Towards Sustainable Growth in India:
Connecting the Missing Dots *https://www.kdpublications.in*
ISBN: 978-81-19149-33-9

4. National Mission for Sustainable Agriculture (NAMSA) with reference to Sub Missions: Rainfed Area Development, Agroforestry and Soil Health Management

Dr. Radha Mahali

Abstract:

Indian Economy is a developing economy. Indian rural economy is full of resources by not only natural resources but also human resources. According to the Global Economy World Bank recent data 64.61% of population lives in rural areas. Now a day all countries of the world are focusing to achieve sustainable development goals. Sustainable Agriculture plays an important role in Sustainable development process. Agriculture is one of the most effective instruments for reducing poverty, local livelihoods. One of the crucial requirements of the agricultural sector is to ensure that effective governance structures and related policies are in place at all level. Therefore, it is relevant to study about Sustainable Agriculture and the role of government in it. Government initiates some schemes and programme to achieve its goal. In India under National Agriculture Policy, government started National Mission for Sustainable Agriculture (NAMSA). The main aim of the study is to analyse and evaluate the role of NAMSA in Sustainable Agriculture. The study highlights about some Central Sponsored programmes / Schemes under the flagship of NAMSA. In this study secondary data have been used for evolution the scheme. As per requirements of development process governments spread ongoing and newly started programmes all over the country.

Keywords:

rural economy; agriculture; NAMSA; rainfed area; agroforestry;

soil health management

Introduction:

Agriculture is known as the back bone of a country. It plays a crucial role in Indian Economy. According to the census 2011, 54.6% of total workforce are engaged in different types of agriculture an allied sector activity. It accounts for 18.6% of India's GVA at current prices during 2021-22. Agriculture sector plays very crucial role in providing job opportunities in rural sector in India. Labour force participation Rate is 56.9% for male and female 27.2% for female (PLFs 2021-22). Development of rural sector is also important because literacy rate of rural area is less then urban area that is 83.5% for male and 68.9% for female. Agriculture sector plays very important role in good production of food grains for growing population. The country's total food grain production has estimated to be a record- high 314.6 million tonnes in 2021-22, an increase of 3.8 million tonnes over 2010-21. Country's last 6 years share in total GVA of the country at current prices are as follows:

Table No 8.1: Gross value Added (GVA) of Agriculture & Allied sector (Rs in Crore)

Items	**Years**					
GVA of Agriculture and Allied Sectors	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
	2518662	2829826	3029925	3358364	3609494	3980067
Percent to Total GVA	18.0	18.3	17.6	18.3	20.0	18.6

Source: NSO, Ministry of Statistics and Programme Implementation, GOV of India

India is a developing country and now it is in 1st rank in term of population after Covid 19 Pandemic. After independence India is continuously working to create its own image in world economy. As India is a planned economy therefore it focuses on different plans/ Programmes /schemes during development process to achieve its Economic, Political and Environmental goals. Agricultural policy formation and implementation is necessary for the growth and development of agriculture sector. According to the Indian constitution, agriculture is a state subject.

Because of this, states have the obligation and the right to execute agricultural policies that are specific to their circumstances, even if the central government sets the overall direction for agricultural policies and, crucially, distributes monies for their state-level implementation. States may decide to fully or partially implement programmes from the central government.

This is a reasonable paradigm in light of the varied ecological zones of the nation that call for customised interventions as opposed to policies that apply universally.

Literature Review:

Since the 1960s green revolution, which was primarily based on expanding crop production particularly in cereal production, to feed growing population of nation at that time Indian agricultural policy was production centred. Now day Indian Agricultural policies are income – centred, it seeks to achieve high productivity, reduced cultivation cost and remunerative prices on the product. It also focusses to earn higher profits from farming activities. Therefore, Traditional technic is no longer useful to fulfil food requirement for growing population of a country. Sustainable agriculture is an alternative for solving fundamental and applied issues related to food production in an ecological way (Lal (2008).

A multidisciplinary approach should be used to assess the social and economic effects of the new farming systems, with the help of economists or social scientists. Therefore, sustainable agriculture fosters the development of multidisciplinary studies that associate agronomy with ecology, economics, sociology and geography (Lichtfouse et al., 2004).

The difficulty of this task is that it involves not only human activities, such as farm management and agricultural policy, but also several independent variables, such as climate, topography, soil type, animal gas emissions, etc. (Cymerman 1994; Kielbasa et. al. 2016).

Additionally, farmers from all regions exhibited a great resistance to taking risks and implementing new practises.

