

Sustainable Agriculture and Food Security: Challenges and Policies of Jharkhand

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Sustainability is the process of maintaining change in an equitable way, in which the exploitation of resources, the management of investment, the orientation of technological evolution and institutional diversification are all in sync. These all heighten both the current and future potential to satisfy human needs and desires. Sustainable agriculture is farming in sustainable ways based on an understanding of ecosystem services, the contemplation of relationships between organisms and their environment. Agriculture growth plays a pivotal role in curtail poverty in order to advance economic development and growth. Agricultural sector added 16.2 percent to Nation's GDP in 2014-15 which is 1% more than 15.2 percent in the 11th plan. The population of the country is predicted to be somewhere around 1.6 billion by 2050. This would mean per capita availability of water, land and other defined natural resources will diminish. To deal with numerous problems and issues associated with agriculture, a task Force on Agricultural Development under the leadership of Vice-Chairman, NITI Aayog has been established. Jharkhand comprises of the agro-climatic zone VII (Eastern highland and mountainous region), branched into three subzones. Jharkhand's climate ranges from dry semi humid to humid semi arid types with an annual downfall of 1200-1600 mm. Total tillable area in Jharkhand is about 48.67 percent. Government of Jharkhand was determined to establish an exclusive commission for food security and consequently the Department of food, public distribution and consumer affairs set up Jharkhand State Food Commission via notification number 1632 on 13th April 2017. Agricultural development has a hand in food security in numerous ways like contributing to food availability, access and stability through diversity of food produced and food utilization. There are many government schemes, policies and acts for securing the call for food of the people of Jharkhand.

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This paper would qualitatively explore the benefits derived by farmers of Jharkhand who off late have been encouraged to take up sustainable means of agriculture. Secondary data is used to make the study. It would be a preliminary contribution towards exploring the economic and social impact for invigorating the participation level of the farmers at grass-roots level also the policies undertaken by the government to implement and promote the same.

Keywords: Sustainable Agriculture, Food Security, Government Policies, NABARD

Introduction

By the year 2050, the world's population is expected to grow to 9 billion. To meet this increasing demand for food, agricultural productivity must be sustainably improved. The sustainable development goal on agriculture, food security and nutrition demonstrate global commitment towards realizing this ambition. Agricultural vulnerability is dependent upon climatic, biological, social and infrastructural factors. The present position of rural Indian farmers and Indian agriculture is passing through difficult times due to vagaries of weather in several parts of the country. The rural areas in these parts are facing the shortage of food, feed and fodder as well as drinking water.

Since Jharkhand is agrarian state, agriculture forms an economic foundation which helps in creating employment opportunities and reducing poverty. In spite of various experimentation, strategies, plans and programs yet the state agricultural growth and development seems beaten up. Therefore, the national policy for farmers calls for a paradigm shift from a purely commodity cantered approach to a human cantered approach for agriculture development. This requires improving economic viability of farming by substantially increasing the net income of the farmers. Given this scenario, if the state can develop better agricultural infrastructure, capacity building measures, and streamlined and sufficient flow of credit, it can overcome the challenge it faces in the current circumstances. The next question which arises is how can this be achieved? This can work out if agro-ecological specific agricultural projects are clearly formulated to form policies with realistic objectives above and beyond effective planning. This would grease the wheels of sustainable rural development and would also help to meet the agricultural challenges. To make the agriculture sector profitable as well as sustainable, an alteration in agriculture planning is the need of the hour. Knowledge driven interventions in crops and area-focused

approach ignoring the commodity based approach are indispensable. Collective efforts are required for the following:

- Resource allocation on crops, livestock and horticulture that depends on resource endowments needs a non-discriminatory approach
- Promotion of Aritech industry to discover technological solutions, technological innovations and adoption
- To brace production systems and forward linkages, a farmer centric institutional framework like farmer producer organisations (EPOs)
- Increasing the agriculture industry linkages to promote agriculture

The role NABARD is quite crucial in the credit flow for sustainable agriculture. One of the sustainable strategies of NABARD is to facilitate enhancement in agricultural productivity and generation of income and employment in agriculture and off-farm sectors, through refinance support to banks and financial institutions.

