have lack competitiveness which is another hurdle in the development of agriculture. Farmer's lack risk bearing capacity and are unskilled which lowers their income in agriculture. This low income and profitability leads to the farmer's indebtedness and suicides in India.
V. Farmers also faces many natural risks and farmers do not have the sufficient benefit of the crop insurance schemes. To overcome the various risks of the agricultural sector, the on-going insurance schemes are not sufficient and enough.
VI. There is a declining trend of the public sector in agriculture after the year 2000 accompanied by the low private sector on investment in agriculture in India.

8. SUGGESTIONS FOR THE GROWTH OF INDIA'S AGRICULTURE SECTOR

I. Expanding capital investment in agriculture in non-green revolution areas, particularly in the eastern and northeastern regions of India, holds immense potential for driving agricultural growth, improving rural livelihoods, and promoting sustainable development. This requires concerted efforts from policymakers, government agencies, financial institutions, and other stakeholders to prioritize agricultural investment, enhance infrastructure, and support farmers in adopting modern and sustainable farming practices.
II. Irrigation facilities should be improved as it is most crucial for the growth of agriculture as mansoon is totally unpredictably in India.
III. Rainfed areas have the potential to play a crucial role in raising agricultural production and increasing farmers' income particularly through initiatives that could be seen as a "Second

green revolution "Rainfed regions, which heavily rely on rainfall for agriculture, often face challenges such as water scarcity, soil degradation and low productivity.

IV. For ensuring national food security, increased agricultural productivity is a major challenge. There is a tremendous opportunity to exploit the existing yield of food grains.

V. Agricultural diversifications are the need of the hour. With the identification of the key crops, the income of the small farmers can be raised.

VI. Farmers should be linked to the markets for augmenting farm production and farmer's income. To reap the benefits of the emerging opportunities, innovative institutions can play a major role.

VII. Global warming also contributing a worst role in changing the climate pattern. Changing climate is an important issue for the agricultural growth. The under-privileged and the marginal areas should be pointed out to get them protected.

9. CONCLUSION

As the population of India is increasing leaps and bounds year after year, the major challenges is to hold the current position and secure sustainability of agriculture. The agricultural production in India is adversely affected by the climate change due to global warming. India has made significant strides in achieving self-reliance in food grains production, the future demand for food grains and raw materials is expected to outstrip current agricultural production levels. Increased demand and low production will create the burden on the agricultural production and will give rise to food inflation in India. On the other hand, the agricultural productivity and the income of the small and marginal farmers have declined. These problems can be overcome with the help of sustainable agricultural development. We need to focus largely on farmers' welfare and income. We need to increase irrigation facilities in every part of the country. We need to provide soil health cards to large percentage of farmers so that they can have better decisions and may get better yields with the available soil quality. It will also encourage balanced use of fertilizers. To control post-harvest losses government and private sectors needs to make large investments in warehousing and cold storages along with food processing unit. We need to introduce agro-marketing in the form of national agriculture market. It will empower the farmers to sell their produce nationwide without middlemen and at a better price. One major problem, farmers are facing today is the nature fury. Private players and government should come forward to introduce "Pradhan Mantri Fasal Bima Yojna (PMFBY) for all crops to make farmers life and income highly secure. We also need to appreciate the role of women's in agriculture sector and need to devise suitable strategies for their welfare.

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