Because the cropping pattern in rainfed areas is dominated by low-value and low-density crops and is dependent on the monsoon, the income of the farmers in rainfed areas are certainly non-comparable to those farmers from the well-endowed regions. (Dhawan 1988b; Narayanamoorthy 2021).

Government of India begin with strong initiatives and put the efforts towards bringing in irrigation to the drought prone areas and precariously water scarce regions with focusing on equity and stability. (Dhawan 1988a).

Meynard et al. (2006) identified four different ways to design innovative agricultural systems for sustainable development of a country:

a. Inventing new farming systems, breaking off with the current traditional ones.
b. Identifying and improving farming systems built by the local stakeholders.
c. Providing tools and methods to stakeholders to improve their own systems or evaluate those proposed by Scientists and Economists.
d. Identifying the economic, social and organisation conditions that may help the Policy makers, Governments and farmers to adopt alternative farming systems.

The purpose of sustainable agriculture is to protect and save natural resources. Some of these may become depleted, e.g., soil nutrients, or seriously damaged or contaminated (groundwater or water courses).

Therefore, more sustainable agricultural practices are emerging to conserve and protect resources (Cordell, White 2011) In reference to agriculture, soil quality has been defined as ‘‘the capacity of soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant and animal health’’ (Doran and Parkin, 1994).

Compared to natural ecosystems, agricultural ecosystems undergo many disturbances and modifications and have many more nutrient inputs and outputs (Hendrix et al., 1992; Magdoff et al., 1997).

Agriculture sustainability is the process of making sure that current agricultural interactions are carried out with the intention of keeping the environment as pristine as naturally feasible based on ideal-seeking. The Food and Agriculture Organization defined sustainable agriculture as "production which fulfils food security, environmental protection, and economic and social needs in rural areas" [FAO 2016].

The following sections attempt to assess the performance of some central government sponsored scheme of the flagship under National Mission for Sustainable Agriculture (NAMSA) aimed at addressing sustainability issues in agriculture with reference to Sub Mission on Rainfed Area Development, Agroforestry and Soil Health Menegment.

National Mission for Sustainable Agriculture (NMSA):

NMSA was first envisaged as one of the eight missions outlined under the National Action Plan on Climate Change (NAPCC) proposed in 2008. It is the flagship central government policy that aims to make agriculture sustainable in a comprehensive manner. As a programmatic intervention since 2014-15, the mission aims at,

"Making agriculture more productive, sustainable, and remunerative and climate resilient by promoting location *specific integrated/composite farming systems; soil and moisture conservation measures; comprehensive soil health management; efficient water management practices and mainstreaming rainfed technologies"* (MoAFW 2019: 101).

NMSA has been designed for converging, consolidating and incorporating all ongoing and newly proposed activities related to sustainable agriculture with a special focus on soil and water conservation, water use efficiency, soil health management and rainfed area development. The National Mission for Sustainable Agriculture (NMSA) was established with the goal of increasing agricultural output, particularly in climatically susceptible rainfed areas, by concentrating on integrated farming, efficient use of rainwater, control of soil health, and resource conservation. The mission encompasses all three dimensions of sustainability mentioned earlier. The centrally sponsored schemes under the mission are:

Rainfed Area Development:

Agricultural productivity depends on the standard and accessibility of natural resources like soil and water. By encouraging conservation and sustainable use of these limited natural resources through suitable agriculture methods and agricultural productivity growth may be sustained. Indian agriculture remains predominantly rainfed covering about 57% of the country's net sown area. Thus, conservation of natural resources in conjunction with development of rainfed agriculture holds the key to meet burgeoning demands for food grain in the country. Rainfed Area Development (RAD) Scheme was made operational from 2014-15 in the country as a component of National Mission for Sustainable Agriculture (NMSA) to mainstream development of rainfed areas in a sustainable manner. Through the adoption of Integrated Farming System (IFS) models created by the Indian Council of Agriculture Research (ICAR), Rainfed Area Development (RAD) strives to promote sustainable agriculture production. Through improved soil health management, increased efficiency in using rainwater, prudent chemical usage, crop diversification, and progressive adoption of crop-livestock-tree farming systems in an integrated manner, RAD seeks to promote improved agronomic practises that are location-specific.For the improvement and preservation of agricultural practises as well as natural resources, RAD use an area-based strategy. This component was developed using a "watershed plus framework" to examine the possible use of the natural resource base and assets created or made available through soil conservation and watershed development initiatives funded by the MGNREGS, PMKSY-WDC, RKVY, etc. This component will introduce appropriate farming systems by integrating multiple components of agriculture such as crops, horticulture, livestock and fishery with agro based income generating secondary agriculture activities and value addition.

