NABARD

Farmers' Welfare in India

A state-wise analysis

Department of Economic Analysis and Research (DEAR)

National Bank for

Agriculture and Rural Development

Mumbai

July 2021

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Farmers' Welfare in India

A state-wise analysis

Part A:

Farmers' Welfare in India - A state-wise analysis

Part B:

Dashboard and Problems and Prospects of Agriculture: State-wise

Department of Economic Analysis and Research (DEAR)

National Bank for Agriculture and Rural Development

Mumbai

July 2021

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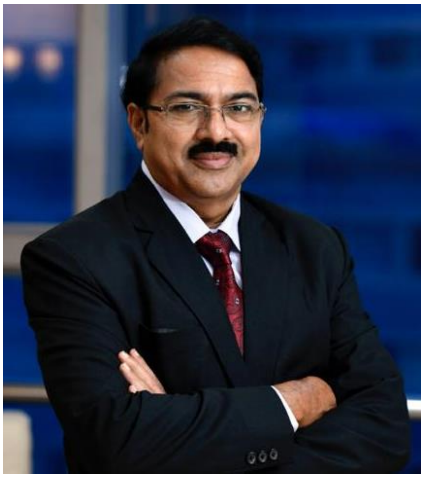
Message



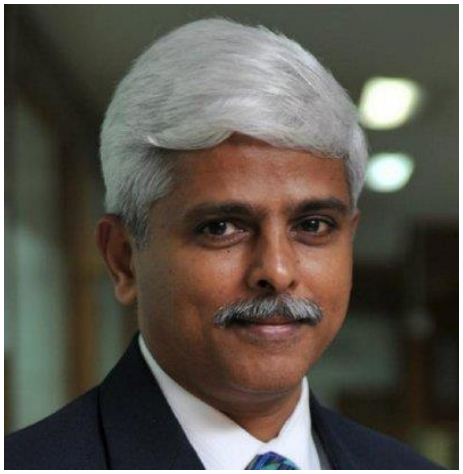
NABARD has been promoting the evidence-based policy formulation on issues faced by the agricultural and rural economy. I am pleased to present this booklet covering state-wise variation in Indian agriculture on NABARD's 40th Foundation Day. The booklet tried to capture the diversities prevalent in agriculture across Indian states adopting farmers' welfare framework. The focus on farmers' welfare in the analysis of Indian agriculture is welcome reflecting the recent development priorities as reflected in the rechristening the name of the Agriculture Ministry to Ministry of Agriculture and Farmers' Welfare.

I hope this booklet will help bring paradigm shift in thinking towards farmers' welfare in the policy discourse among various stakeholders.

I congratulate all the officers of Department of Economic Analysis and Research for their joint efforts in preparing this booklet.

Dr. G.R Chintala
Chairman
12 July 2021

Foreword



Agricultural development has always been viewed from the production perspective. With the clarion call of 'doubling farmers' income by 2022' by the Hon'ble Prime Minister of India, the paradigm is now shifted to farmers' income. Therefore, it is time to think about agriculture from the farmers' income & welfare point of view to bring the focus on farmers.

The Dalwai Committee on Doubling Farmers' Income has brought in the farmers' welfare perspective to the forefront. In this publication, the Department of Economic Analysis and Research (DEAR) has attempted to suggest a framework to understand variation in agricultural performance across states through the farmers' welfare lens. The publication identified various dimensions of farmers' welfare and analysed the inter-state variations. A prototype of a farmers' welfare index is attempted and presented in this publication to take the discourse forward. We welcome debate and improvements to this idea.

I congratulate my colleagues in DEAR for bringing out this timely publication, which is a team effort. This publication also contains a dashboard comprising various development indicators along with a two-pager on problems and prospects of agriculture for all major states.

P. V. S. Suryakumar
Deputy Managing Director
12th July 2021

Preface

Development Economics literature on Indian agriculture is replete with studies on regional variations across states. The discourse is on how a given state performed in terms of one or more indicators in comparison to other states and also understand the factors that helped the state move ahead or left backward. Interesting comparisons were made between Punjab/Haryana and Bihar or other Eastern states, south vs north, east vs west and so on. Measuring regional disparities and explaining them have been considered fashionable research once. Again, after liberalisation and economic reforms which are said to have increased the inter-regional and inter-personal disparities, the interest on study of disparities has again on the rise.

While most of the earlier studies measured variations in agri-GDP or agricultural production and tried to explain in terms of input use, power consumption, infrastructure facilities, etc. we feel there is a need to change the paradigm towards understanding the farmers' welfare. This will shift the focus to farmer from production orientation. In fact, there seems to be a change in paradigm at the highest policy level. First, the name of the Ministry of Agriculture is changed to Ministry of Agriculture and Farmers Welfare (MoA&FW). Second, the announcement of the goal of 'doubling farmers income by 2022' by Hon'ble Prime Minister of India gave primacy to farmers' income rather than production. The Committee on Doubling Farmers' Income (Chairman: Dr.Ashok Dalwai) expounded the concept of farmers' welfare and Dalwai (2019) developed the concept of farmers' welfare and possible list of indicators thereof in his Lalit Doshi Memorial lecture. Predictably, farmers' income is an important determinant of their welfare. However, there are so many other factors that will enhance or diminish welfare. Thus, our paper, Part I of this booklet, identified six dimensions with a set of indicators that influence farmers' welfare under each of them. They are: pre-production factors; post-production determinants; physical and financial infrastructure facilities; social infrastructure, community level institutions, and social capital; ecological factors; and, policy ecosystem. The entire analysis in this paper is organised under this farmers' welfare framework. Based on various indicators under various dimensions, the paper presents a composite index of farmers' welfare across states.

The Part II of the booklet presents dashboard of important development indicators followed by problems and prospects of agriculture in different states. On the whole, the booklet is expected to generate discussion and debate on various aspects of agriculture and farmers' welfare.

The encouragement and support we received from our Chairman and DMDs kept us hooked to the analytical research, our mandate. Shri Suryakumar, DMD needs special mention as the source of inspiration to our young economists whose sweat can be smelt in this publication. Within the department, I appreciate contribution of Dr.Ashutosh Kumar, DGM, Ms.Neha Gupta, AM in preparing the paper on farmers' welfare. A report on regional disparities by Dr.Sunandini, a former research associate, was the starting point for this work. Ms.Tiakala Ao, former General Manager, has taken keen interest in compiling the problems and prospects of agriculture drawing on the contribution from all our officers. Credit for preparing Dashboard goes to Dr.R Balanarayana, who was research associate with us till recently. Details of contributors has been acknowledged elsewhere in this booklet. I thank all the contributors and other staff who helped in this.

Hope this booklet will get enough traction and generate debate on the framework of the current analysis.

Our best wishes to all on 40th Foundation Day of NABARD.

Dr.K J S Satyasai
Chief General Manager,
Department of Economic Analysis and Research (DEAR),
NABARD, Mumbai

PART I

Agriculture and Farmers' Welfare in India

A state-wise analysis

K J S Satyasai
Ashutosh Kumar
Neha Gupta

Contents

ABBREVIATIONS

NAFIS	NABARD All India Financial Inclusion Survey
FPOs	Farmer Producer Organizations
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GoI	Government of India
GSDP	Gross State Domestic Product
GVA	Gross Value Added
GVO	Gross Value Output
MoA & FW	Ministry of Agriculture and Farmers Welfare
MoSPI	Ministry of Statistics and Programme Implementation
PSL	Priority Sector Lending
RIDF	Rural Infrastructure Development Fund
SMF	Small and Marginal Farmers
UTs	Union Territories

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Farmers' Welfare in India

A state-wise analysis

K J S Satyasai, Ashutosh Kumar and Neha Gupta*

Abstract

Disparate agricultural development across regions and states has generated much interest among academicians and policy makers alike. Development literature is replete with comparative studies to understand the pattern of agricultural development across states as also the factors behind such disparities. Most studies measured inter-state variations in output, gross domestic product or gross value added and explained the differences in terms of differential input use, infrastructure, etc. The focus has been on production. Since there is a paradigm shift from production to farmers' income and further, farmers' welfare as enunciated by Dalwai Committee, the present paper seeks to identify indicators that can represent various dimensions of farmers' welfare drawing on the Lalit Modi Memorial lecture by Dr.Ashok Dalwai in 2019. Thus, we have 21 indicators under six dimensions, viz., production, post-production, infrastructure, social development, ecological aspects, and policy & fiscal environment. Besides, the paper explored inter-state variation in a wide ranging aspects pertaining to agriculture. Besides, we also attempted to construct Farmers' Welfare Index (FaWI) combining 21 indicators. Punjab is at the top with an index value of 0.58 and Rajasthan at the bottom with an index value of 0.19.

Introduction

The novel Coronavirus (COVID-19) pandemic has rapidly spread across the world, adversely affecting the lives and livelihoods of millions across the globe. This once in a century pandemic and subsequent lockdowns imposed around the globe has caused simultaneous disruptions to both supply and demand and have adversely affected every aspect of human life. During the year 2020-21, Indian economy shrank by 7.3 percent. However, Agriculture has emerged as the silver lining with record-breaking agricultural production and agri-GDP rising by 3.63 percentage providing the cushion to the economic shock induced by COVID.

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The economic contraction is generally expected to have a profound impact on standard of living, poverty levels and other socio-economic indicators. However, highest ever food grain production, growth in agri GDP have worked as a panacea preventing a bad situation from turning much worse. This has led to increase in rural consumption, which in turn, provided some cushion to the economy. This scenario has again put agriculture in the sharp focus, and it is important to study the state of agriculture in the country, challenges and solutions.

India exhibits considerable heterogeneity in geography, climate, infrastructure, soil conditions, environment, socio-culture, exposure to technologies, access to credit, literacy level, variations in income growth, etc. Indian states differ considerably in the land holding pattern, technique of production, input use, productivity and marketing structures. In the past few years, there is considerable convergence towards the better performing states in the country. Thus, the study of agriculture at the state level assumes great importance. This paper analyses the variation among the states in terms of usage of inputs, agriculture dependency, and policy recommendation for the improved performance.

According to Census 2011, out of the total workers of 481.7 million, there are 118.7 million cultivatos and 144.3 million agricultural labourers, which mean approximately 54.6 per cent of the total workers, were employed in agriculture and allied sector. However, the percentage share of workers engaged in agriculture sector has been declining. As per Labour Bureau Report 2015-16, 46.1 per cent of the working population was employed in agriculture and allied sector. Further, as per an ILO estimate, employment in agriculture sector as percentage of the total employment was approximately 44 per cent in the year 2018. As per 10th Agriculture Census 2015-16, the total number of operational holdings in the country was 146 million and total operated area was 157.14 million hectares in 2015-16.

Agriculture plays a significant role in the development of the Indian economy. However, the contribution of agriculture to GDP has gone down from 52 per cent in the 1950s to 30 per cent in the 1990s and further below 20 per cent from 2010 onwards. In 2019-20, the share of Agriculture & Allied GVA in overall GVA at 2011-12 prices was 14.4 per cent and at current prices was 16.14 per cent. Accelerating the

growth of agriculture sector is necessary to increase incomes of those dependent on agriculture to ensure inclusiveness.

Indian agriculture and allied sector broadly cover four activities, *viz.*, crop, livestock, forestry and fisheries. To stimulate the productivity of these activities, Government of India (GoI) has, from time to time, given policy thrusts which led to the various agricultural revolutions, *viz.*, green revolution in cereal production (late 1960s-early 1980s) which was succeeded by the white revolution in milk production (starting in the 1970s), the gene revolution in cotton production, (in early 2000) and the blue revolution which focused on increasing fisheries production and productivity (1973-2002). As a result, the agriculture sector has not only become self-sufficient but has emerged as the net exporter of several agricultural commodities like rice, marine products, cotton, *etc.*

India exhibits considerable heterogeneity in geography, climate, infrastructure, soil conditions, environment, socio culture, exposure to technologies, access to credit, literacy level, variations in income growth, etc. In recent years, a number of studies have investigated the trend in regional disparities in economic development among the Indian states and the findings showed that there is a steady rise in regional disparities. (Cashin & Sahay, 1996; Bajpai & Sachs, 1996; Nagaraj et al., 1998; Rao et al., 1999; Aiyar, 2001; Sachs et al., 2002; Trivedi, 2002; Purfield, 2006; Nayyar, 2008). This paper analyses the differences among the states with a special focus on the role of agriculture, which has been considered as the most important source of economic growth. With a view to accelerate agricultural growth, both the central and the state governments have initiated several measures, major being land reforms and large investments in irrigation, roads and other rural infrastructure. In spite of the efforts taken, the agricultural growth has been concentrated in a few select Indian states in the north and south. The states falling in the central, eastern and north eastern regions have lagged behind although there has been evidence to indicate an improvement in their agricultural growth in recent years. This paper brings out the regional variations among the states on several agricultural aspects.

The rest of this paper is organised into various sections covering the analytical framework explaining the concept of farmers' welfare and its dimensions, methodology and database; demographic aspects of agricultural/rural households;

pre-production and post-production factors; infrastructure -physical, financial and social; policy and fiscal aspects; and, ecological factors.

Analytical Framework

The variation across the states is an interesting discourse in literature. Inter-regional variations are studied with a view to understand what makes certain states better and what lessons the less developed states can learn from them. Such variations in various agricultural indicators are captured in various earlier studies using different frameworks. A few studies and reports even constructed an index to capture inter-state variations. NITI Aayog is working on an Agriculture Transformation Index, which will measure the performance of States across six pillars: inputs, sustainability, productivity and diversification, policy, preservation, processing and exports, and farmers' income and welfare. The index is aimed at capturing the new policy paradigm in agriculture—at the core of which are sustainable intensification and increasing farmers' income. All these studies looked at output and/or input aspects. This approach leaves certain dimensions. This paper proposes to adopt a farmers' welfare framework. Dalwai (2019) has elaborated the concept of farmers' welfare and listed the following indicators that can reflect farmers' welfare:

- both absolute and relative average income;
- availability and accessibility to social security system – education, health, etc.;
- facilitating the farmer in moving up Maslow's need hierarchy beyond social security

Some of the estimated measures suggested are:

- average monthly income and consumption expenditure and the resultant saving / surplus;
- income spread amongst agricultural households belonging to different size classes of land holding;
- comparative monthly income of agricultural households vis-à-vis other professional classes;
- relative monthly income of agricultural households vis-à-vis the national average of the whole population;
- percentage of farmers below poverty line

He also suggested additional measures of welfare as below:

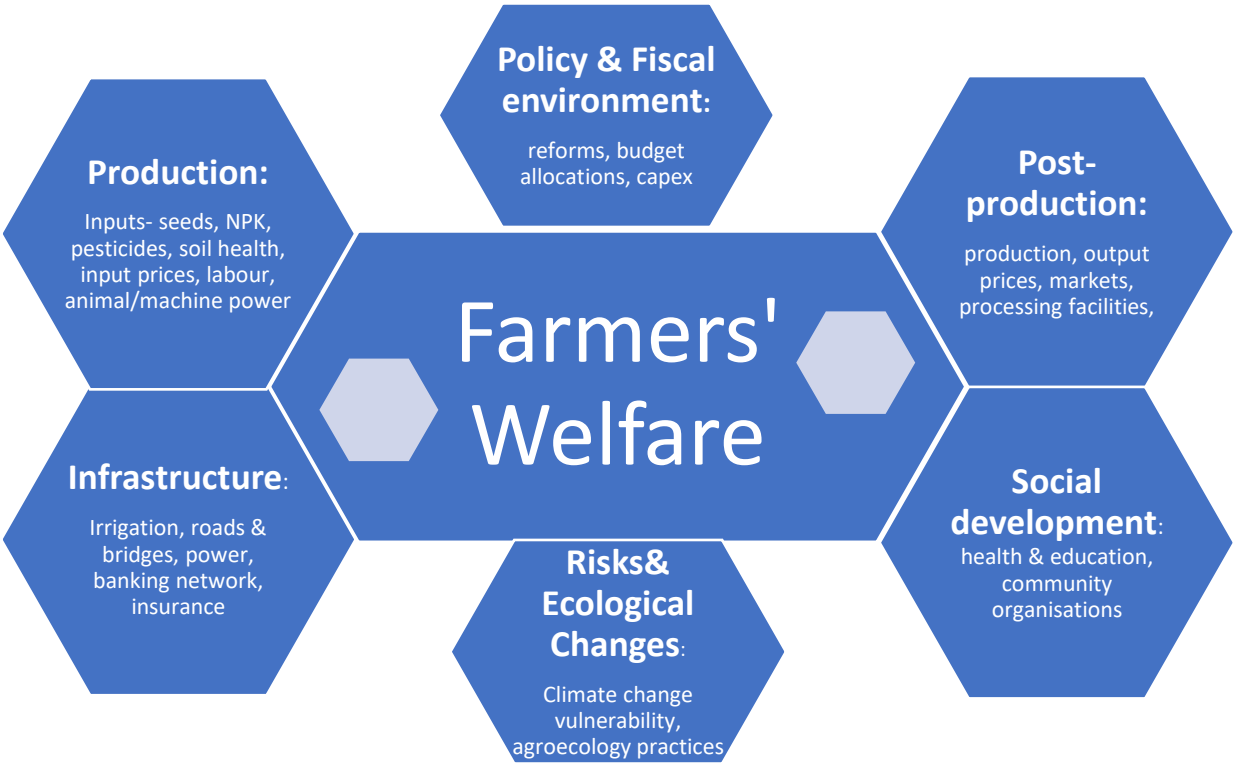
- average size of indebtedness and access to institutional credit;
- average amount of investments in creating productive assets;

- average rate of literacy; and
- state of health of the family [life expectancy at birth, Infant Mortality Rate (IMR), Material Mortality Rate (MMR)]

Looking from farmers' welfare perspective is a welcome approach. As the focus changed from production to income with the announcement of the goal of doubling farmers' income by 2022 and the renaming the Ministry of Agriculture to Ministry of Agriculture and Farmers Welfare (MoA&FW), the paradigm shift is needed towards farmers' welfare.