Objectives of the Study

1. To do a comparative chronological analysis of the sustainable agricultural development in Jharkhand
2. To examine the different schemes, acts and policies undertaken by the Jharkhand Government for the sustainable agriculture and food security.
3. To analyse the role of NABARD in the agricultural credit.
4. To provide a brief critique on the current status and future scope and viability of sustainable agriculture

Literature Review

A total of 3.3 crore population of Jharkhand State, comprises 76% rural population. About 26% population belongs to tribal community and about 91% tribal inhabitants in rural area. The total geographical area of the State is 79.70 Lakh Hectares, out of which 23.22 Lakh hectares (29.33%) are under forests, 5.66 Lakh hectares (7.12%) are barren lands, 7.24 Lakh Hectares (9.10%) are put to non-agricultural use, 0.90 Lakh hectares (1.15%) are under pastures and other

grazing lands, 3.07 Lakh hectares (3.86%) are cultivable waste-land, 0.88 Lakh hectares (1.11%) are under miscellaneous trees and groves, 12.04 Lakh hectares (15.14%) are current fallows, 8.45 Lakh hectares (10.63%) are under other fallows and 17.95 Lakh hectares (22.58%) are net-sown area. The number of electrified villages is 14667 (45%) of total villages. A total of 8484 villages (26%) are connected by roads.

Jharkhand forms a part of agro-climatic zone VII of the country which is known as eastern plateau and hill region. The State has further been divided into three agro-climatic regions i.e. Central and North-Eastern Plateau (Region-I), Western Plateau (Region-II) and South-Eastern Plateau (Region -III). The central and North Eastern Plateau has 50% of the net cultivated area and 13% of the area under forest, whereas the Western and Southern Eastern Plateau together have the rest 50% of the net cultivated area and a larger forest cover of 33% and 24% respectively. On an average annual rainfall of Jharkhand is 1289mm and it varies from 1285-1308mm between different sub zones, out of which 85% is received during four monsoon months (June-Sept), where potential evapotranspiration is far below precipitation. This offers opportunity to harvest run-off water and its recycling as per need of crop during dry spells. But till date no systematic effort has been made towards rain water harvesting, conservation and its application. Out of the cultivable area of 3.8 million hectares, 80% of the area is drought prone and about 7% area is flood prone. Jharkhand is one of the top producers of mineral resources covering a propordence of the districts with a paradox to be among the bottom lying states so far as development is concerned. 24.4 lakh hectares that constitutes around 30.61% of the areas is under agricultural waste lands that need to be beneficially and constructively utilised for agricultural development. According to the agricultural census 2010-2011, about 92%(11 crore individual land holdings) belongs to below 3 hectares size classes in the country and about 62% area (81 mha) of the total individual cultivable land(131 mha) is owned by them. Similarly, 94%(1.88 million of the individual land holdings) belongs to below 3hectare size classes in Jharkhand. Hence the project of doubling the farm income targets about 1.88 million of individual land holdings by the Jharkhand Government. The average monthly income per capita from farming increased from Rs. 1060 in 2003 to Rs. 3844 in 2013, according to report situational assessment of agricultural households by the NSSO, a compounded annual income growth rate of 13.7%. However the farmer's income in Jharkhand is lesser than the national average income. Jharkhand has a high ranking in terms of poverty in India at 40.3% (sharp

contrast between 49% in rural and 23% in urban poverty), where 27.5% is all India average of poverty. Jharkhand has low productivity of agriculture as we compare the state figures with the country figures. Adding 15% to the GDP, around 70% of the state population depends primarily on agriculture and allied activities for subsistence. In total, 58.4% of agricultural workers contribute about 23% to national GDP.