The salient features of Rainfed Area Development are;

a. Through crop rotation and crop variety, RAD encourages longer periods of soil cover (mulching), which is crucial to boosting the soil's organic matter.

b. Increasing protective irrigation from rainwater sources through effective water management strategies that is required to secure rainfed crops in times of short interval droughts.
c. Promoting indigenous seed varieties that are more climate-resilient while ensuring their high quality, diversity, and timely availability.
d. As farmers' knowledge and management abilities are improved, location-specific agronomic advances are used to create integrated agricultural systems that promote regenerative agriculture.
e. Strengthening support systems for Extensive Livestock Systems (health care, breeding, drinking water, fodder in commons, etc.)
f. Promote fisheries in rainfed water bodies through institutionalized support systems.
g. Integrated value chain support systems, with a focus on local markets, to realise the growth potential of farming production systems based on pulses, millets, and oilseeds.
h. Risk minimization, resilience building and enhancing private investment.

A. Objectives:

a. To implement a location-specific and landscape-based strategy to dry-land areas in order to achieve natural resource conservation and sustainable use, improvement of agriculture production systems, and livelihood development through integration/convergence of schemes in an area-based approach.
b. Location-specific Integrated/Composite Farming Systems will help to make agriculture more profitable, productive, and tolerant of climate change.
c. To conserve natural resources through appropriate soil and moisture conservation measures;
d. To increase the knowledge and skills of farmers and other stakeholders in the field of climate change adaptation strategies, in coordination with other ongoing Missions like the National Food and Nutrition Security Mission and the National Initiative for Climate Resilient Agriculture (NICRA).
e. To improve the productivity of rainfed farming by mainstreaming rainfed technologies refined under All India Coordinated Research Project on Dry land Agriculture (AICRPDA-NICRA) and by

leveraging resources/provisions made under other Schemes/Missions like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), PMKSY-WDC, NFNSM, RKVY, Krishionati Yojana, SMAE, National Mission on Natural Farming etc.

The importance of the programme can be understood by the fact that 68.3 million hectares (mha) of the 140.1 million hectares (mha) of cultivated land used to produce food grains are irrigated, while the remaining 71.7 mha are rainfed.

Table 8.2: Targets and Achievements under RAD Scheme

Year	Coverage under Integrate Farming System (in Hectare)		Expenditure (in Crore INR)	
	Target	Achieved	Target	Achieved
2015-16	42,380.6	35,543.1	152.2	123.5
2016-17	55,833.5	40,961.5	200.8	147
2017-18	72,518.3	50,075.8	270.1	180.2
2018-19	99,346.5	69,988.8	281.1	183.4
2019-20	50,114.6	45,270.5	191.1	66.6

NMSA: It is evident from examining the coverage aim and financial allocation for the programme over time that the programme continuously fails to meet the objectives.

Sub Mission on Agro Forestry:

India became the first country to adopt a National Agroforestry Policy in 2014. Agroforestry is the term used to describe both traditional and contemporary land-use systems where woody perennials (trees, shrubs, bamboos, and palms) are purposefully incorporated alongside crops and/or animals in a variety of spatial or temporal arrangements. It is described as the research and practise of interactions between agriculture and forestry that involve farmers, trees (woody perennials), forests, and livestock on various sizes.

Agroforestry creates a green corridor enabling sensitive species to move between different habitats. It offers potential to sequester carbon in the soil when trees are sustained.

Agro Forestry Achievements:

a. Large Farmers are the primary adopters of agroforestry in India.
b. 25 million Ha Area is under agroforestry across 15 agro climatic zones.
c. More than 5 million farmers practise agroforestry across India.
d. Eucalyptus, Melia, Popur and Casuarina are the popular trees integrated under agroforestry.
e. It is considered particularly beneficial to the income generation capacity of marginal and small farmers across India

Table 8.3: Represent different Agro- climatic regions/ Zones in India

Sr. No	Agro- climatic regions / Zones	State represented
I	Western Himalayan region	Himachal Pradesh, Jammu & Kashmir, Uttarakhand
II	Eastern Himalayan region	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, West Bengal
III	Lower Gangetic plain region	West Bengal
IV	Middle Gangetic plain region	Uttar Pradesh, Bihar
V	Upper Gangetic plain region	Uttar Pradesh
VI	Trans Gangetic plain region	Chandigarh, Delhi, Haryana, Punjab,