In this paper, taking cue from the above, we propose to adopt the farmers' welfare framework and discuss the related indicators (Figureure 1). We can understand farmers' welfare in terms of six dimensions. Production, post-production factors that can enhance or diminish welfare of farmers can range from input availability, costs and quality, labour availability and wage rates, output prices, market access, post-harvest facilities, etc. These backward and forward linkages will be effective if the physical and financial infrastructure facilities such as connectivity, irrigation, power, banking network and penetration, among others. Social infrastructure such as education and health facilities, network of community organisations, degree of social capital built up, and so on. Superimposed on these 4 dimensions are policy environment and ecological forces that would moderate the level of farmers' welfare. Accordingly, we compiled data on various indicators under these 6 dimensions to understand the level of farmers' welfare across states. We also attempt to combine these indicators into dimension indices and then a composite index of farmers' welfare. All these indicators will defined such that higher the value, higher would be the farmers' welfare.

Figure 1: Framework for understanding farmers' welfare



We have identified 21 indicators representing the above 6 dimensions as listed in Table 1. Some of these indicators are the dimension indices culled from EPWRF (2020).

Table 1: Indicators along with dimensions identified to create the indices

Dimension	**Indicator**
Production	No of soil health cards issued per ha of NSA
	EPWRF Agri index covering 10 indicators such as value of production, density of veterinary institutions, etc
	EPWRF Irrigation index – covering 2 indicators: % Gross Irrigated Area as percentage of Gross Cropped Area (GCA) and Cropping Intensity
Post-production	Average Monthly Agri Household Income (Ag) from NAFIS 2016-17
	Ratio of Agri HH income to Non-agri HH income
	No of rural primary and wholesale markets per lakh ha of GCA
	Number of registered/unincorporated processing units per ₹ 1 million value of production
Infrastructure	Agriculture Credit/Ha (₹ Lakh)
	Rural branches per one lakh Operational holding
	Electricity consumption per ha of NSA
	EPWRF Road connectivity index
	EPWRF Electrification index

Dimension	Indicator
	EPWRF Telecommunication index
	Financial Inclusion index- Nafindex (NABARD)
Social development	EPWRF Health index
	EPWRF Education index
	EPWRF Drinking Water, Sanitation and Housing index
Ecological dimensions	EPWRF Environment index
	Percentage of non-degraded land over total land area (computed from NITI Aayog SDG dashboard data)
	SDG-Life on Land index (NITI Aayog SDG dashboard data)
Fiscal dimension	Public expenditure on agri and allied sectors/OH (Rs.'000)-TE2019-20 average

We constructed the dimension indices (Di)using the following formula:

Di = (Actual value – Minimum value)/(Maximum -Minimum value)

Dimension indices of indictors within a dimension are combined using simple average with equal weights. Such dimension indices are combined by taking arithmetic average to compute Farmers' Welfare Index (FaWI).

It should be noted that the purpose of this exercise is just to understand the variation and the value of the index or the indicators may not be used to interpret it for any other purpose or judge states.

The data are collected from various sources such as RBI, MoSPI, MoA&FW, NITI Aayog, NABARD, etc. on GDP, Agricultural GVA, GVO, income, yield, credit, etc. for different states. In this paper, we have presented state-wise data in tables and maps as heatmaps to make the pattern across states visible.

Rural Demography

This section covers general features of the states and demographics of rural population (Table 2). Indian states are diverse in terms of geographical area with Rajasthan (34224 thousand ha) and Goa (370 thousand ha) at extremes. In terms of agricultural operational holdings (OH) Uttar Pradesh tops with 238.22 lakh holdings and Sikkim has the lowest with 0.72 lakh holdings. The density of OH per sq km of geographical area is highest in Kerala (195.2) followed by Bihar (174.3) and Uttar Pradesh (98.9) at the top end. At the bottom end, we have Manipur (6.7), Mizoram (4.3) and Arunachal Pradesh (1.3).

Density of rural population was highest in Bihar at 981 per sq km which is 280 people higher compared to the second ranking West Bengal (701) and several times higher than the lowest ranking Arunachal Pradesh (13).

Table 2: State-wise population density and literary ratio

States	Area (000 ha)	Rural population %	Rural density	Rural sex ratio	Operational holdings	Density of Agri OH/km²
Andhra Pradesh	16297	70.4	213	993	8524000	52.3
Arunachal Pradesh	8374	77.1	13	953	113000	1.3
Assam	7844	85.9	342	960	2742000	35.0
Bihar	9416	88.7	981	921	16413000	174.3
Chhattisgarh	13519	76.8	145	1001	4011000	29.7
Goa	370	37.8	149	1003	75000	20.3
Gujarat	19602	57.4	177	949	5321000	27.1
Haryana	4421	65.1	373	882	1628000	36.8
Himachal Pradesh	5567	90.0	111	986	997000	17.9
Jammu& Kashmir	NA	NA	NA	NA	NA	NA
Jharkhand	7972	76.0	314	961	2803000	35.2
Karnataka	19179	61.3	195	979	8681000	45.3
Kerala	3886	52.3	450	1078	7583000	195.2
Madhya Pradesh	30825	72.4	171	936	10003000	32.5
Maharashtra	30771	54.8	200	952	15285000	49.7
Manipur	2233	70.8	91	969	150000	6.7
Meghalaya	2243	79.9	106	986	232000	10.3
Mizoram	2108	47.9	25	952	90000	4.3
Nagaland	1658	71.1	85	940	197000	11.9
Odisha	15571	83.3	225	989	4866000	31.3
Punjab	5036	62.5	344	907	1093000	21.7
Rajasthan	34224	75.1	150	933	7655000	22.4
Sikkim	710	74.8	64	882	72000	10.1
Tamil Nadu	13006	51.6	286	993	7938000	61.0
Telangana	11210	61.3	193	999	5948000	53.1
Tripura	1049	73.8	259	955	573000	54.6
Uttar Pradesh	24093	77.7	645	918	23822000	98.9
Uttarakhand	5348	69.8	132	1000	881000	16.5
West Bengal	8875	68.1	701	953	7243000	81.6
India	**328726**	**68.85621**	**254**	**949**	**146454000**	**44.5**

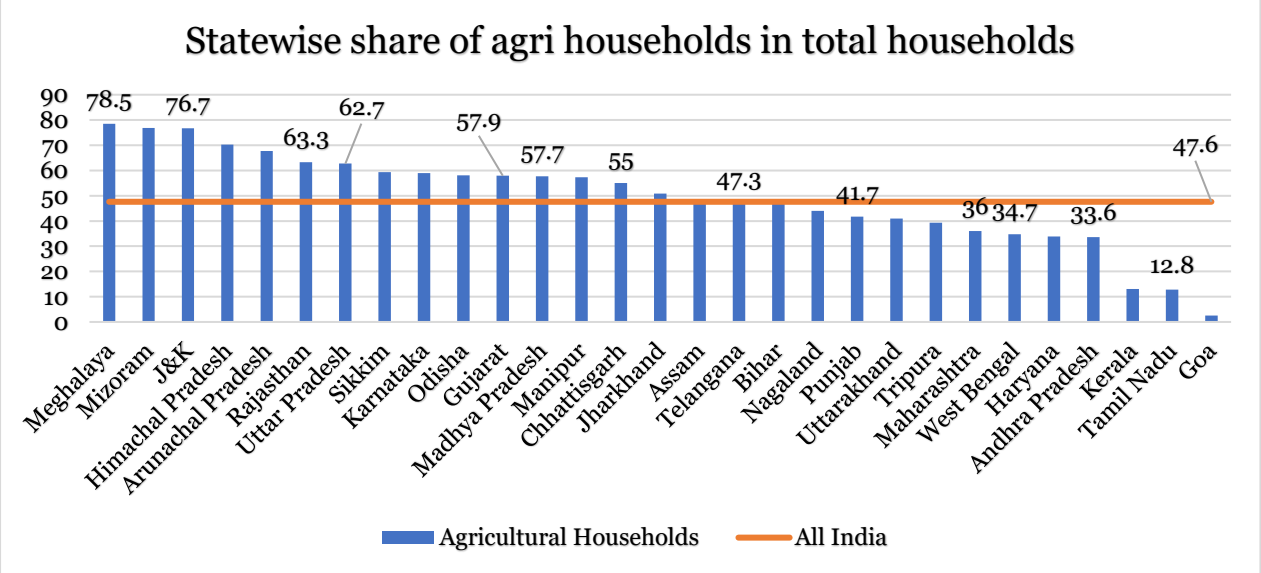
Source: Census, 2011, Agricultural Census, 2015-16

Agricultural Households

The livelihood dependence on agriculture is ascertained by the share of agriculture households in total households and share of agri workers to total workers. As per NABARD All India Rural Financial Inclusion Survey (NAFIS) 2016-17 agriculture households are those households who earn a minimum of ₹5000 from agriculture operations (agriculture and allied activities) and having at least one member self-employed in agriculture during last 365 days. The state wise percentage share of agricultural households to the total number of households in the state has been plotted in the following Figureure 1.

Higher proportion of agri households points towards a higher dependency on agriculture. Industrial states like Tamil Nadu (12.8%), Maharashtra (36%) and Andhra Pradesh (33.6 %) have a lower proportion of agri households in total households in comparison to non-industrial states like Uttar Pradesh (62.7 %), Madhya Pradesh (57.9%) and Rajasthan (63.3 %).

Figure 1: State-wise share (%) of agricultural households in total households



Source: NAFIS 2016-17, NABARD

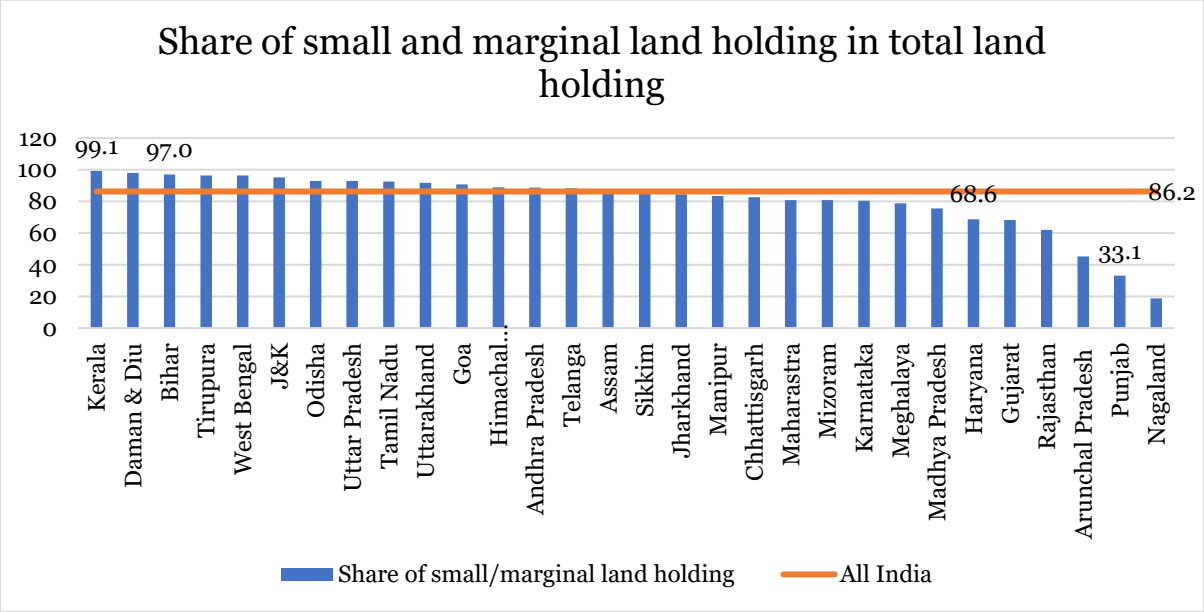
Pre-production factors influencing farmers' welfare

This section presents the indicators pertaining to pre-production phase or backward linkages that may influence the farmers' welfare. Land, labour, input use and cost of cultivation related aspects are discussed.

Operational Land holdings

As per 10th Agriculture Census 2015-16, the total number of operational holdings in the country was 146.45 million and total operated area was 157.82 million hectares. The small and marginal holdings taken together (0.00-2.00 ha) constituted 86.2 per cent of the total number of operational holdings, while their share in the operated area stood at 47.34 per cent in 2015-16. In comparison, semi-medium and medium land holding farmers owning between 2-10 hectares of land account for 13.2 percent of all farmers but own 43.6 percent of crop area. The large holdings (10 ha and above) were merely 0.57 percent of total number of holdings in 2015-16 and had a share of 9.04 per cent in the operated area as against 0.71 per cent and 10.59 per cent, respectively for 2010-11 census. The average size of land holding in 2015-16 was 1.08 hectare as against 1.15 during 2010-11. The census 2015-16 also found out that the percentage share of female operational holders has increased from 12.79 per cent in 2010-11 to 13.87 per cent in 2015-16. In terms of operated area, the share of women increased from 10.36 per cent to 11.57 per cent during the same period.

Figure *2: State wise percentage share of Marginal and Small operational holdings to Total holdings*



Source: Agricultural Statistics at a glance, 2018

Efficiency in land and irrigation use

State-wise net sown area, cropping intensity, gross irrigated area, net irrigated area and irrigation intensity have been provided in Table 3. In India, the net sown area increased by about 18 percent from 119 million ha in 1950-51 to 140 million ha in 2014-

15 whereas the cropping intensity has increased from 111 percent to 141 percent during the same period. The improvement in cropping intensity and, consequentially, farm produce is attributable to growth of farm power during the last few decades, the adoption and application of package of farm machinery and technology for agricultural mechanization. From 1971-72 to 2012-13, the share of tractor (6.8% to 45.8%) and electric motor (14% to 26.8%) in farm power availability has increased and the share of agricultural workers (15.4% to 5.1%) and animals (45.4% to 5.1%) have reduced.

There is state-wide variation in India in cropping intensity with Punjab, Haryana, West Bengal, Uttar Pradesh's cropping intensity higher than national average and Gujarat, Karnataka, and Odisha's cropping intensity lower than national average. Such variation is mainly on account of availability of irrigation facilities and new technologies which has made it possible to raise short-duration crops.

The state-wide statistics of irrigation intensity shows a variation in the irrigation intensity. The sate wise variation in irrigation intensity is due to varied geographical conditions in different parts of the country. Rugged mountains, sandy deserts and rocky terrains without aquifers have very poor facilities of irrigation. Fertile alluvial plains with perennial rivers have higher irrigation intensity. Hence, the highest intensity of irrigation exists in Punjab and Haryana, the Ganga-Yamuna Doab of Uttar Pradesh, Bihar, West Bengal and Godavari Krishna Deltas. Haryana and Punjab with nearly 100 per cent irrigated states have higher irrigation intensity whereas Assam, Kerala, and Maharashtra, which are rainfed states, are characterised by low irrigation intensity.