The situation of the food security is critical. Although Jharkhand has abundant natural resources yet the state suffers from poverty (more than 40% of the population live below poverty line). Jharkhand is at the bottom of the scale of development indicators. According to World Food Programme Mapping, the most insecure in the matter of food and nutritional security are Bihar and Jharkhand. As per National Sample Survey II, around 2% of the population suffer from acute and chronic hunger and 10% from seasonal food insecurity.

Agriculture Related schemes by State and Central Government

CENTRAL SPONSORED SCHEMES

- **Rashtriya Krishi Vikash Yojna (RKVY)** - This is sponsored by Ministry of Agriculture and Farmer's Welfare, Govt. of India. A number of agricultural activities like clustered demonstration of hybrids/varieties are being conducted along with their package of practices both during kharif and *rabi*. The soils of Jharkhand (about 40%) are highly acidic. Therefore, lime application has been advised for amelioration of acidic soils. Bio-fertilizers are also provided to the farmers not only for increasing the production and productivity but also for ensuring fertility of the soils. Trainings for capacity building both at district and block levels at regular intervals for empowering farmers with latest information/technology are also organized.
- **Bringing Green Revolution in Eastern India (BGREI)** – This scheme was launched in 2010-11 for increasing the production and productivity of rice during *kharif* and wheat during *rabi* season. Hybrid varieties of rice developed both by public and private institutions are given to the farmers and clustered demonstrations of 100 hectare at one place are conducted following the system of Rice Intensification (SRI). This is helpful in increasing the rice productivity up to 20 to 25 percent more than the traditional system.

Trainings are also organized for capacity building of farmers in view of strengthening their knowledge about the latest technologies developed by SAUs and ICAR Institutes. The promotion of wheat cultivation has also been taken up after harvest of rice under BGREI because production and productivity of wheat is required to be strengthened for ensuring food availability to ever growing population.

- **National Food Security Mission (NFSM)** – Cultivation of pulses is being promoted under NFSM along with cultivation of rice, application of lime and rhizobium are also provided to farmers which ultimately improves the soil fertility condition. Trainings are organized for capacity building of the farmers on all aspects of agriculture which is helpful in empowering the farmers especially the women for having the information about the latest technologies related to agriculture. Similarly, National Mission for Sustainable Agriculture (NMSA), Pradhan Mantri Krishi Sichee Yojna (PMKSY) and National Mission on Oilseed and Oil Palm Development (NMOOP) are undertaken at the farmers field through officials of the State Department of Agriculture for not only increasing the production and productivity but also the profitability (income) of the farmers. This has been helpful in increasing the cropping intensity and employment generation to the farmers and ultimately ensuring the livelihood security among the farmers.
- **National Mission for Sustainable Agriculture (NMSA)**- National Mission for Sustainable Agriculture (NMSA) has been mapped out to strengthen agricultural productivity particularly in rain-fed areas focusing on integrated farming, synergizing resource conservation, soil health management, and water use efficiency. NMSA lines up to promote sustainable agriculture through a chain of adaptation measures focusing on ten key dimensions. These include, improved crop seeds, pest management, livestock and fish cultures, improved farm practices, nutrient management, agricultural insurance, credit support, markets, water use efficiency, access to information and livelihood diversification. The aim of NMSA is to impregnate the optimum utilization of resources of common through community based approach. NMSA cater to key dimensions of water use efficiency, nutrient management and livelihood diversification through adoption of sustainable development pathway.

- **Paramparagat Kheti Vikas Yojana (PKVY)** – The *Paramparagat Kheti Vikas Yojana* (PKVY) is an initiative to promote organic farming in the country and was launched by Central Government in 2015. Under PKVY, cluster approach and PGS Certification is used to promote organic. Government is strongly in support of implementation of the scheme for enriching soil health and welfare of farmers. According to the scheme, farmers are encouraged to form groups or clusters and take to organic farming methods over large areas in the country. To avail the scheme, each cluster or group must have 50 farmers willing to take up organic farming under the PKVY and possess a total area of at least 50 acres. Each farmer enrolling in the scheme will be provided INR 20,000 per acre by the government spread over three years time.