Sr. No	Agro- climatic regions / Zones	State represented
		Rajasthan
VII	Eastern plateau and hills region	Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, West Bengal
VIII	Central plateau and hills region	Madhya Pradesh, Rajasthan, Uttar Pradesh
IX	Western plateau and hills region	Madhya Pradesh, Maharashtra
X	Southern plateau and hills region	Andhra Pradesh, Karnataka, Tamil Nadu
XI	East coast plains and hills region	Andhra Pradesh, Odisha, Puducherry, Tamil Nadu
XII	West coast plains and ghat region	Goa, Karnataka, Kerala, Maharashtra, Tamil Nadu
XIII	Gujarat plains and hills region	Gujarat, Dadra & Nagar Haveli, Daman & Diu
XIV	Western dry region	Rajasthan
XV	Island region	Andaman & Nicobar Islands, Lakshadweep

Source: Planning Commission (Khanna, 1989) has identified 15 resource development regions in the country, 14 in the main land and remaining one in the islands of Bay of Bengal and Arabian Sea.

Table 8.4: Represent percentage of Net Sown Area under agroforestry

State	Percentage of Net Sown Area under agroforestry
Jammu and Kashmir + Ladakh	12
Himachal Pradesh	5
Punjab	10
Haryana	10
Delhi	2
Uttarakhand	10
Rajesthan	2
Uttar Pradesh	0.5
Gujrat	8
Madhya Pradesh	8
Bihar	14
Jharkhand	21
West Bangal	7
Maharashtra	9
Chhattisgara	13
Odisha	13
Goa	8
Andra Pradesh + Telangana	19
Karnataka	9
Pandicherry	6
Tamil Nadu	13
Kerela	4
Sikkim	8
Assam	9
Meghalaya	7
Tripura	10

State	Percentage of Net Sown Area under agroforestry
Arunachal Pradesh	9.8
Nagaland	1
Manipur	5
Mizoram	3

Under net sown area Jharkhand has covered maximum net sown area that is 21% of its Total area and Telangana covered 19% area by agroforesty.Punjab, Haryana, Uttrakhand, Bihar, Chhattisgara, Odisa, Tamil Nadu, Tripura covered 10-15% by agroforestry.

Rest countries comes under 5-10% Net sown area by agroforestry Only Nagaland, Delhi, Rajesthan and Mizoram comes under very low covered area that is 1-3%.

Different states have different geographical and political conditions which affects implementation of scheme for that particular area.

Table 8.5: Annual area covered and trees planted under Agroforestry

Year	Area covered (hectare)	Trees Planted
2016-17	373	463159
2017-18	2273	3473699
2018-19	2819	1937075
2019-20	774	260056

NMSA: The intended expansion of the tree cover is also consistent with India's nationally determined commitment to the Paris Agreement, which calls for the improvement of the tree cover to create an additional 2.5–3 billion tonnes of carbon sinks. After 2020 tree plantation affected by Covid 19 Pendamic.

Soil Health Management (SHM):

The ability of the soil to support and sustain crop development while maintaining environmental quality is referred to as the "soil health" or "soil quality" of an agro ecosystem.

In order to improve the soil health of the Indian soils, government of India has initiated two major schemes namely:

- Soil Health Management Scheme
- Soil health card Scheme

The goal of SHM is to promote both location-specific and crop-specific sustainable soil health management, including residue management, organic farming methods through the creation and linking of soil fertility maps with macro-micro nutrient management, appropriate use of land based on land capability, prudent fertiliser application, and minimising soil erosion/degradation.

Assistance is given for various improved packages of practises based on land use and soil characteristics, developed by thematic maps and databases created by geographic information systems (GIS) on the characteristics of land and soil gathered through substantial field-level scientific studies.

Soil Health Card Scheme

In February 2015, the central government had launched the Soil Health Card Scheme. Under this programme the government plans to issue soil card to farmers to help them get a good harvest by studying the quality of soil. The major components of the scheme are:

a. Issue of Soil Health Cards
b. Training for soil analysis
c. Financial assistance for package of nutrient recommendations
d. Capacity building and regular monitoring and evaluation
e. Constitution of the Project Management Team (PMT)

Table 8.6: Under this scheme soil health card has been distributed in different phases are as follows:

Phase	Duration	Total card no (Crore)
Phase I	2015-2017	10.74
Phase II	2017-2019	11.69
Phase III	2019-2020	13.53

Press Information Bureau

Table 8.6: shows that the distribution of Soil Health Card is continuously increasing during different faces of distribution.