Table 3 : State-wise Gross Sown Area, Net Sown Area, Cropping Intensity, Net Irrigated Area, Gross Irrigated Area and Irrigation Intensity in 2015-16 (000 ha)

States	Gross Sown Area	Net Sown Area	Cropping Intensity (%)	Gross Irrigated Area	Net Irrigated Area	Irrigation Intensity (%)
Andhra Pradesh	7532	6209	121	3547	2743	129
Arunachal Pradesh	301	227	133	56	56	100
Assam	4060	2801	145	388	297	131
Bihar	7572	5205	146	5247	2958	177
Chhattisgarh	5640	4651	121	1753	1476	119
Goa	157	130	121	39	39	100

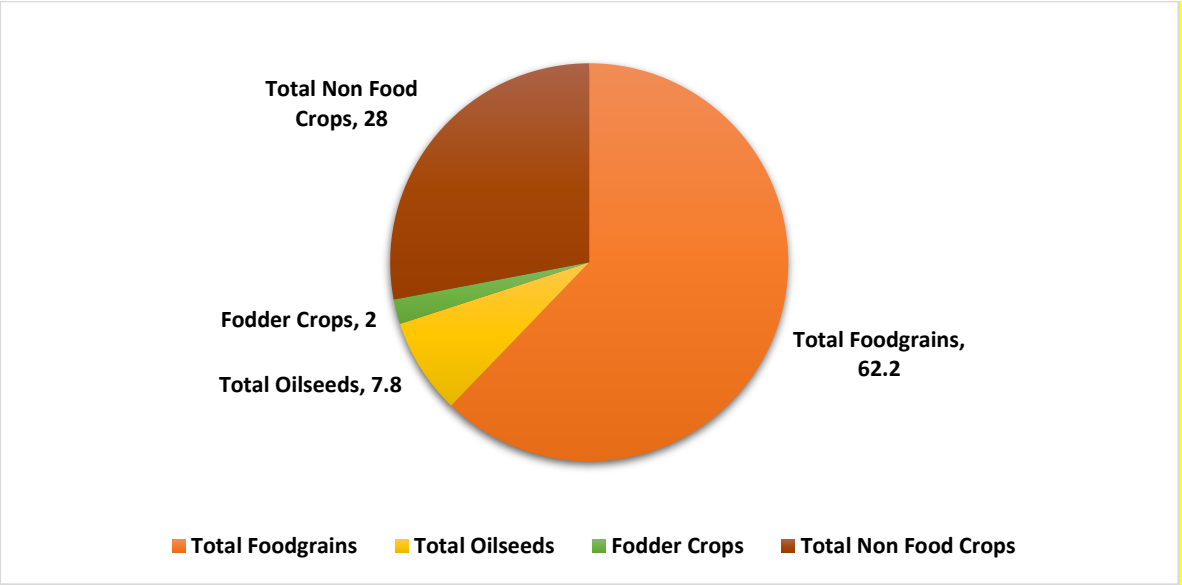
States	Gross Sown Area	Net Sown Area	Cropping Intensity (%)	Gross Irrigated Area	Net Irrigated Area	Irrigation Intensity (%)
Gujarat	11522	10302	112	6037	4233	143
Haryana	6510	3522	185	5948	2956	201
Himachal Pradesh	933	551	169	206	120	172
Jammu and Kashmir	1159	754	154	519	356	146
Jharkhand	1812	1386	131	235	213	110
Karnataka	12009	10006	120	3742	3243	115
Kerala	2628	2023	130	484	414	117
Madhya Pradesh	23714	15149	157	10029	9284	108
Maharashtra	23467	17192	137	4736	3215	147
Manipur	437	437	100	73	73	100
Meghalaya	303	245	123	127	80	159
Mizoram	188	145	130	31	16	194
Nagaland	504	384	131	114	104	110
Odisha	4803	4198	114	1434	1230	117
Punjab	7872	4137	190	7765	4137	188
Rajasthan	25014	18024	139	10562	7938	133
Sikkim	137	77	177	16	16	100
Tamil Nadu	6074	4833	126	3575	2833	126
Telangana	4893	4175	117	2028	1486	137
Tripura	486	255	190	117	81	144
Uttar Pradesh	26203	16469	159	20882	14231	147
Uttarakhand	1083	698	155	541	330	164
West Bengal	9881	5243	189	6325	3105	204
ALL INDIA	197054	139506	141.2	96614	67298	143

Source: RBI Handbook of States

Cropping pattern

The overall percentage distribution of principal crops under gross cropped area indicate that the major share of area is under food grains (cereals, millets and pulses) followed by non-food crops (cotton, jute, mesta, sugarcane, tea and coffee) and oils seeds (groundnut, castor, sesamum, rapeseed & mustard, linseed and coconut).

Figure 2: Cropping pattern 2014-15



Source: Directorate of Economics and Statistics, DAC & FW

Input use

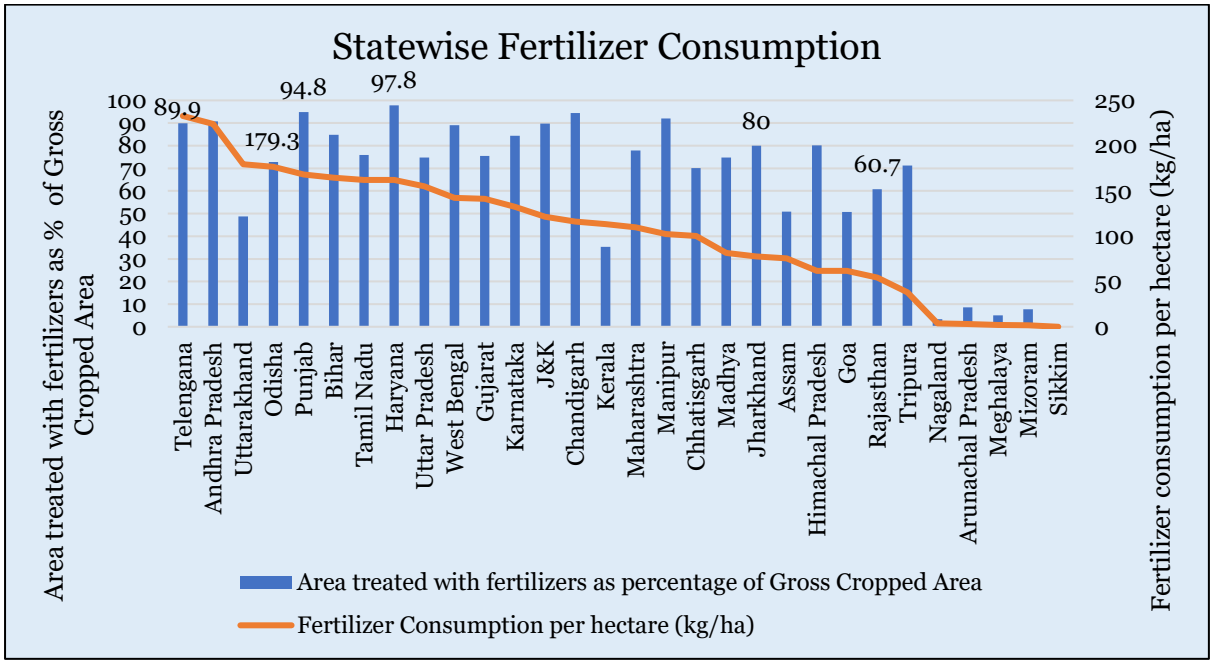
Farm inputs determine the fate of farmers even in a normal monsoon year. These inputs, including seeds, fertilizers, pesticides, machines and appliances, irrigation, etc., in turn depend on the business and industry dealing with the production and sales of these products and related services. The quality, quantity and prices related information about these inputs determine the costs of production of the agricultural produce. The productivity of farm depends greatly on the availability and judicious use of farm inputs by the farmers (Singh 2019).

State-wise consumption of Fertilizer per Hectare

Fertilizers play a pivotal role in increasing the crop production and yield. The consumption of fertilizers has increased tremendously from the green revolution period with the usage of High Yielding Varieties.

It is evident that the average consumption of fertilizer in the southern zone and northern zone are higher than the all India average consumption. The remaining zones are seen to be consuming lesser than the national average consumption. After the introduction of the Soil Health Cards Scheme in 2015-16, the usage of average fertilizer consumption in the southern states started declining from 191.80 kg/ha in 2015-16 to 152.66 kg/ha in 2018-19. The trend is fluctuating in the other zones including at the all India average.

Figure 3: State-wise percentage of area treated with fertilizer, consumption per hectare



Source: Input Survey 2016-2017, Agriculture Census Division, Department Of Agriculture, Cooperation & Farmers Welfare, Ministry Of Agriculture & Farmers Welfare, New Delhi 2021

States like Punjab and Haryana have more than 90 percent of Gross Cropped Area (GCA) treated with fertilizers while Rajasthan has only 60 percent of GCA treated with fertilizers. Fertilizer consumption per hectare is lowest in the North Eastern States.

The actual use of nitrogenous fertilizer is higher than the normative level in the states of Andhra Pradesh, Assam, Punjab, Bihar, Haryana and Jharkhand and it is near optimal in Odisha (Table 4). In all other states, the actual nitrogen use remains below the recommended norms (Chand and Pavithra, 2015). The Government has issued soil health cards, which provides current nutrient availabilities in the soil, and recommended level of input use for a given field. This would greatly benefit in addressing fertilizer use imbalance as the normative levels are derived at field level than at the state level.

Table 4: Deviation of actual use of fertilizer from normative use

State	Deviation of actual use of NPK from normative (A-N/N)	(100-Deviation from normative NPK use)
Andhra Pradesh	44.02	56
Arunachal Pradesh	NA	NA
Assam	-6.85	93.2
Bihar	1.57	98.4
Chhattisgarh	-45.09	54.9
Goa		
Gujarat	-13.85	86.2
Haryana	3.58	96.4
Himachal Pradesh	-65.48	34.5
Jammu & Kashmir	-35.41	
Jharkhand	-11.98	88
Karnataka	-10.98	89
Kerala	-63.9	36.1
Madhya Pradesh	-35.7	64.3
Maharashtra	-9.57	90.4
Manipur		
Meghalaya		
Mizoram		
Nagaland		
Odisha	-16.66	83.3
Punjab	19.38	80.6
Rajasthan	-43.99	56
Sikkim		
Tamil Nadu	-1.38	98.6
Telangana		
Tripura		
Uttar Pradesh	-24.8	54.9
Uttarakhand	-45.08	75.2
West Bengal	-44.72	55.3
India	-17.44	82.6

Source: Chand and Pavithra

Cost of cultivation of major crops

The major crops produced in the states and the cost of cultivation is presented in Table 5. The disparities in the cost of cultivation of major crops in the different states is visible very clearly. The cost of cultivation for each crop in states differ due to the availability of agricultural inputs such as HYV seeds, machineries, tools, usage of fertilizers, etc.

Table 5: State wise Cost of Cultivation for Major Crops (2015-2016) (₹/hectare)

States	Paddy	Wheat	Maize	Gram	R&M	Cotton
Andhra Pradesh	53108	-	43025	34335	-	52788
Assam	37430	-	-	-	27449	-
Bihar	29791	29056	30253	21810	18603	-
Chhattisgarh	35160	-	-	19678	-	-
Gujarat	43128	31437	36451	-	29980	55082
Haryana	47711	34838	-	26386	26753	43177
Himachal Pradesh	28309	23869	27321	-	-	-
Jharkhand	25948	19984	29460	16847	-	-
Karnataka	52393	22662	35270	20585	-	44677
Kerala	59327	-	-	-	-	-
Madhya Pradesh	31688	26918	27510	24723	20473	62768
Maharashtra	58449	39628	56845	28491	-	57650
Odisha	44710	-	40254	-	-	47623
Punjab	41137	29745	39756	-	-	46049
Rajasthan	-	38784	36543	19894	27647	49384
Tamil Nadu	55451	-	65465	-	-	78019
Uttar Pradesh	41777	36057	28553	24662	27539	-
Uttarakhand	31718	30029	-	-	-	-
West Bengal	55714	37254	-	-	33842	-

Source: Directorate of Economics and Statistics, 2017

Gross Capital Formation (GCF) in Agriculture

Investment in agriculture has two components *viz*., the Gross Fixed Capital Formation (GFCF), which includes primarily the investment in physical assets in agriculture, and the stocks which are presently in the form of inventories but which are not actually used for further production, although they could be used. The two components taken together constitute the Gross Capital Formation (GCF).

Capital formation in agriculture helps in improving the stock of equipment, tools and productivity of natural resources, which, in turn, enables the farmers to use their resources, particularly land and labour, more productively. Creation of capital goods, thus, is necessary for raising productivity of existing resources and realising the long-term growth potential. There is positive relationship between capital formation and agricultural growth, and agricultural growth and poverty alleviation.

The GCF in agriculture and allied sectors relative to GVA in this sector has been showing a fluctuating trend from 16.5 per cent in 2012-13 to 15.5 per cent in 2017-18 and increased again to 16.4 per cent in 2018-19 (Table 6).

Table 6: Gross Capital Formation (GCF) in Agriculture and Allied Sectors relative to GVA of the India at Constant Prices (2011-12) prices

Year	GCF of agriculture & allied sector (₹ Crores)	GVA of agriculture & allied sector (₹ Crores	GCF of agriculture & allied sector as percentage of GVA (in percentage)
2012-13	251094	1524288	16.5
2013-14	284424	1609198	17.7
2014-15	272663	1605715	17.0
2015-16	237648	1616146	14.7
2016-17	267153	1726004	15.5
2017-18	283922	1828329	15.5
2018-19	306749	1872339	16.4

Source: Pocket Book of Agricultural Statistics, 2019

Investment in agriculture is undertaken by both public as well as by private sectors. While public sector investment in agriculture is undertaken for building necessary infrastructure, private investment in agriculture is made either for augmenting productivity of natural resources or for undertaking such activities, which supplement income sources of farmers. Private sector investment includes investments made by private corporates and households.

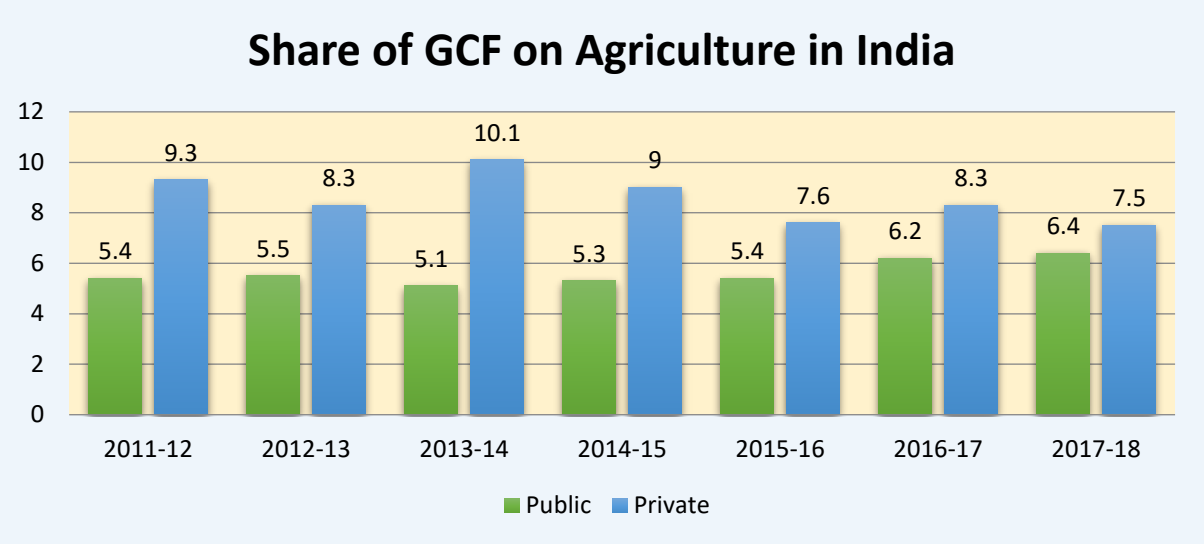
There exists a complimentary relationship between capital formation by public and private sector as the capital formation by public sector creates conducive conditions for capital formation by private sector. In the years from 2011-12 to 2017-18, share of GCF by private sector to total GCF has declined with no commensurate increase in share of public sector. A fall in the GCF especially by the public sector may have detrimental impact on agri growth and thus on incomes of farmers.

Share of Agricultural Labour to Total Workers in India

Bihar, Andhra Pradesh, Tamil Nadu and Chhattisgarh has higher proportion of agri labourers to total workers. In many states with higher proportion of agri workers, lot of agri labourers migrates to other states with lower percentage of workers and higher wages during the harvest season.

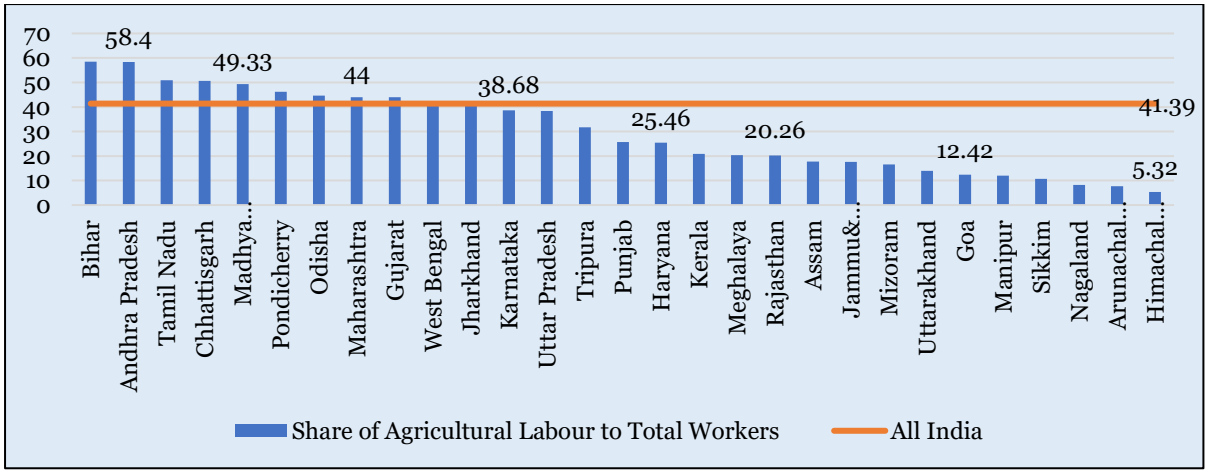
Higher proportion of agri labour points towards high agriculture dependency and falling size of land holdings over time. Farmers with uneconomic operational land holding size are compelled to work on other farmers' fields (Figure 5).