STATE SCHEMES

- **Krishi Mela, Workshops and Exhibition** – Krishi melas are organized every year at State, District and Block levels for technological backstopping to officers working in State Department of Agriculture, NGOs and farmers. Exhibition in the form of posters, pamphlets, leaflets, etc. are also displayed and distributed among the farmers. Workshops related to varieties and package of practices are also organized at block, district and state levels for providing these information to farmers.
- **Seed Exchange** – Seed exchange programs are also executed so that quality seed of crop/varieties may be given to farmers. There is a problem in relation to availability of quality seeds in pulses and oilseeds which are being met by seed exchange program.
- **Conversion of Fallow Land into cropped Area-** There is a huge chunk of fallow land during *rabi* especially the rice fallow which is about 14.60 lakh hectare. Efforts are being made to capture the residual moisture and cultivation of *rabi* pulses and oilseeds are being promoted. For this, early to medium duration varieties of rice are being given to farmers during kharif so that rice may be transplanted by end of October and by using Zero Seed cum Fertilizer Drill, *rabi* pulses and oilseeds are taken for increasing cropping intensity.
- **Double Cropping Rice Fallow-** Since rice fallow area is 14.60 lakh hectares, cropping intensity in the State varies from 122 to 124 percent only against the national average of 149%. Cultivation of early duration varieties of rice during *kharif* is being promoted

among the farmers for taking *rabi* pulses (chickpea and lentil) and *rabi* oilseeds (mustard and linseed). This activity is helping in increasing the area under cultivation which may in turn help in increasing the cropping intensity.

- **Single Window Centre** – State has implemented the Single Window Centre in all the 24 districts of Jharkhand where inputs (seed, fertilizer, pesticides etc.), information about Govt. schemes including machines/equipments related to mechanization are provided at one place. This activity is helping farmers to a great extent in knowing the latest information about the agricultural activity.
- **Grant-in-Aid Scheme**- This Scheme is running for the welfare of women labourers, which has been continuing since sixth Plan (1981-82), and is administered through voluntary organizations by giving grant-in-aid to them for the purposes of organizing working women and educating the about their rights/duties, legal aid to working women. The focus of the Scheme is awareness Generation among women labour, in the area of wages, like minimum wages, equal remuneration, etc. to disseminate information on various Central/State Government Agencies available for the benefit of women labourers.
- **Renovation of Agricultural Laboratories**- The agricultural laboratories established in different districts and sub-divisions have been strengthened to a great extent. The Soil Testing Laboratories have been renovated and also provided with the required quantity of chemical and glassware for testing the soil samples across the State. The required equipments have also been purchased and provided to laboratories for assessing the different parameters of soil testing etc.

Analysis and Discussion

Crop intensity and cropped area growing are moderate in the face of good rainfall in the area. Adoption of technology sounds like a challenge which leads to lower productivity. Estimation of cultivable area is around 3.8 million hectare while the net sown area is 2.56 million hectare with only 12% of the cropped area under irrigation. The total cultivable land in the country is 55% while for the state it is 52%. Nonetheless, national average is 76% with only 43% area of cultivable land is under net sown area. Jharkhand suffers from several disparities in terms of agriculture and allied sectors inspite of the fact that there are several accessible opportunities which can make the state self sufficient in the production of agriculture. The agricultural

development of Jharkhand should also mainstream with national strategic goals like improving food security enhancing opportunities for inclusive growth improving the competitiveness of agriculture, then improving and sustaining the status and quality of natural resources for agriculture, enhanced risk management and creation of quality manpower for sectoral development. Major constraints and challenges faced by agricultural sector are-