Under the scheme the states have been sanctioned for the setting up of Soil Halth Laboratories, 429 static labs, 102 new mobile labs, 8752 min labs, 1562 village – level laboratories and strengthening of 800 existing labs. The Soil Health Management Scheme has shown to be beneficial for farmers, but it is also giving the agrarian young jobs. Farmers and village youngsters up to the age of 40 are eligible to establish Soil Health Laboratories and conduct testing under the programme. A laboratory may cost up to Rs. 5 lakhs, of which the Central and State Governments may cover 75%. Self-Help Groups, Farmers' Cooperative Societies, Farmers Groups, and Agricultural Producing Organisations are all subject to the same rules. (PIB)

Conclusion:

India is a process of Sustainable Agricultural development. Each and every year centre government is introducing different programme/ Schemes to achieve its goal. Under this chapter only three submissions have discussed. there are many others programmes/Schemes and policies have to be studied. By studying three submissions of NAMSA it is observed that achievements are in progress but goals are yet to have achieve because there is difference in achievement among different states. Some state takes more initiative of some central sponsored programme and others are getting less benefits from it. It is due to different Political, Economic and Environmental conditions.

Bibliography:

1. **CYMERMAN R. 1994**: "Balanced economy (sustainable development) in rural areas. In: Advisory in sustainable development of rural areas". *Szczecin*. Wydaw. Druk p. 11–36
2. **CORDELL D., WHITE S. 2011**." Peak phosphorus: Clarifying the key issues of a vigorous debate about long-term phosphorus security". *Sustainability*. No 3(10) p. 2027–2049
3. **Dhawan, B D (1988a):** "Irrigation in India's Agricultural Development: Productivity, Stability and Equity," *Studies in Economic Development and Planning,* Sage, New Delhi
4. **Dhawan, B D (1988b):** "Dryland versus Irrigated Farming", *Economic & Political Weekly*, Vol. 23, No. 12, pp. 575-576.
5. **Doran, J. W., and T. B. Parkin. 1994.** Defining and assessing soil quality. Pp 3–22 in J. W. Doran, D. C. Coleman, D. F. Bezdicek, and B. A. Stewart, eds. Defining soil quality for a sustainable environment. Soil Science Pub. 35. Madison, WI: *American Society of Agronomy*
6. **FAO 2016.** "Sustainability assessment of food and agriculture systems (SAFA)" [*online*]. *Rome. Food and Agriculture Organization of the United Nations*.
7. Available at: http://www.fao.org/nr/ sustainability/sustainability-assessments-safa/en/
8. **Government of India, Press Information Bureau, 2020,** Soil Health Card scheme of Central Govt: A success story, *Ministry of Agriculture &Farmers Welfare* 05 February 2020
9. **Government of India, Annual Report 2021-2022:** "Periodic Labour Force Survey (PLFs)", *Ministry of Statistics and Programme Implementation. NSSO*
10. **Government of India, Annual Report 2022-23**, Department of Agriculture & Farmers Welfare, *Ministry of Agriculture & Farmers Welfare*
11. **Kielbasa.,Drangert J.O., Ulen B., Tonderski K. 2016:** " Drivers and constraints for Polish farmer`s implementation of measures to remediate nutrient leaching to waters." *International Scientific Journal Mechanization in Agriculture and Conserving of the Resources*. Scientific Technical Union of Mechanical Engineering – Bulgarian Associate of Mechanization in Agriculture. Year 62. Iss. 4 p. 22–26.

12. **Lichtfouse E., Habib R., Meynard J.M., Papy F. (2004):** "Agronomy for sustainable development", *Agronomie* 24, 445.
13. **Lal R. (2008):** "Soils and sustainable agriculture". A review, *Agron. Sustain. Dev*. 28, 57–64**.**
14. **Magdoff, F., L. Lanyon, and B. Liebhardt. 1997**: "Nutrient cycling, transformations, and flows: Implications for a more sustainable agriculture." *Advances in Agronomy* 60:1–73
15. **Meynard J.M., Aggerri F., Coulon J.B., Habib R., Tillon J.P. (2006),**" Recherches sur la conception de systèmes agricoles innovants," Rapport *du groupe de travail*, septembre 2006, 72 p.
16. **Narayanamoorthy, A (2021):** "Farm Income in India": *Myths and Realities*, Oxford, New Delhi.
17. National Mission for Sustainable Agriculture, (n.d.). *Achievement under sub-mission on Agroforestry.* NMSA.
18. https://nmsa.dac.gov.in/RptAchievementAgro.aspx
19. National Mission for Sustainable Agriculture, (n.d.). *All India achievement under Rainfed Area*
20. *Development.* NMSA
21. https://nmsa.dac.gov.in/RptActivityAchievement.aspx
22. Soil Health Management in India, https://www.icfa.org.in/assets/doc/reports/Soil_Health_Management_in_India.pdf