Figure 4: Percentage share of Public and Private Gross Capital Formation (GCF) in Agriculture to Overall GCF (2018)



Source: Ministry of Statistics and Programme Implementation

Figure 5: Percentage Share of Agricultural Labour to Total Workers



Source: Data.gov.in and Census 2011, Govt. of India

Post-production factors influencing farmers' welfare

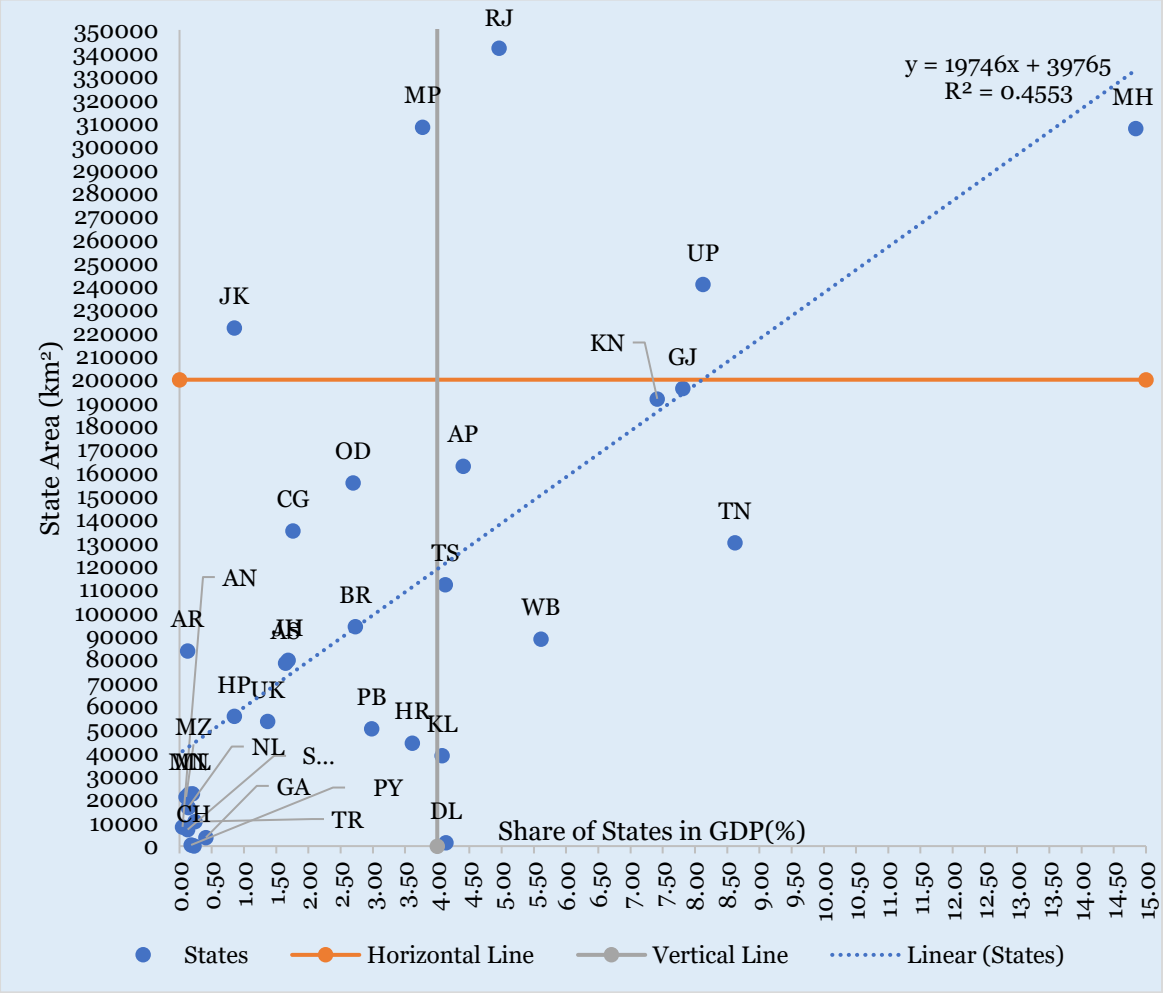
The following section covers the state wise share of agri GVA in total GVA, inputs, yield and income of agri households. Share of agri GVA in total GVA has been declining over the years on account of better performance of services and manufacturing sectors.

State-wise Gross Domestic Product (2018-19)

The state-wise percent share of Gross Domestic Product (2018-19) to the overall Gross Domestic Product at constant prices has been presented in the Figureure 6.

Maharashtra is a big state in terms of its area and population and has highest contribution to national GDP. However, states like Rajasthan and Madhya Pradesh, which are comparable in terms of area, does not have lower contribution to GDP at national level.

Figure 6: State-wise % share of GDP in National GDP (constant prices)



Source: NITI Aayog, 2019

Share of Agriculture and Allied Sector GVA

The share of agriculture and allied sectors' GVA in the Gross Value Added (GVA) of India at current prices has declined from 18.2 per cent in 2014-15 to 16.5 per cent in 2019-20. The share of agriculture and allied sectors in the total GVA of the country has been declining because of relatively higher growth performance of non-agricultural sectors.

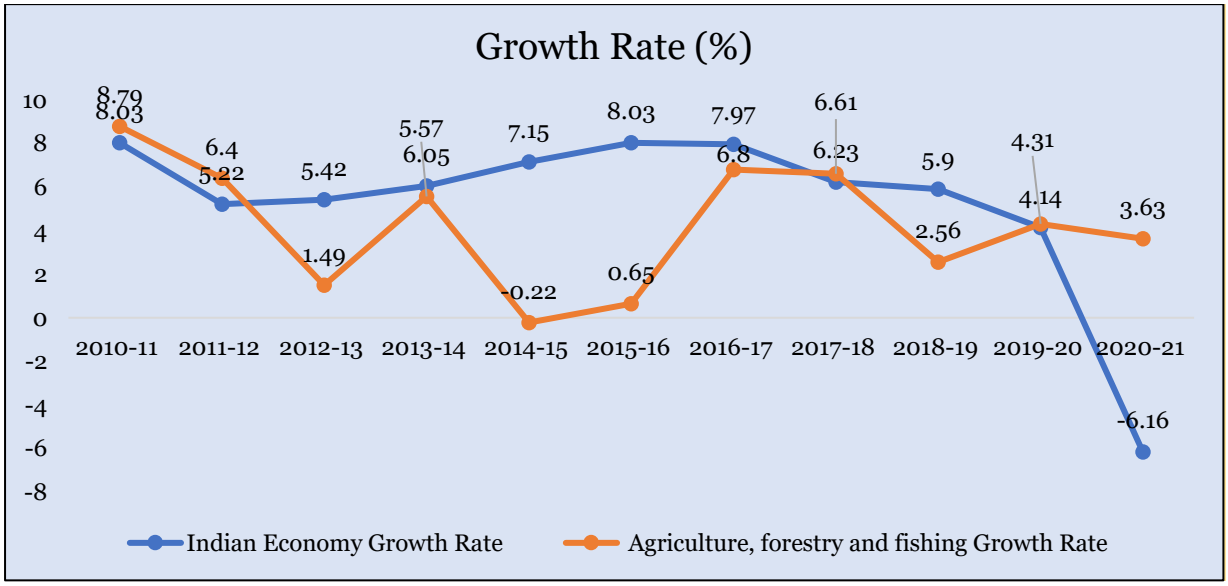
Growth of agriculture sector has been fluctuating as it is seen in the share of Agriculture and allied sectors in total GVA of the country at constant prices (Table 7). The volatility witnessed in Agriculture sector's growth rate is more than Indian economy's growth rate (Figure 7), as growth in agriculture and allied activities hinges on good food grains production, which is still dependent on the timely arrival and adequacy of rains during the monsoon. Allied sectors such as livestock acts as important income shock absorber to the farmers in the times of distress.

Table 7: Share of Agriculture and Allied Sectors in total GVA of the country at Constant Prices

Income	**Year**					
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**
GVA of agriculture and allied sector (₹ Crore)	2093612	2227533	2496358	2670147	2775852	3047187
Share of GVA of agriculture & allied sectors in GVA of total economy (per cent)	-0.2	0.6	6.3	5.0	2.9	2.8

Source: CSO, 2019

Figure 7: Indian Economy's and Agriculture's Growth Rate at constant prices (2011- 2012 series)

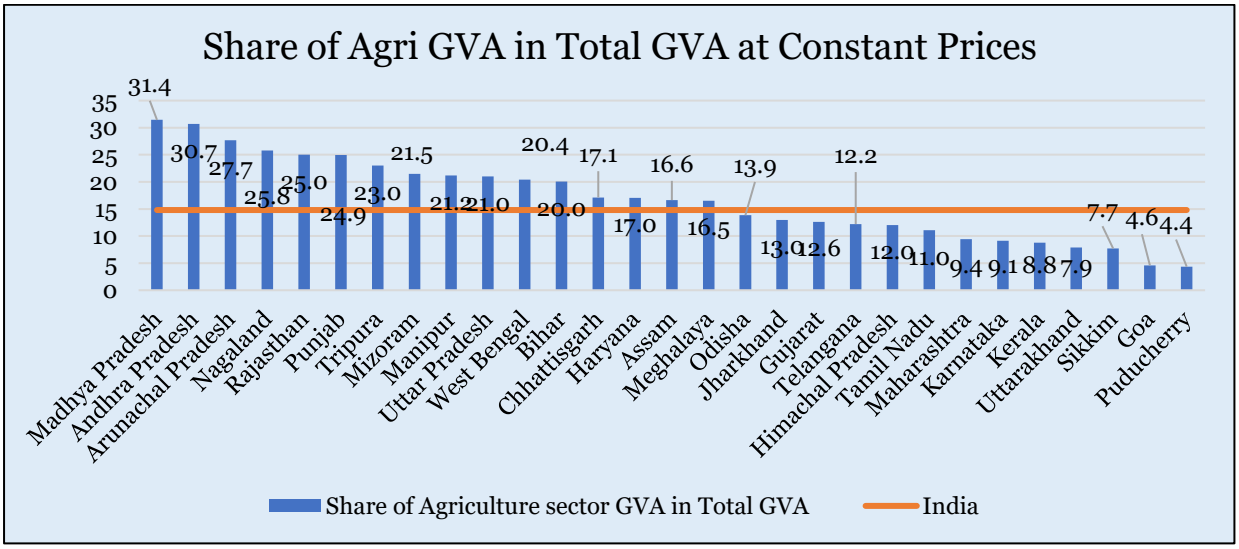


Source: CSO

State-wise Agricultural Gross Value Added

The state wise percentage share of agricultural Gross Value Added to the overall GVA at constant prices for the year 2018-19 has been presented in the chart below. Madhya Pradesh, which has highest share of agriculture in GVA, also recorded double-digit agriculture growth in past decade. Factors such as bringing markets closer to farmers and increasing the efficiency of the value-chains have emerged as important contributors for enhanced agricultural growth in Madhya Pradesh (wheat, soybean, pulses) (Gulati and Saini 2021). Industrial state like Gujarat had lower share of agri sector in its GVA but it has recorded growth in GVO of agriculture at 9.1 per cent per annum between 2001-02 to 2015-16 due to growth in livestock and cotton (Gulati and Saini 2021).

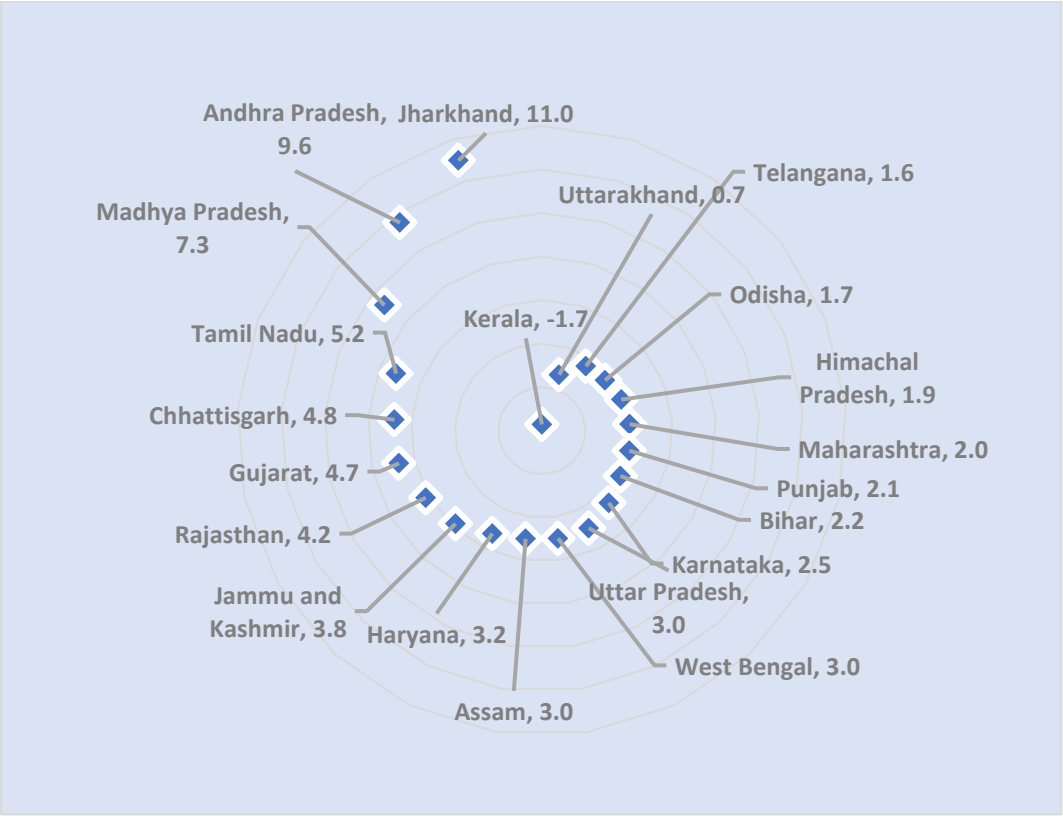
Figure 8: State-wise percentage share of Agricultural GVA in overall GVA at constant prices in 2018-19



Source: RBI

States vary in terms of their natural resource endowments, share of agriculture in overall state employment, contribution of agriculture to overall state gross domestic product (GDP) and, inter alia, in terms of the historical growth rate witnessed in their agriculture sector (Ashok Gulati 2021). States like Gujarat and Madhya Pradesh have experienced very high rates of agricultural growth, particularly during the last 10–15 years. On the other hand, Punjab has been experiencing low current growth rate, despite having exceptional historical performance.

Figure 9: State-wise agriculture (Agri GVSA) growth rate (%) in 2018-19



Productivity of major crops

The attainment of self-sufficiency in food grains was one of the most important objectives of agriculture policy. A significant acceleration in yield was observed in agriculture during the period of green revolution in 1960s. However, the spread of green revolution was highly skewed in favor of certain region and states leading to high growth in agricultural output while the other regions did not show similar growth in agriculture products and productivity.

There is a wide spread disparity in the yield of major crops in the different states (Table 8). The yield for each crop in states differ due to the availability of agricultural inputs (such as HYV seeds, machineries, tools, usage of fertilizers), geographical location, climate, weather, etc.

Table 8: State-wise Productivity of Major crops (2015-16)(Qtl./hectare)

States	Paddy	Wheat	Maize	Gram	Cotton
Andhra Pradesh	58.6	-	51.3	9.9	14.5
Assam	32.8	-	-	-	-
Bihar	27.5	26.8	32.6	15.7	-
Chhattisgarh	31.9	-	-	5.7	-
Gujarat	43.2	30.9	13.3	-	18.2
Haryana	52.3	43.1	-	14.2	8.4
Himachal Pradesh	20.3	13.2	13.7	-	-
Jharkhand	21.8	16.2	34.1	11.1	-
Karnataka	51.9	6.9	32.4	4.6	12.3
Kerala	43.5	-	-	-	-
Madhya Pradesh	22.0	30.6	17.7	11.7	13.6
Maharashtra	24.0	24.8	43.0	8.8	16.3
Odisha	35.3	-	37.9	-	12.2
Punjab	69.9	46.5	35.5	-	7.0
Rajasthan	-	37.5	17.1	7.8	15.7
Tamil Nadu	49.1	-	59.8	-	24.7
Uttar Pradesh	35.9	32.0	22.9	7.0	-
Uttarakhand	47.2	32.9	-	-	-
West Bengal	44.9	22.9	-	-	-

Source: Directorate of Economics and Statistics, 2017

Yield of paddy is very high in states like Punjab, Andhra Pradesh and Haryana whereas yield of wheat is higher in states like Punjab, Haryana and Rajasthan. As far as maize is concerned, Tamil Nadu and Andhra Pradesh are the two states with higher yield. Bihar and Haryana are the states where yield of gram is highest. The yield of gram ranged between 6.99 qtl per hectare and 15.7 qtl per hectare. Similarly, the yield of paddy ranged between 20.34 qtl per hectare in Himachal Pradesh and 69.89 qtl per hectare in Punjab. The yield of wheat ranged between 6.89 qtl per hectare (Karnataka) and 46.53 qtl per hectare (Punjab). The yield of cotton ranged between 6.97 qtl per hectare (Punjab) and 24.68 qtl per hectare (Tamil Nadu).

Agricultural Income

To analyze the disparity amongst the states, the state wise average monthly income per agricultural household as per NABARD All India Rural Financial Inclusion Survey (NAFIS) 2016-17 has been given in the Table 9. This table shows that some of the states like Punjab (₹23,133), Haryana (₹18,496) and Kerala (₹16,927) are having higher average income when compared to other states. It also highlights that the certain states such as Bihar (₹7175), Odisha (₹7731), Jharkhand (₹6991), Uttar Pradesh (₹6668)

and Madhya Pradesh (₹7919) are getting low average monthly income when compared to overall India's average monthly income (₹8931) per agricultural household.