Developmental Aspects-

- The fertilizer consumption is also very low that is 33.52, 17.39 and 4.82 kg/hectare, respectively, of nitrogen, phosphorous and potassium. Low availability of boronated SSP and slow release fertilizers.
- Large acreage under dry land agriculture with lack of suitable high yielding crop varieties.
- Poor crop management, low input used and inadequate crop planning leading to less efficient production.
- Wastage of rain water in the absence of appropriate watershed management systems
- Indiscriminate use of insecticides , fungicides especially in vegetable cultivation and other crops leading to health hazards
- Inadequate input availability(irrigation-12%;low seed replacement rate for paddy-16%, maize 12%, pulses 13% and oilseed 30%); inadequate availability of seed and planting
- Economically constrained farmers (BPL population 31.8%)
- Low credit/insurance, and inadequate infrastructure
- Inadequate post harvest infrastructure
- Poor infrastructure, roads, communication, power supply, storage, processing and marketing facilities for agricultural produce.

Technological Aspects-

- Poor adoption of technologies on location-specific soil and water conservation models
- Integrated nutrient management strategies for different crops, protocols for organic farming for vegetable crops
- Collection, charecterization and evaluation of lesser known wild crops

Critical gaps-

Agriculture and allied sectors play a pivotal role in providing food security, bringing rural prosperity and increasing rural income. The weakened condition due to prolonged hunger and poverty signals a necessity to increase productivity both in terms of food grains and income from farm with an integrated approach in farming. Regrettably, agriculture and allied sector undergo several disparities as discussed below -

- Poor quality of soil – The run-off during monsoons results in damaging the top soil and run off leaching due to soil porosity. The after-effect of which is deficient soil nutrients, and acidic soil lacking micro-nutrients.
- Small land holdings- Agricultural economy of Jharkhand depends on nature, investments, productivity, paddy as the dominant crop, irrigational activities and small and marginal holdings. From the above stated dependence investments, productivity and irrigation are low or inadequate besides monocropping with paddy. The small size of holdings renders it impossible to enhance economies of scale. It is therefore impossible to organise farmers for the cropping patterns, seeking extension support, marketing and obtaining training and capacity building.
- Non-adoption of crop rotation- 88% of the land is under monocropped paddy and the only crop rotation practice in the state is paddy-wheat. The lack of water deterioration of the soil status and inability to purchase the seeds and inputs often lead to both restricting kharif crop area and also increase probability of current fallow.
- Non adoption of recommended varieties- Dearth of certified seeds of the required heterogeneity of crops and quality seeds results in poor fertilizer use, improper pesticide application and low seed replacement which are necessary inputs that leads to deceleration in the productivity of crops.
- Application of low input by farmers –Considering low level of input used in pesticides, fertilizers, good quality seeds excluding credit, the production and productivity of agricultural produce is heavily distressed. If national average and level of critical inputs are compared, the results are not very favourable.

- Research Development- Technology is the main driver of the progress more so for development of agriculture in the state. A dynamic research in the field of bio diversities is needed covering a large section of farmers with small holdings and irrigated agriculture. A need to develop compatible seeds in millets, upland paddy and high yielding has come to the fore. Jharkhand has a great potential so far as tubers, vegetables, plants, crops and animals which need to be conserved are concerned. Thence these potentials the premiere research institutions need to work on agro-climate zone specific technologies. Because of the risky environment and the related difficulty in gaining access to markets, food security is a primary concern of households in the State. Besides, sustenance agriculture is culturally entrenched in tribal communities. As a result, large amounts of the resources of farm households are typically applied to rice production, particularly in the rainy season, for their own consumption. Despite the predominance of agricultural employment, non-agricultural income plays an important role in its contribution to household income. Since most of the agricultural land is mono-cropped, the household labour is free for non-agricultural income generating activities after the monsoons. The importance of non-agricultural income suggests that technological interventions in agriculture need to take into account the opportunity cost of labour in non-agricultural activities. Provision of credit to agriculture sector has been one of the main concerns of policy planners in India since independence. However, an assessment of the situation at ground level indicates that recourse to non-institutional credit continues to dominate as far as rural areas and agriculture sector are concerned. The credit policy, crop insurance related issues and the role of SHGs can play in overall economic development in the State of Jharkhand.