Table 9: State-wise average monthly income per agricultural household (₹)

Particulars	Average Monthly Household Income (NAFIS) (A)	Average Monthly Agri Household Income (Ag)	Average Monthly Non-Agri Household Income (N)	Ratio Ag:N	Ratio A:Ag
Andhra Pradesh	5842	6920	5296	1.3	0.8
Arunachal Pradesh	9877	9072	11562	0.8	1.1
Assam	8880	9878	7985	1.2	0.9
Bihar	6277	7175	5474	1.3	0.9
Chhattisgarh	7272	8580	5675	1.5	0.8
Goa	10758	10687	10760	1.0	1.0
Gujarat	10518	11899	8617	1.4	0.9
Haryana	12072	18496	8775	2.1	0.7
Himachal Pradesh	11702	11828	11402	1.0	1.0
Jammu & Kashmir	10747	9355	15333	0.6	1.1
Jharkhand	5853	6991	4676	1.5	0.8
Karnataka	8383	10603	5193	2.0	0.8
Kerala	15130	16927	14863	1.1	0.9
Madhya Pradesh	6632	7919	4877	1.6	0.8
Maharashtra	8938	10268	8188	1.3	0.9
Manipur	9679	9861	9435	1.0	1.0
Meghalaya	10061	10039	10144	1.0	1.0
Mizoram	9491	9931	8034	1.2	1.0
Nagaland	10002	9950	10043	1.0	1.0
Odisha	7241	7731	6563	1.2	0.9
Punjab	16020	23133	10935	2.1	0.7
Rajasthan	8338	9013	7172	1.3	0.9
Sikkim	8560	8603	8497	1.0	1.0
Tamil Nadu	9716	9775	9708	1.0	1.0
Telangana	7811	8951	6787	1.3	0.9
Tripura	8612	7592	9271	0.8	1.1
Uttar Pradesh	6256	6668	5565	1.2	0.9
Uttarakhand	8762	10855	7309	1.5	0.8
West Bengal	6860	7756	6383	1.2	0.9
All India	8059	8931	7268	1.2	0.9

Agricultural Markets

The agricultural markets in India are underdeveloped and lack both horizontal as well as vertical integration. The markets involve number of intermediaries thereby increasing the prices from the point of production to point of consumption. Price

discovery, lack of infrastructure, grading, market fee and adequate standards are major issues of agricultural marketing (Chand, 2016). Agricultural Produce Market Committee Act (APMC act, 2003) has been amended so as to provide direct sale of farm produce, infrastructure development, freedom to market functionaries to operate in different markets, single levy of market fee etc. Some states have adopted and some have adopted it partially (Chand & Singh, 2016 and Pavithra et al., 2018). Gujarat was among the first state to amend the Agricultural Produce Marketing Committee (APMC) Act, which enabled farmers to directly sell their produce to wholesalers, exporters, industries and large trading companies without having to operate through commission agents. The state government has also pursued aggressive policies to promote diversification to high-value crops, especially fruit and vegetables and spices (Kaur & Dhillon, 2017).

Table 10: State wise availability of APMCs

Particulars	Total rural primary & wholesale markets per lakh ha of GCA	Total regulated markets per lakh ha of GCA	Number of registered/unincorporated processing units per GCA	Number of registered/unit corporated processing units per million value of production	Value of output in 2016-17 (mn)	value of output per hectare (₹ thousand)
Andhra Pradesh	4.3	4.3	21.3	0.2	677105.1	89.9
Arunachal Pradesh	24	0	16.6	0.0	20791.7	69.1
Assam	27.8	5.5	19.3	0.2	278290.8	68.5
Bihar	23.7	-	5.0	0.3	473295.3	62.5
Chhattisgarh	19.9	3.3	8.4	0.1	312190.3	55.4
Goa	17.7	5.1	3.9	0.3	11808.4	75.2
Gujarat	2.7	3.2	23.7	0.1	1011399.9	87.8
Haryana	7.4	4.3	24.4	0.1	482138.1	74.1
Himachal Pradesh	8.2	5.7	64.4	0.2	90413.4	96.9
Jammu & Kashmir	0.7	1	10.8			0.0
Jharkhand	48	12	30.0	0.6	186328.8	102.8
Karnataka	10.1	4.2	4.4	0.2	646740.6	53.9
Kerala	52.1	-	9.9	0.3	283635.7	107.9
Madhya Pradesh	0	2.2	16.4	0.1	1252554.9	52.8
Maharashtra	18.8	3.9	8.5	0.2	1345680	57.3
Manipur	31.6	-	4.1	0.2	28520	65.3
Meghalaya	35	0.6	30.2	0.2	20446.9	67.5
Mizoram	197.6	-	17.2	0.1	10481.6	55.8

Particulars	Total rural primary & wholesale markets per lakh ha of GCA	Total regulated markets per lakh ha of GCA	Number of registered/unincorporated processing units per GCA	Number of registered/unit corporated processing units per million value of production	Value of output in 2016-17 (mn)	value of output per hectare (₹ thousand)
Nagaland	38.7	3.6	13.5	0.1	32931.9	65.3
Odisha	30	8.4	32.8	0.2	343774.4	71.6
Punjab	23.1	5.4		0.1	583309	74.1
Rajasthan	2.9	1.7	0.6	0.1	932622	37.3
Sikkim	12.9	-	250.3	0.0	11154.7	81.4
Tamil Nadu	0	4.8	19.3	0.4	479967.5	79.0
Telangana	4.1	4.1	13.9	0.3	326753.4	66.8
Tripura	-	-	10.9	0.4	38021.5	78.2
Uttar Pradesh	15.6	2.4	8.2	0.2	1744606	66.6
Uttarakhand	6	5.3	7.3	0.2	82779.9	76.4
West Bengal	36.7	5	136.2	0.3	930852.1	94.2
All India			12.7	0.2	12755478	64.7

Source: Report of the Committee on Doubling Farmers' Income Volume IV, Ministry of Agriculture and Farmers' Welfare, GoI; Annual Report 2019-20, Ministry of Food Processing Industry, GoI

The total number of APMC markets are more in Western region and minimum number of markets are present in North Eastern states. Even for animal products including milk too the markets in North East are inadequate (Satyasai, 2020). The number of markets have to be increased in order to cover the area served by them as the market density is low for many states (Table 11).

Table 11: Distribution of states according to market density

Market Density (average area served in sq. km. per regulated market)	States
Less than 100 sq. km.	Nil
101 -200 sq. km.	Punjab, Haryana, WB
201-400 sq. km.	AP, Assam, Maharashtra, Odisha, Karnataka, UP, Jharkhand
601-800 sq. km.	TN, Goa, Gujarat, MP, Chhattisgarh, Rajasthan
801-1000 sq. km.	Uttarakhand, HP

Source: Indiastat

Storage Structures

The one third of the grains produced (Wheat and Paddy) are procured by Central (FCI) and State agencies for PDS and reserve them towards food security. The storages are responsible for maintenance of buffer stock and operational stocks such as Central

Warehousing Corporation (8.68 Mt), State Warehousing Corporation (25.57 Mt), Cooperative sectors (15.34 Mt) and State Civil Supplies Corporation (9.8 Mt). A National Policy on handling, storage and transportation of food grains, 2000 was amended with the objective to expand storage capacities in producing or surplus states (Bihar, Haryana, Madhya Pradesh, Punjab and Uttar Pradesh) as well as consuming or deficit states (Assam, Gujarat, Kerala, Maharashtra, Tamil Nadu and West Bengal) as per requirements. New warehouses are constructed under Private Entrepreneurs Guaranteed Scheme, 2008 (PEGS) and Public Private Partnership (PPP).

Availability of Storage Capacity

Availability of Storage Capacity plays a major role in preserving and protecting the farm produce from insects, rodents, etc. so that they can be consumed and preserved for a longer period of time. This helps farmers in delaying the decision of selling the produce depending on the market prices.

Table 12: Zonewise Availability of Storage Capacity

(as on March 2019)

States/Zones	Storage Capacity (Lakh Metric Tonnes)
Northern Region	446.31
Western Region	231.71
Southern Region	110.32
Eastern Region	60.20
North Eastern Region	7.14

Source: Department of Food & Public Distribution, Agricultural Statistics at Glance, 2019 MoA&FW, GoI.

From the Table 12, it is observed that the Northern and Western zones have larger capacity to store grains compared to southern, eastern and north eastern states.

Table 13: State-wise Availability of Storage Capacity

(Lakh metric tonnes as on March)

State/UTs	2014	2015	2016	2017	2018	2019
Andhra Pradesh	68.47	27.31	24.02	28.71	26.80	25.48
Arunachal Pradesh	0.23	0.28	0.23	0.41	0.27	0.30
Assam	6.25	5.76	6.29	3.98	4.68	3.98
Bihar	11.50	10.49	15.10	15.56	25.81	22.10
Chandigarh	4.09	0.00	0.00	0.00	0.00	0.00
Chhattisgarh	23.70	23.58	24.98	19.00	15.04	24.90
Goa	0.50	0.20	0.20	-	0.00	0.00
Gujarat	18.33	9.86	9.26	8.82	9.28	10.71
Haryana	64.78	107.77	116.11	101.73	99.17	112.20
Himachal Pradesh	0.45	0.51	0.49	0.35	0.51	0.53
Jammu & Kashmir	1.75	2.10	2.49	2.59	2.79	2.46
Jharkhand	2.11	2.95	2.53	2.91	3.68	5.51
Karnataka	25.02	29.24	29.62	13.87	11.56	12.49
Kerala	9.00	5.89	5.89	5.55	7.17	7.62
Madhya Pradesh	68.63	59.17	129.66	124.29	210.73	157.80
Maharashtra	53.43	31.79	31.55	31.98	34.19	38.30
Manipur	0.31	0.32	0.32	0.32	0.32	0.49
Meghalaya	0.42	0.28	0.23	0.23	0.22	0.22
Mizoram	0.26	0.25	0.67	0.25	0.93	0.67
Nagaland	0.46	0.33	0.45	0.44	0.48	0.49
Odisha	14.09	13.57	11.63	13.57	12.10	13.15
Puducherry	0.84	0.00	0.00	0.00	0.00	0.00
Punjab	182.66	240.00	252.56	250.13	201.43	234.30
Rajasthan	39.88	25.49	23.24	21.42	19.90	27.83
Sikkim	0.11	0.00	0.00	0.00	0.00	0.00
Tamil Nadu	24.41	17.58	16.99	26.97	43.17	31.31
Telangana	-	19.79	20.88	17.52	27.37	33.42
Tripura	0.83	0.37	0.83	0.43	0.44	0.99
Uttar Pradesh	91.59	57.53	64.43	58.28	58.72	62.38
Uttarakhand	2.84	3.67	3.80	0.21	3.93	2.94
West Bengal	19.64	14.68	16.72	18.64	18.67	19.44
Grand Total	**741.83**	**714.43**	**814.84**	**775.38**	**843.03**	**855.68**

Source: Department of Food & Public Distribution, Agricultural Statistics at Glance 2019, MoA&FW, GoI.

Cold Storages Structures

The cold storage structures are required in order to prevent the post-harvest loses in the perishable commodities. The zone wise availability of cold storage structures is given below in the table.

Table 14: State-wise of Availability of Cold Storage Structures (as on March 2020)

States/UTs	Number of cold storages	Capacity (MT)
Andhra Pradesh and Telangana	452	1836366
Arunachal Pradesh	2	6000
Assam	37	163258
Bihar	306	1415595
Chandigarh	7	12462
Chhattisgarh	98	484331
Goa	29	7705
Gujarat	890	3515976
Haryana	352	791780
Himachal Pradesh	65	125967
Jammu and Kashmir	55	182527
Jharkhand	58	236680
Karnataka	209	602457
Kerala	199	81705
Madhya Pradesh	302	1281411
Maharashtra	603	979607
Manipur	3	7100
Meghalaya	4	8200
Mizoram	3	3971
Nagaland	4	7350
Odisha	177	566321
Punjab	672	2201386
Rajasthan	167	561293
Sikkim	2	2100
Tamil Nadu	173	347583
Tripura	14	45477
Uttar Pradesh	2368	14500773
Uttarakhand	47	162821
West Bengal	511	5940511
Others	107	150962
India	7916	36229675

Source: 1. https://www.indiastat.com/table/agriculture/2/coldstorages accessed on 06.05.2019.
2. Information received from ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal.

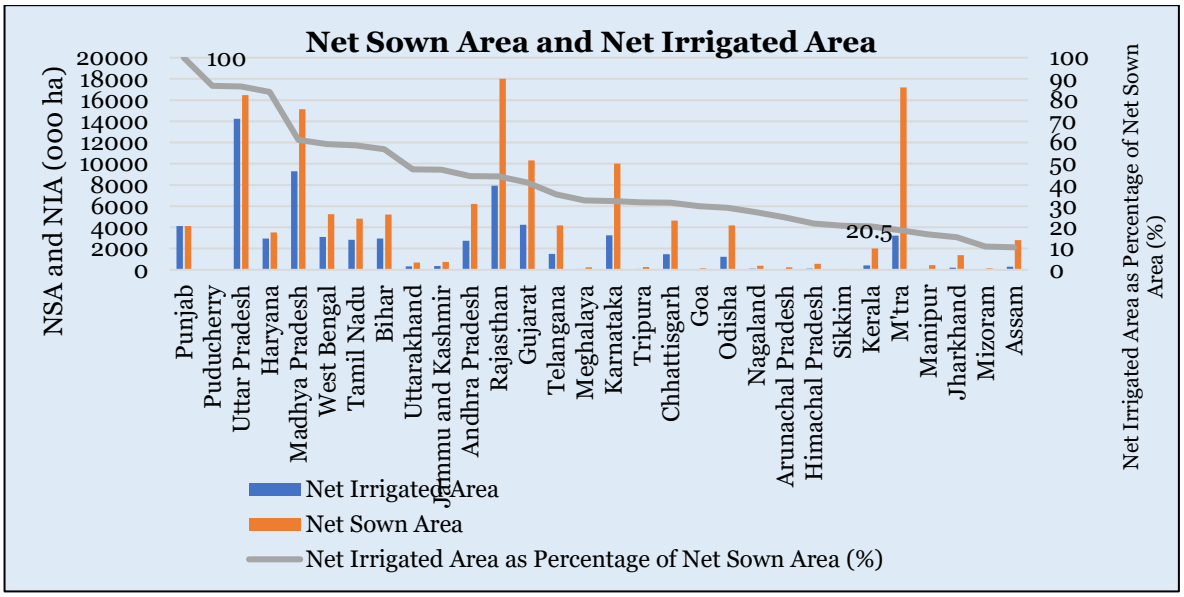
From the Table 14, it is observed that the Northern states have greater space to store the commodities that are perishable compared to other zones and minimum capacity is observed in the north-eastern region.

Physical and Financial Infrastructure

State-wise Net Irrigated Area as percentage of Net Sown Area

Irrigation plays an important role in improving the yield and diversification of crops in agriculture. Around 78 percent of freshwater in India is used for agriculture but only 48% of gross cropped area in under irrigation, thus pointing towards deprivation of water resources for half of the gross cropped area. There is widespread disparity in net sown area under irrigation in different states wherein Assam has only 10 percent of net sown area under irrigation while Punjab has 100 percent of net sown area under cultivation.

Figure 10: State-wise Net Irrigated Area and Net Sown Area in 2015-16

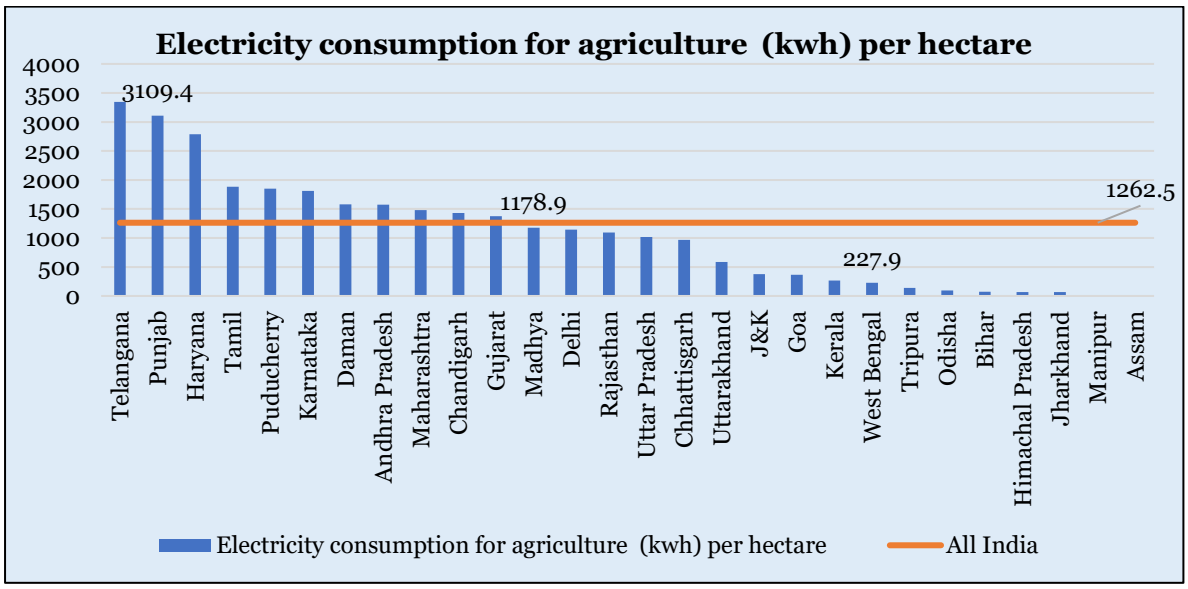


Source: Agriculture Statistics at a Glance, 2019, Directorate of Economics and Statistics, Department of Agriculture Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare.

State Wise Electricity Consumption for Agriculture

Agriculture constitutes around 20 percent of electricity consumption in the country. However, it varies greatly across the different regions of the country with Agriculture constituting 2 percent of electricity consumption in Eastern Region and 24 percent in Southern Region. Power subsidy in certain states leads to inefficient use of power and groundwater extraction leading to alarmingly low level of ground water in these states.

Figure 11: State-wise Electricity consumption for agriculture (kwh) per hectare in 2017-18



Source: Input survey 2016-17, MoAFW

State-wise credit Disbursements

Credit acts as access enabler to other inputs and thus plays an important role in augmenting the yield and use of higher yield varieties of seeds, fertilizers, etc. However, there is wide interstate disparity in the availability of agri credit. The y-0-y growth rate in 2019-20 has remained lowest for the Western Region and for Northern and North-Eastern Region, it has remained less than the overall growth rate (Table 15).

Table 15: Regional Distribution of Agriculture Credit and Real Sector Indicators(%)

Regions	Share in total agri. GLC (%)				Real Sector Indicators (%)			
	2017-18	2018-19	2019-20 (P)	% Growth in GLC from 2018-19 to 2019-20	Share in Net Sown Area	Share in NIA	Share in Food grain production#	Share in rural/semi urban branches
Northern	22.1	21.7	20.4	3.5	18.9	22.6	24.9	16.9
N E R	0.9	0.9	0.8	3.3	3.27	1.0	3.0	3.7
Eastern	8.3	8.7	9.1	9.6	11.7	11.0	16.5	18.6
Central	14.4	13.7	14.1	13.0	26.6	37.7	32.5	20.9
Western	11.7	12.3	11.2	1.9	19.8	40.6	7.4	12.4
Southern	42.6	42.8	44.4	13.2	19.6	16.7	15.7	27.5

Note: (a) # denotes share for the period 2017-18, P = provisional
(b) Net Sown Area as per 2014-15, NIA- Net irrigated Area as per 2014-15
Source: Calculated based on data from MOA, RBI, SLBC and NABARD

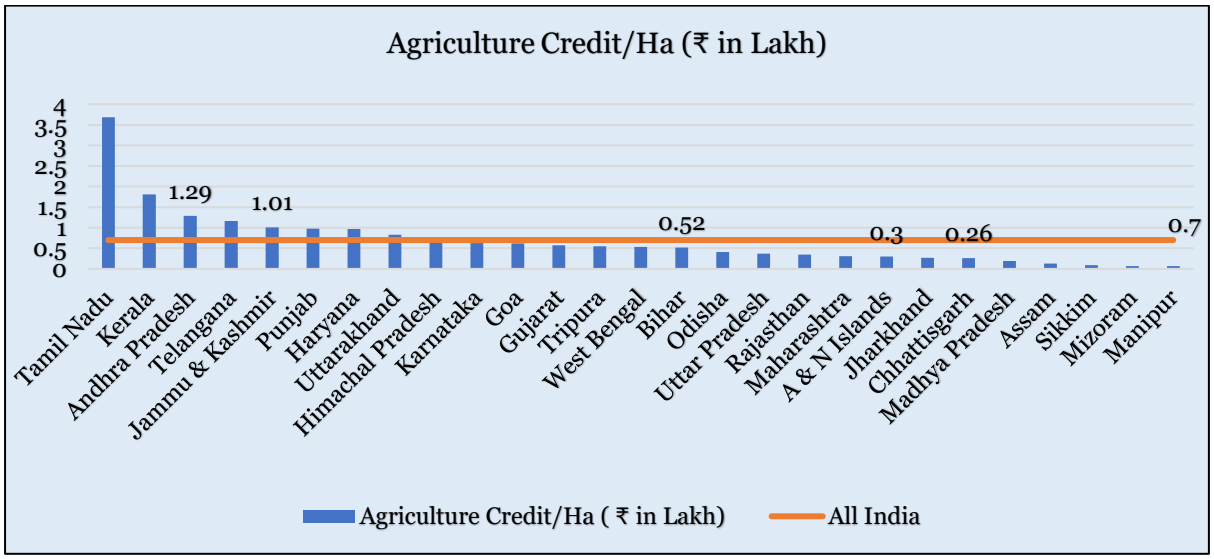
The Southern Region has higher credit absorption capacity may be because of better infrastructure facilities, better outreach and credit availability leading to improvement in its share. Normally, low density of credit delivery outlets and weak financial health of Rural Financial Institutions could be the constraints for increasing credit flow in credit starved regions like Eastern and Central states. However, Central and Eastern regions account for 21 percent and 19 percent share in rural and semi urban bank branches, respectively pointing towards demand side bottlenecks in the regions.

Data further indicates that there is a growing disconnect between the real sector parameters and regional distribution of agriculture credit. The Southern Region accounted for 19.6 per cent of NSA and 16.6 percent of NIA, but availed the highest share (44.4 percent) of GLC disbursed during 2019-20.

State-wise Credit per hectare

There is wide variation in credit per hectare across states with states like Andhra Pradesh and Punjab having Agri credit/ha way more than 1 lakh per hectare. While the same is lower than ₹0.5 lakh per hectare for a bigger state like Uttar Pradesh. In this context, different credit absorption capacity of states also plays a major role in determining the demand for credit.

Figure 12: State-wise credit per hectare in 2019-20

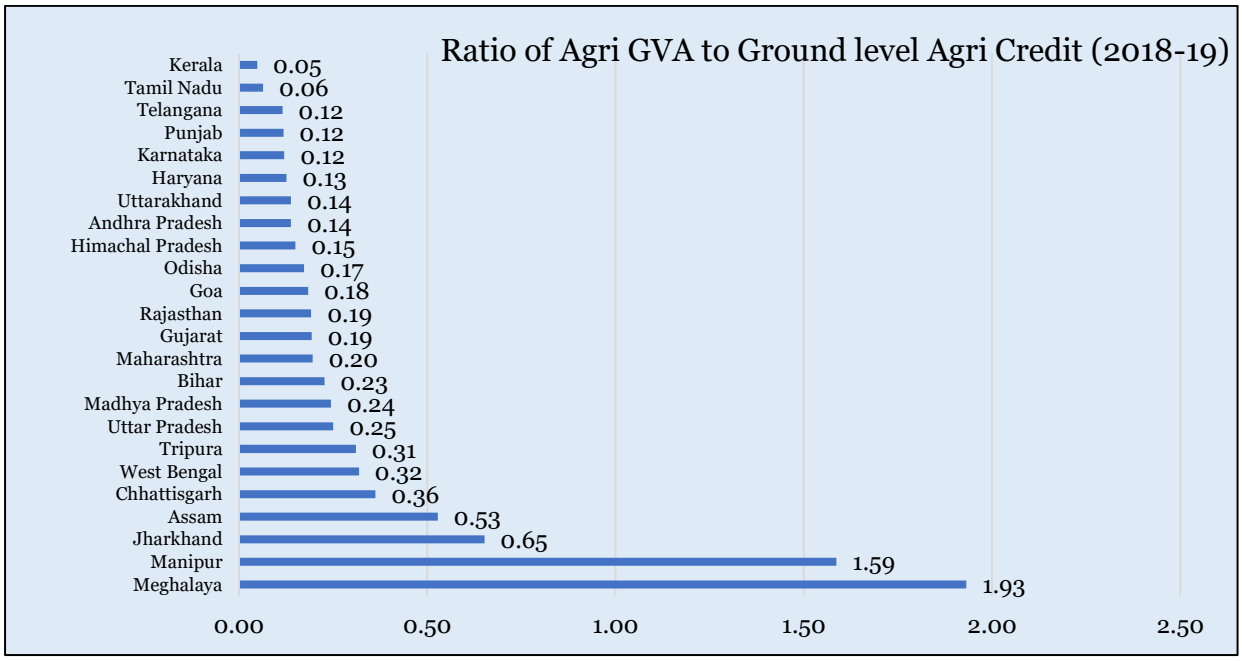


Source : NABARD

State-wise Ratio of Agri GVA to Ground Level Agri Credit (2018-19)

The contribution of Ground Level Agri Credit (GLC) to Agri GDP varies highly across states. It was lower for states with higher GLC per hectare or per Agriculture land holding (Punjab, Kerala) while it was higher for states with lower GLC per hectare or per Agriculture land holding (Jharkhand, Assam).

Figure 13: Ratio of Agri GVA to Ground Level Credit (2018-19)



Source: NABARD

Social infrastructure, Social Capital and Community development

Farmer Producers' Organisation

Farmer Producers' Organizations (FPOs) have emerged as an effective mechanism to transform smallholder agriculture into a viable agri-business enterprise. NABARD extended financial support to FPOs under Producers Organization Development Fund (PODF), PODF-ID, and Producers' Organization Development and Upliftment Corpus (PRODUCE) for credit facilitation, capacity building/ handholding and market linkages. State-wise, number of FPOs promoted by NABARD and their membership are presented in Table 16. Of all the members, small and marginal farmers account for 81 percent of members in FPOs, broadly in line with share of marginal and small farmers in number of operational landholdings.

Table 16: State wise FPOs promoted and share of small/marginal farmers in membership

State	No. of FPOs registered	Total membership	Share of Small and Marginal Farmers
Andhra Pradesh	264	112458	84.2
Arunachal Pradesh	6	1468	99.4
Assam	54	22855	90.6
Bihar	257	65628	83.9
Chhattisgarh	54	24795	87.2
Goa	2	105	81.0
Gujarat	176	63354	79.4
Haryana	84	32771	58.0
Himachal Pradesh	98	16308	89.8
Jammu and Kashmir	17	3248	85.9
Jharkhand	148	48538	82.8
Karnataka	244	107698	68.9
Kerala	131	54038	98.1
Madhya Pradesh	252	90733	80.8
Maharashtra	258	71176	86.6
Manipur	11	5211	54.8
Meghalaya	12	2035	80.1
Mizoram	19	4751	100.0
Nagaland	5	1424	100.0
Odisha	236	98587	91.0
Punjab	89	10531	57.3
Rajasthan	162	63206	59.2
Sikkim	4	1628	84.2
Tamil Nadu	219	156512	80.9
Telangana	345	89859	83.7
Tripura	1	235	100.0
Uttar Pradesh	185	58459	76.9
Uttarakhand	90	25690	99.5
West Bengal	294	152240	86.0
TOTAL	**3721**	**1386002**	**81.7**

Source: NABARD

Policy and Fiscal Ecosystem

Public Expenditure on Agriculture and allied activities

The allocations for agricultural sector have increased significantly over the years, however, much of these are for revenue expenditure for development and welfare schemes. It is time to increase the allocations for investment in the productive capacity; and the priority sectors are research and education, infrastructure development for livestock services, micro-irrigation and land development. Triennial (TE2019-20) average expenditure on agriculture and allied sectors per operational holding shows wide variation with states like Bihar, Uttar Pradesh, Kerala, West Bengal, and Andhra Pradesh spending less than ₹10,000 per operational holding and

Punjab spending over ₹96400 to stand at the top of the leader board. This inadequate allocation affects the growth of agriculture, income along with private expenditure on investment.

Table 17: State-wise public expenditure on agriculture and allied activities (₹crore)

States	2017-18	2018-19	2019-20 (RE)	2020-21 (BE)	Avg public exp TE 2018-19/OH (Rs.'000)
Andhra Pradesh	7326	8489	6714	6714	8.8
Arunachal Pradesh	769	800	1178	1079	81.0
Assam	2905	2895	6449	4580	14.9
Bihar	3626	3636	6880	6702	2.9
Chhattisgarh	8781	18020	21470	15607	40.1
Goa	320	331	536	569	52.8
Gujarat	7802	8367	7785	7778	15.0
Haryana	2735	3392	4409	6045	21.6
Himachal Pradesh	1800	2185	2458	2683	21.5
Jammu & Kashmir	2032	2840	3048	3823	
Jharkhand	2016	1788	4229	4585	9.6
Karnataka	14521	20305	21502	15753	21.6
Kerala	5528	6193	6010	6930	7.8
Madhya Pradesh	11928	15603	13233	9579	13.6
Maharashtra	26130	20020	32940	23862	17.2
Manipur	471	549	875	1113	42.1
Meghalaya	573	676	1115	1034	34.0
Mizoram	544	569	709	692	67.5
Nagaland	626	694	918	895	37.9
Odisha	5801	7843	12104	11554	17.6
Punjab	7487	12343	11777	13193	96.4
Rajasthan	5114	8376	10865	11182	10.6
Sikkim	300	428	726	611	67.3
Tamil Nadu	11553	12362	14647	15227	16.2
Telangana	6560	12600	21468	25148	22.8
Tripura	663	733	878	1005	13.2
Uttar Pradesh	27265	12129	10351	11336	7.0
Uttarakhand	2132	2485	2714	3252	27.7
West Bengal	3730	7911	5071	8983	7.7

Source: Various issues of state finances: A study of budgets, RBI

Risks and Ecological Aspects

Inclusive and sustainable management of natural resources while improving rural lives and livelihoods remained a high priority in NABARD's development agenda. It has been implementing, since beginning, various programmes such as Watershed Development and Tribal Development Fund, to achieve "sustainable and equitable rural prosperity".

Agriculture Distress

Agrarian distress, in the present agriculture context, is mainly in terms of low market value for produce, crop failure due to untimely rains, loss of livestock because of natural calamities, low productivity due to pests, etc. NABARD All India Financial Inclusion Survey conducted in 2016-17 covered questions on Agriculture distress and coping strategies adopted thereof. The survey found that agriculture household in varied situations, adopted similar strategies for tackling the distress by taking institutional loans, borrowing from friends/relatives, and using personal savings about 35 percent each. Strategies such as selling household items and animals, putting children and females in the household to work, etc. were used as a last resort to deal with distress data reveals.

Table 18: Proportion of Agri Households (HH) facing agri distress

State	% of HH faced crop failure	% of HH faced decline in productivity	% of HH faced Decline in Market Price	% of HH faced Loss of Livestock
Andhra Pradesh	70.1	45.9	47.4	16.1
Arunachal Pradesh	19.6	5.3	0.9	3.3
Assam	3.7	0.9	1.8	2.7
Bihar	58.3	31.7	8.4	5.9
Chhattisgarh	63.6	38.4	22.4	11.0
Goa	16.1	7.5	6.0	0.0
Gujarat	31.3	18.9	20.2	5.6
Haryana	38.2	12.4	10.1	13.9
Himachal Pradesh	74.3	35.9	25.8	16.9
J&K	59.8	27.4	6.3	7.0
Jharkhand	69.8	31.0	21.0	24.2
Karnataka	45.7	24.7	11.0	0.9

State	% of HH faced crop failure	% of HH faced decline in productivity	% of HH faced Decline in Market Price	% of HH faced Loss of Livestock
Kerala	39.4	27.7	25.5	3.9
Madhya Pradesh	35.2	13.8	13.5	4.0
Maharashtra	63.1	39.2	34.4	17.9
Manipur	10.4	1.5	0.0	1.1
Meghalaya	51.2	39.7	45.9	23.2
Mizoram	20.1	21.5	14.9	3.1
Nagaland	11.7	9.2	5.8	21.5
Odisha	61.4	18.8	5.9	4.9
Punjab	19.5	7.8	7.5	12.7
Rajasthan	57.5	29.2	22.1	11.3
Sikkim	36.9	15.0	19.4	4.2
Tamil Nadu	36.9	6.0	8.9	3.2
Telangana	59.6	39.0	40.0	10.0
Tripura	21.1	7.0	1.4	2.8
Uttar Pradesh	72.3	37.5	19.9	15.8
Uttarakhand	42.7	21.2	11.1	24.9
West Bengal	49.8	23.3	22.6	11.0
All India	**53.8**	**27.6**	**18.2**	**9.8**

Source: NABARD Financial Inclusion Survey 2016-17

Watershed Development

Watershed development and management practices play a dual role of natural resource conservation as well as livelihood enhancement. NABARD is engaged in watershed development since three decades and have sanctioned 3401 watershed development projects covering an area of 23.43 lakh ha, of which 1800 have been completed successfully. State-wise details are given in Table 19.

Table 19: Number of Watersheds Sanctioned during 2020-21

Name of the state	Number of Watersheds
Andhra Pradesh	2
Bihar	2
Gujarat	8
Haryana	2
Himachal Pradesh	11
Jharkhand	4
Karnataka	5
Kerala	1
Madhya Pradesh	10
Maharashtra	13
Odisha	5
Punjab	3

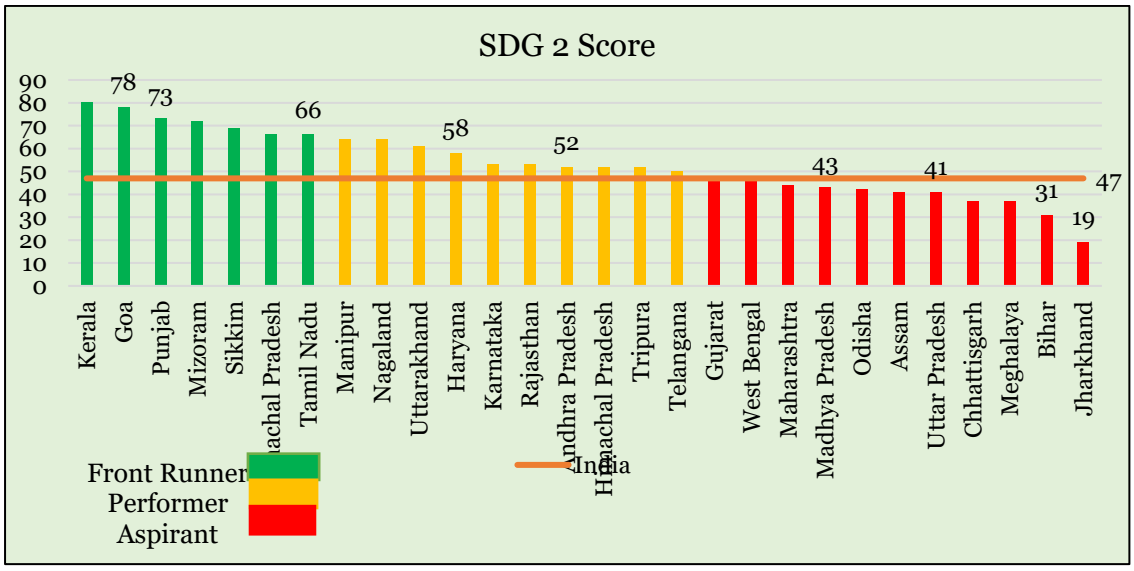
Name of the state	Number of Watersheds
Rajasthan	2
Tamil Nadu	4
Telangana	12
Uttar Pradesh	4
Uttarakhand	2
West Bengal	3
Manipur	4
Arunachal Pradesh	2
Mizoram	1
Assam	1
Total	101

Sustainable Development Goals

SDG 2 (Zero Hunger) aim to end all forms of hunger and malnutrition by 2030, making sure all people especially children have sufficient and nutritious food throughout the year. This involves promoting sustainable agricultural, supporting small-scale farmers and equal access to land, technology and markets. It also requires international cooperation to ensure investment in infrastructure and technology to improve agricultural productivity. The goal also focuses at doubling agricultural productivity, maintaining genetic diversity of seeds, plants and farmed animals, and strengthening capacity for climate change adaptive agriculture.