Table 1: Productivity Gap in Farm Sector (2015-16)

Particular (kg/hectare)	India	Jharkhand
Rice	2404	1814
Wheat	3093	1701
Maize	2509	1304
Sugarcane	71095	59024
Pulses	652	920
Oilseeds	968	664
Honey	88.90	1.20

Source: niti.gov.in

Findings and Conclusion

The State is one of the largest producers of the mineral resources of the country spreading over majority of the districts with a paradox to be among the bottom lying States in terms of development. An area of 24.4 Lakh Hectares (30.61%) is under agricultural wastelands that have to be beneficially utilized for rural development. A variety of agricultural produce have immense potential for commercial agriculture and setting up of Processing Industry in production area. Lac, Tamarind, Honey and Ornamental fishes have high potential for commercialization in Jharkhand State. Extension of appropriate technology to farmers for high-tech horticulture including protected cultivation and precision farming is required. Increase of acreage of orchards and plantation crops including bamboo, particularly in districts where total area under horticulture is less than 50% of agricultural area. There are few schemes by the Central as well as the State Government like Extension of National Horticulture Mission (NHM) in newer areas, Traditional Agriculture Development Scheme (TADS), National Agriculture Development Scheme (NADS), Rain-fed horticulture and Special Crop Scheme (SCS),etc, to boost the diversification in the State.

The National Commission on Farmers (NCF) constituted on Nov 18, 2004 under the chairmanship of Professor M.S. Swaminathan submitted its final report on Oct 4, 2006. The report contains suggestions to achieve the goal of faster and more inclusive growth of agriculture. Some of the important suggestions and key findings of the Report which are relevant to the Jharkhand are as-

- A medium term strategy for food and nutrition security in the country in order to move towards the goal of universal food security overtime.
- Enhancing productivity, profitability and sustainability of major farming systems of the Country.
- Policy reform to substantially increase flow of rural credit to all farmers
- Special programs for dry land farming for farmers in the arid and semi-arid regions, as well as for farmers in hilly and coastal areas
- Enhancing the quality and cost competitiveness of farm commodities so as to make them globally competitive

- Protecting farmers from imports when international prices fall sharply
- Empowering elected local bodies to effectively conserve and improve the ecological foundations for sustainable agriculture
- Credit and insurance- Timely and adequate supply of credit is the basic requirement of small farm families. Reduce rate of interest for crop loans to 4% simple, with government support. Issue Kisan Credit cards to women farmers, with joint pattas as collateral. Develop an integrated credit-cum-crop-livestock human health insurance package. Promote sustainable livelihood for poor by improving financial services, infrastructure, investment in human development, agriculture and business development services including productivity enhancement, local value addition and alternate market linkages and institutional development services forming and strengthening producers' organisations such as SHGs and water user associations.
- Food Security – Several studies have shown that poverty is concentrated and food deprivation is acute in predominantly rural areas with limited resources such as rain fed agriculture areas. Eliminate micronutrient deficiency induced hidden hunger through an integrated food cum fortification approach. Promote establishment of Community Food and Water Banks operated by women Self- Help Groups (SHGs), based on the principle store grain and water everywhere. Help small and marginal farmers to improve the productivity, quality and profitability of farm enterprises and organise a Rural Non Farm Livelihood Initiative.
- Jharkhand is enriched with mammoth natural resources, primarily in minerals and forests. Around 80% of the state population residing in 32625 villages is dependent on agriculture and allied activities for subsistence. Ensuring rural development, agricultural development, capacity building, bringing supplementary land under cultivation through vertical and horizontal expansion, irrigating more areas, raising production by increasing the productivity of crops besides optimum utilisation of inputs like agricultural tools, seeds, pesticides and fertilizers can be some of the strategies in modernising and developing the agriculture sector.

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