As per NITI Aayog SDG Index India, Kerala is the front-runner state along with six others while Jharkhand (19) is an aspirant state with 11 other states.

Figure 14: State-wise SDG 2 (Zero Hunger) index score



Crop Insurance

Agricultural income and production are affected by natural disasters such as droughts, floods, cyclone, storms, earthquakes and landslides and the outbreak of fire, pests etc. Apart from MSP, Contract farming and future trading, agricultural insurance is considered as important mechanism to address the risk to output and income resulting from uncertainty (Raju et al., 2008). Crop Insurance not only stabilizes the farm income but also helps the farmers to initiate production activity after a yield loss. Various crop insurance schemes are introduced so far such as Pilot Crop Insurance Scheme, Comprehensive Crop Insurance Scheme, Experimental Crop Insurance Scheme, National Agricultural Insurance Scheme, Farm Income Insurance, Livestock Insurance, Weather Based Crop Insurance/Rainfall Insurance and Pradhan Mantri Fasal Bima Yojana. The gross sown area covered under insurance are calculated zone wise and given in the table below.

Table 20: Zonewise Gross Cropped Area and Area under Insurance

States/Zones	Gross Cropped Area (Lakh Ha)	Area insured (Lakh Ha)	% of Area Insured
Northern Region	437.7	73.73	14.32
Western Region	902.04	320.09	62.15
Southern Region	339.26	63.33	12.30
Eastern Region	240.9	57.16	11.10
North Eastern Region	63.69	0.68	0.13
All India	1983.59	514.99	25.96

Source: Department of Agriculture, Cooperation & Farmers Welfare, 2016

From the table 20, it is observed that the gross sown area under insurance are more in western regions compared to other regions and the least area is covered in north-eastern regions. However, overall, the coverage of area under insurance is low.

There are several difficulties that farmers face while accessing credit. One of the major concerns in this regard is the lack of land records (such as the Record of Rights, Tenancy and Crop Information) among farmers. Thus, documentation requirements are indirectly one of the barriers to adoption of crop insurance. Land-owning farmers face issues owing to a lack of automatic mutations. Updating these records can prove

to be a complex bureaucratic process that most farmers are ill-equipped to handle. Non-loanee farmers need to exert extra effort to go through the process of enrolling under the insurance scheme, which often may not happen. Tenant farmers are often oral lessees who cannot prove cultivation, as landowners are reluctant to provide formal lease documentation for fear of losing land rights. As a result, these tenant farmers and sharecroppers also find it difficult to access credit and hence, crop insurance.

Agro Ecology

India is the first nation in the world to adopt an agroforestry policy dealing with the practice of integrating trees, crops and livestock on the same plot of land. This approach is instrumental in augmenting efforts of achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions. NABARD's wadi approach under its Tribal Development Fund has been a pioneer in providing sustainable livelihood to the tribal families along with promoting environmental sustainability. This fund has benefitted 5.58 lakh tribal families spread across 5.3 lakh acre of land till 31st March 2021.

Table 21: state-wise number of wadis, families benifitted and area covered as on 31st March 2021

Name of State	Number of Wadis	No. of families to be benefited	Area covered ('00 Acres)
Bihar	87.0	16907.0	167.7
Andhra Pradesh	84.0	38427.0	362.5
Meghalaya	63.0	4430.0	44.3
Himachal Pradesh	59.0	3191.0	21.9
Madhya Pradesh	56.0	72776.0	695.9
Gujarat	56.0	45312.0	445.2
Tripura	56.0	800.0	8.0
Uttar Pradesh	54.0	15104.0	136.0
Jharkhand	49.0	32225.0	296.9
Manipur	37.0	1710.0	27.0
Telangana	32.0	22232.0	198.8
Rajasthan	27.0	50005.0	469.2
Arunachal Pradesh	25.0	2306.0	26.1
Karnataka	23.0	25299.0	207.1
Uttarakhand	23.0	3840.0	119.3
Odisha	19.0	48014.0	434.2
Nagaland	14.0	5350.0	51.8

Name of State	Number of Wadis	No. of families to be benefited	Area covered ('00 Acres)
Tamil Nadu	13.0	12426.0	91.7
West Bengal	11.0	31442.0	298.6
Assam	10.0	6450.0	59.4
Jammu & Kashmir	8.0	989.0	10.1
Kerala	6.0	9469.0	100.4
Mizoram	6.0	3150.0	31.2
Chhattisgarh	5.0	56163.0	560.1
Maharashtra	3.0	47847.0	434.3
Sikkim	3.0	2188.0	21.4
Dadra Nagar Haveli	1.0	800.0	8.0
Total	**830**	**558852**	**5327.1**

Farmers' Welfare Index (FaWI)

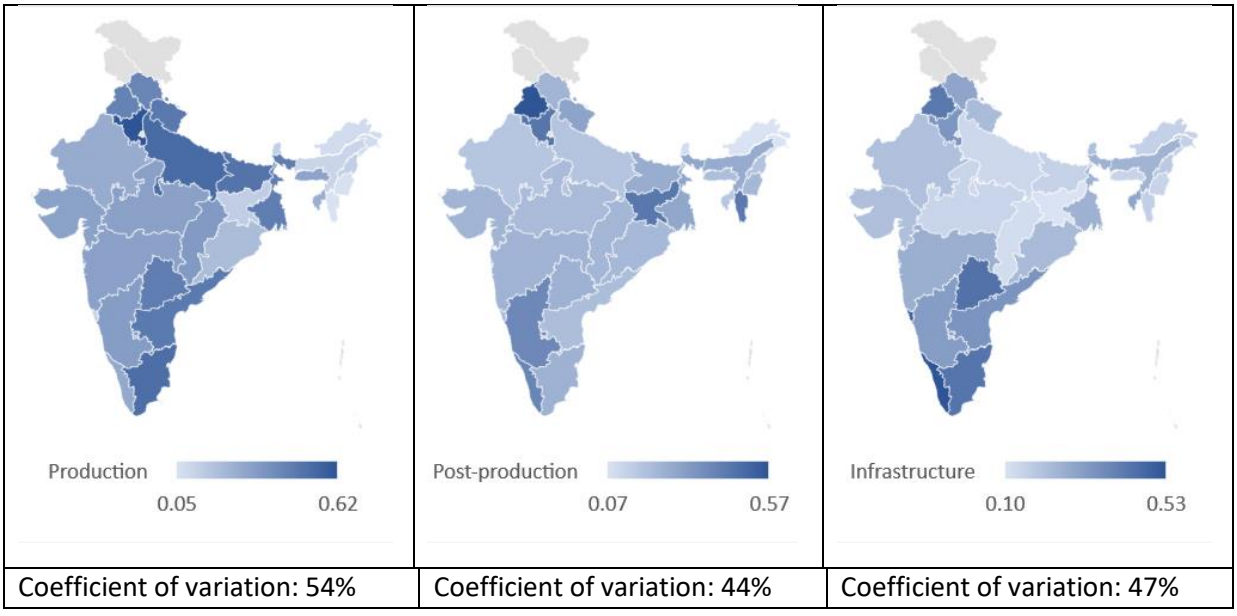
In the foregoing sections, inter-state variations in various aspects have been discussed which have bearing on farmers' welfare. In this section we present a composite index, FaWI combining indicators under six dimensions discussed earlier. Table 22 and Figure 15 gives the value of the index and it's dimensions. Farmers' Welfare Index (FaWI) as a composite index of 21 indicators representing six dimensions has coefficient of variation (CV) of 25% with Punjab at the top with a value of 0.58 and Rajasthan at the lower end with a value of 0.19. Among the dimensions, variations in fiscal dimension was maximum with a CV of 94%.

Table 22: Farmers' Welfare Index and its Dimensions

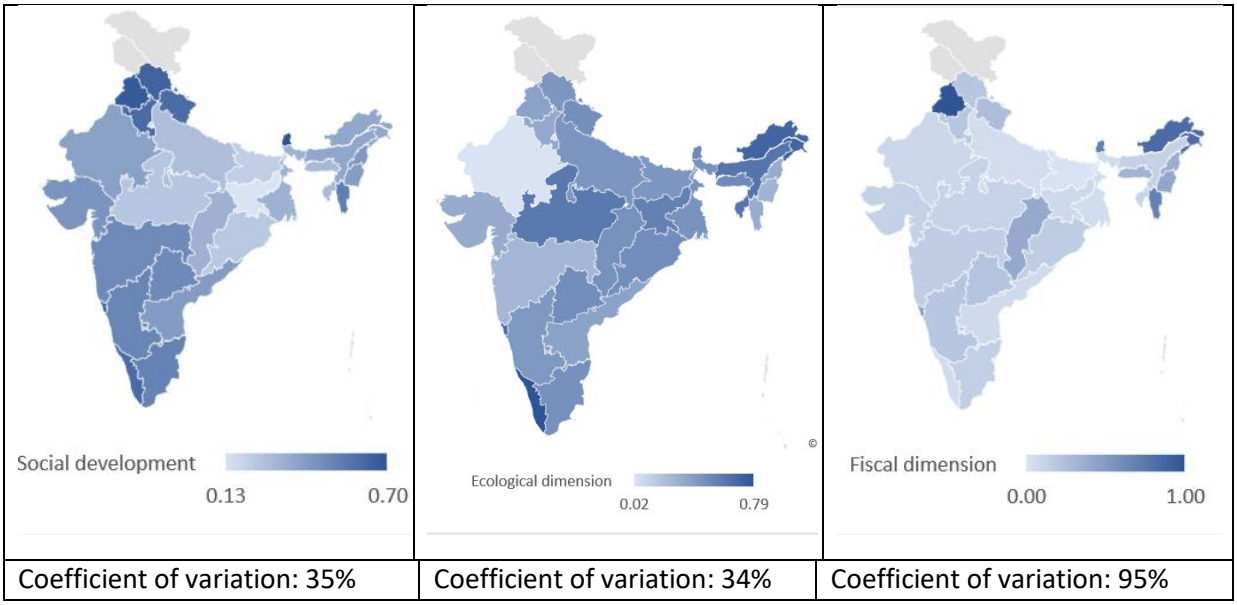
State	Production	Post-production	Infrastructure	Social development	Ecological dimension	Fiscal dimension	FaWI
Andhra Pradesh	0.47	0.20	0.34	0.42	0.37	0.06	0.31
Arunachal Pradesh	0.07	0.07	0.16	0.37	0.69	0.84	0.37
Assam	0.10	0.26	0.25	0.37	0.61	0.13	0.29
Bihar	0.50	0.26	0.15	0.22	0.43	0.00	0.26
Chhattisgarh	0.34	0.22	0.12	0.33	0.46	0.40	0.31
Goa	0.13	0.22	0.52	0.66	0.65	0.53	0.45
Gujarat	0.31	0.23	0.21	0.45	0.32	0.13	0.27
Haryana	0.62	0.46	0.33	0.61	0.33	0.20	0.43
Himachal Pradesh	0.42	0.23	0.29	0.64	0.43	0.20	0.37
Jharkhand	0.13	0.45	0.10	0.13	0.55	0.07	0.24
Karnataka	0.33	0.39	0.31	0.50	0.42	0.20	0.36
Kerala	0.28	0.40	0.53	0.61	0.79	0.05	0.44

State	Production	Post-production	Infrastructure	Social development	Ecological dimension	Fiscal dimension	FaWI
Madhya Pradesh	0.31	0.21	0.15	0.25	0.59	0.11	0.27
Maharashtra	0.31	0.23	0.26	0.49	0.26	0.15	0.28
Manipur	0.05	0.22	0.15	0.41	0.27	0.42	0.25
Meghalaya	0.30	0.20	0.15	0.30	0.50	0.33	0.30
Mizoram	0.05	0.44	0.16	0.54	0.31	0.69	0.36
Nagaland	0.13	0.18	0.18	0.43	0.32	0.37	0.27
Odisha	0.20	0.22	0.22	0.24	0.48	0.16	0.25
Punjab	0.44	0.57	0.42	0.68	0.37	1.00	0.58
Rajasthan	0.27	0.17	0.21	0.40	0.02	0.08	0.19
Sikkim	0.13	0.09	0.21	0.70	0.50	0.69	0.39
Tamil Nadu	0.52	0.24	0.44	0.52	0.46	0.14	0.39
Telangana	0.46	0.24	0.44	0.49	0.48	0.21	0.39
Tripura	0.26	0.17	0.29	0.30	0.61	0.11	0.29
Uttar Pradesh	0.53	0.18	0.14	0.28	0.44	0.04	0.27
Uttarakhand	0.48	0.29	0.22	0.61	0.47	0.27	0.39
West Bengal	0.46	0.28	0.25	0.33	0.46	0.05	0.30

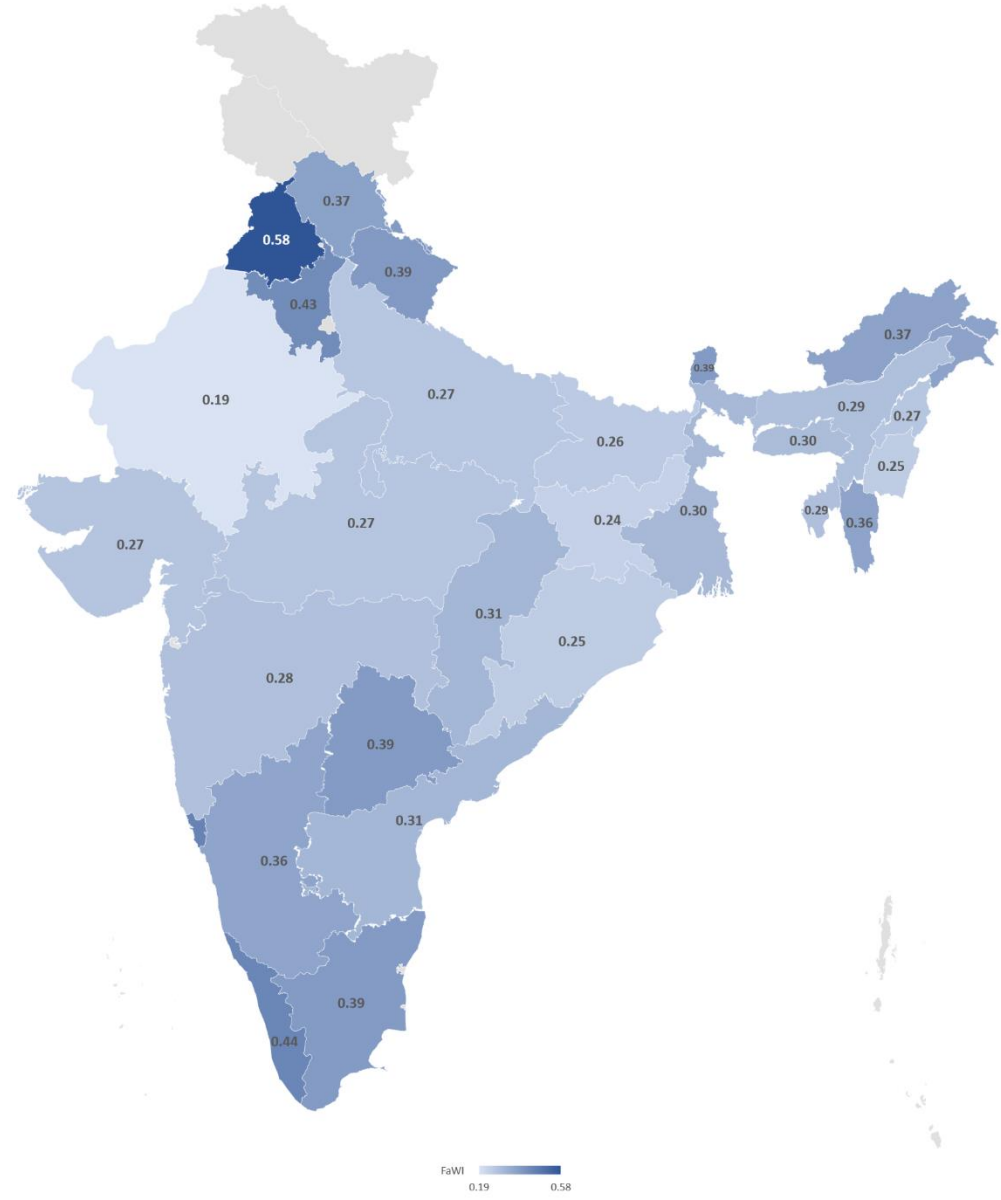
Figure 15: Spatial pattern of Farmers' Welfare Index (FaWI) and its dimensions



Coefficient of variation: 54%	Coefficient of variation: 44%	Coefficient of variation: 47%



Coefficient of variation: 35%	Coefficient of variation: 34%	Coefficient of variation: 95%



Conclusions

A little below 70% of the Indians are rural and are mostly engaged in agriculture and allied activities for their livelihood. Mainly directly and a lot more, indirectly. Though the share of agricultural income in total gross domestic product (GDP) has been declining, the performance of the economy and the standard of living of a large section of population depend considerably on growth in the agricultural sector which indeed is one of the most important barriers for improving labour productivity in agriculture and economic growth of states. Therefore, it is imperative to reduce employment pressure on agriculture by improving labour market linkages of agriculture with non-agricultural sectors. Also, the pattern of farming is not similar and it varies from region to region. While some states are capital–technology intensive and some are labour intensive. Moreover, Green Revolution has increased the inter-state and inter-crop disparities as only the states of Punjab, Haryana, Western Uttar Pradesh showed higher output mainly for wheat and paddy due to the adoption of technologies emphasized during that period. The flow of credit to the farmers of Northern and Southern states are high when compared to the farmers in NE states. The technology led intensification of agriculture would promote agricultural as well as overall growth and speed up process of reducing disparities. Most of the states are associated with low levels of agricultural productivity and per capita output. The human capital (rural literacy), physical capital (tractor, pump set and other farm machineries), rural infrastructure (irrigation facilities, rural connectivity, digital connectivity, market facilities etc.) and access to credit have effects on the growth rates of agricultural development. Hence, higher investment for creation of infrastructural facilities on the above factors with special focus on the eastern and north eastern states could be an effective way of achieving high growth rates and in reducing regional disparities in agricultural development.

In this paper, we deviated from the usual and adopted farmers' welfare framework and attempted to capture the inter-state variation in agricultural development discussed in the foregoing paragraph from a different paradigm. We constructed a Farmers' Welfare Index (FaWI) as a composite index of 21 indicators representing six dimensions. The results revealed variation (Coefficient of Variation, CV, of 25%) in

the Index with Punjab at the top with a value of 0.58 and Rajasthan at the lower end with a value of 0.19. Variations in fiscal dimension was maximum with a CV of 94%.

This study is expected to spur further debate and studies while improving methodology and scope as we move.

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PART II

Dashboard

&

Problems & Prospects of Agriculture: State-wise

Abbreviations Used in Dashboard

CWMI	Composite Water Management Index
EODBI	Ease Of Doing Business Index
EPI	Export Preparedness Index
HI	Health Index
III	India Innovation Index
SEQI	School Education Quality Index
CF	Current Fallow
CW	Culturable Waste Land
FL	Forest Land
PP&GL	Permanent Pasture & Grazing Land
ANAC	Area Not Available for Cultivation
NSA	Net Sown Area
LUMTC	Land Under Miscellaneous Trees
OF	Other Fallow
MF	Marginal Farmers
SF	Small Farmers
SMF	Semi-Medium Farmers
MdF	Medium Farmers
LF	Large Farmers
Agri & Allied	Agriculture and Allied activities
M&Q	Mining and Quarrying
RRBs	Regional Rural Banks
PACS	Primary Cooperative Credit Societies
DCCBs	District Central Cooperative Banks
CBs	Commercial Banks
CBs	Commercial Banks
RRBs	Regional Rural Banks

Data Sources

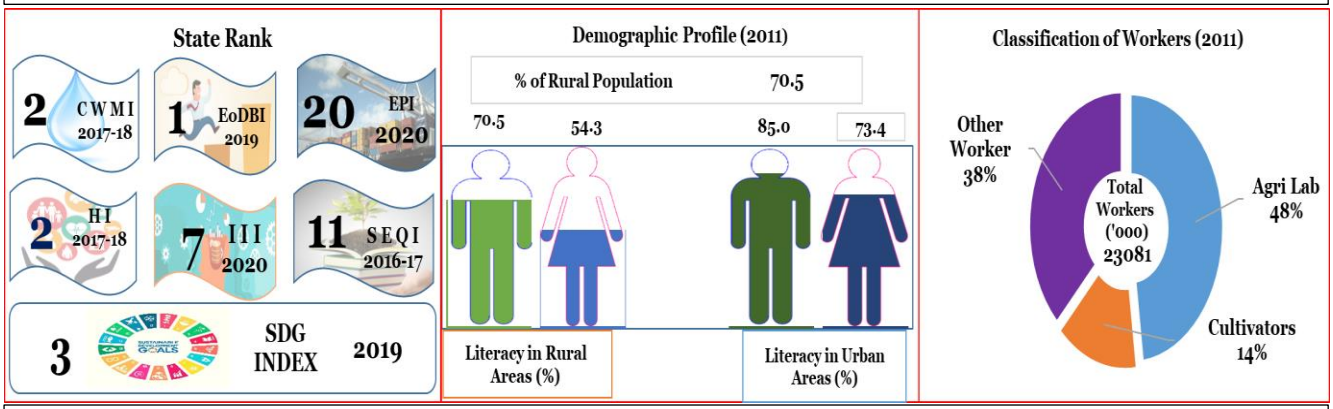
Sr No.	Variables	Source
1	State wise Rural Roads	https://statesofindia.cmie.com
2	NPK Consumption	Agricultural Statistics at a Glance 2019, MoA&FW, GoI.
3	No. of Cold Storages and Capacity	Agricultural Statistics at a Glance 2019, MoA&FW, GoI.
4	No. of Godowns and Capacity	Lok sabha questions, http://164.100.24.220/loksabhaquestions/annex/17/AS123.pdf
5	Area, Production and Productivity	Crop Production Statistics Information System, MoA&FW, GoI.
6	Land Particulars	Land use Statistics, MoA&FW, GoI.
7	No. and Area of Land Holdings	Agriculture Census 2015-16, MoA&FW, GoI.
8	Sectoral GSVA	MoSPI, GoI. http://mospi.nic.in/GSVA-NSV
9	Health Index	NITI Aayog, http://social.niti.gov.in/uploads/sample/health_index_report.pdf
10	School Education Quality Index	NITI Aayog, http://social.niti.gov.in/edu-new-ranking
11	SDG Index	NITI Aayog https://sdgindiaindex.niti.gov.in/#/ranking
12	Export Preparedness Index	NITI Aayog https://niti.gov.in/sites/default/files/2020-08/Digital_ExportPreparednessIndex2020_0.pdf
13	India Innovation Index	NITI Aayog https://niti.gov.in/sites/default/files/2021-01/IndiaInnovationReport2020Book.pdf
14	Composite Water Management Index	NITI Aayog https://niti.gov.in/writereaddata/files/document_publication/2018-05-18-Water-index-Report_vS6B.pdf
15	Ease of Doing Business Index	Hand Book of Indian States 2020, RBI.
16	Demographic Profile	https://www.census2011.co.in/
17	Workers Classification	Census India 2011, GoI.
18	Length of Railway line	Hand Book of Indian States 2020, RBI.
19	Market yards	State Focus Papers
20	Agricultural Pumpsets	All-India Report on Input Survey 2016-17, MoA&FW, GoI.
21	Agricultural Tractors	All-India Report on Input Survey 2016-17, MoA&FW, GoI.
22	Power Tillers	All-India Report on Input Survey 2016-17, MoA&FW, GoI.
23	Agro Climatic Zones	State websites
24	Livestock Census	20th Livestock Census 2019, GoI.
25	Fish Production	Indiastat.com
26	Various Livestock Production	Basic Animal Husbandry Statistics 2019, GoI.
27	No. of Bank Branches	NABARD State Focus Papers
28	C-D Ratio	NABARD State Focus Papers
29	Agency-wise Outstanding	NABARD State Focus Papers
30	% Of 3 years average of total and agriculture loans	NABARD State Focus Papers
31	GSDP and Per capita Income	MoSPI, GoI. http://mospi.nic.in/GSVA-NSVA
32	No. of Districts, Villages (inhabited) and Panchayats	NABARD State Focus Papers
33	Irrigation Sources	Land use Statistics, MoA&FW, GoI.
34	Rainfall LPA (in mm)	https://statesofindia.cmie.com

Andhra Pradesh

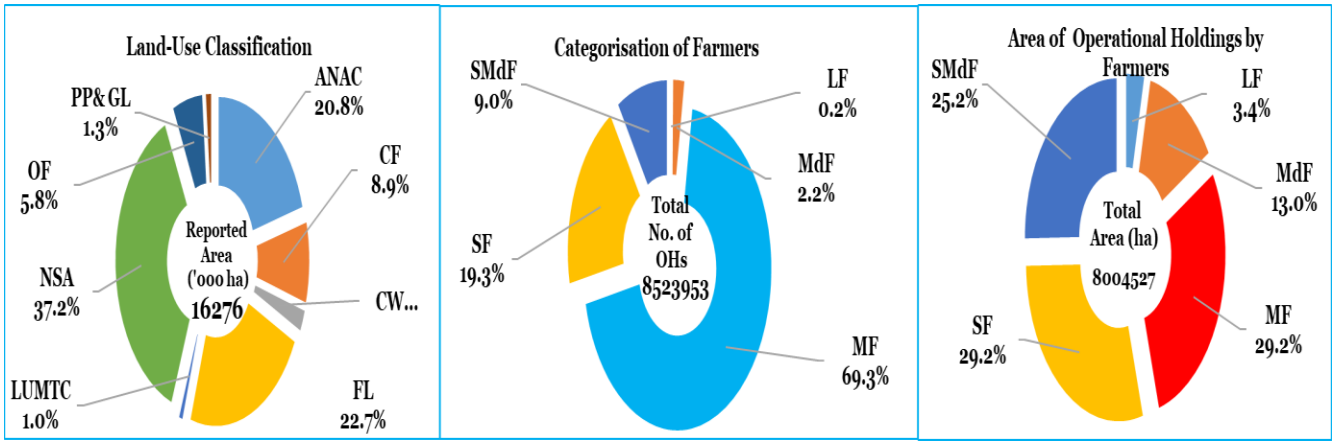
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
6	13	12918	913.5	670	16452

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
169519	972782	16297	49577	34967

General Demographic Profile

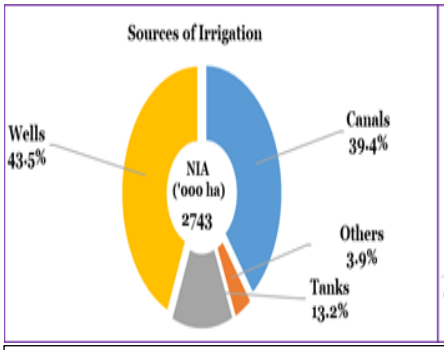


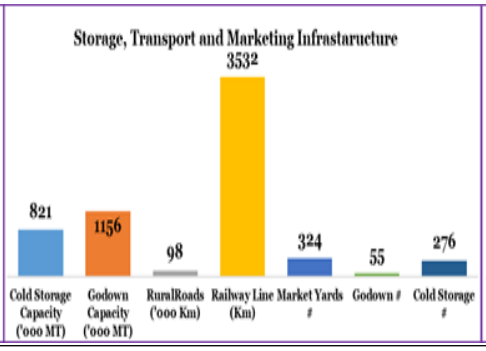
Land Usage (2015-16)

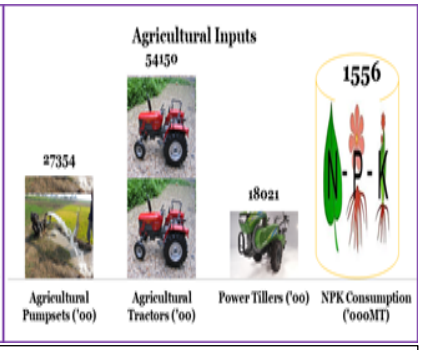


Irrigation

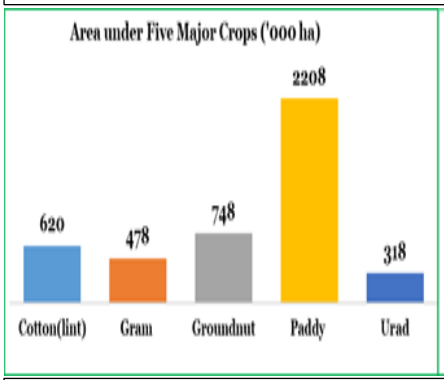
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

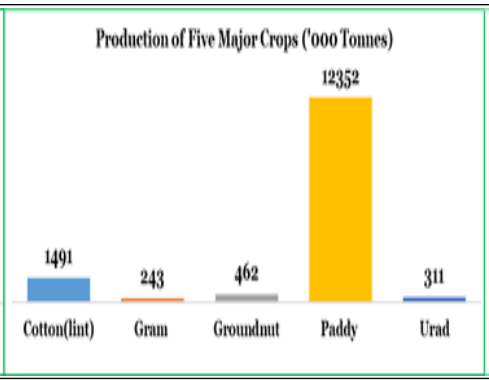


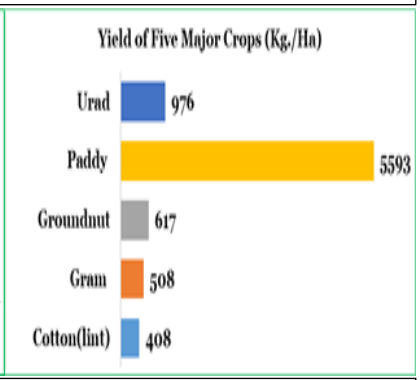




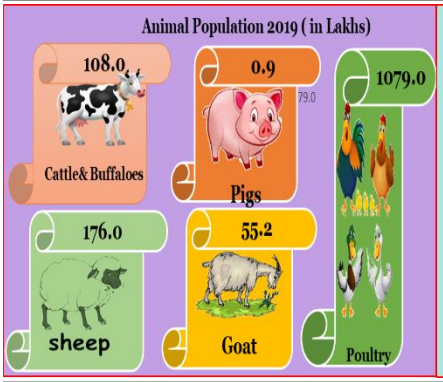
Area, Production and Yield of Five Major Crops 2018-19

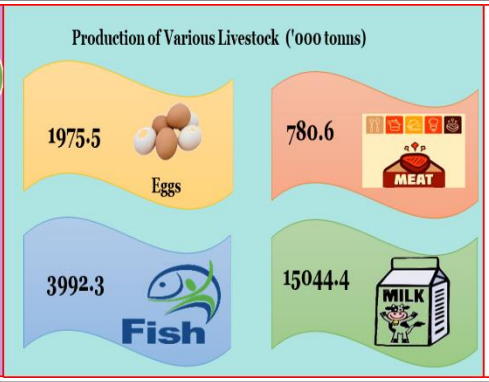


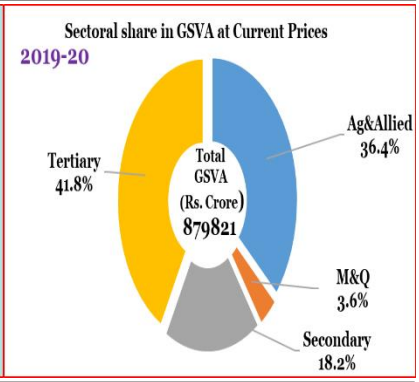




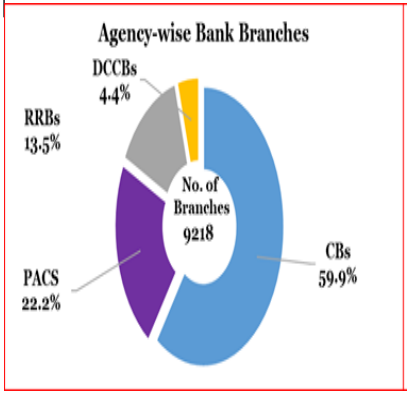
Allied Activities

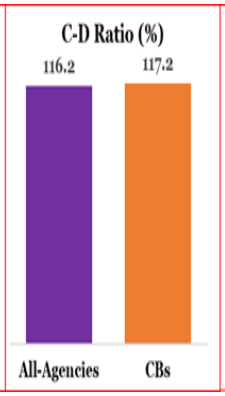


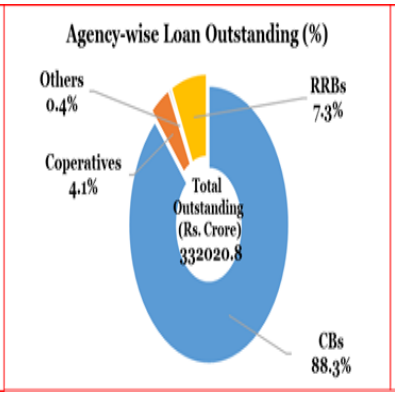


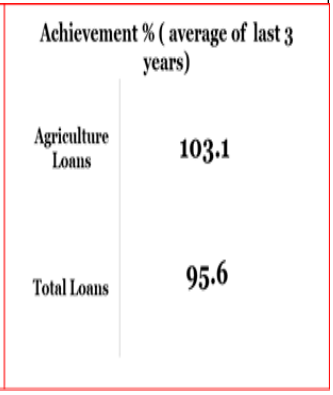


Agricultural Credit Details as on March 2018









Problems and Prospects of Agriculture in Andhra Pradesh

Andhra Pradesh is endowed with plenty of natural and human resources with competitive socio-economic advantages. Its geographical spread of 1,62,970 sq km makes it the 8th largest state in the country. Situated in a tropical region, it has the second longest coastline in the country with a length of 974 km, indicating rich potential for marine fisheries.

Agriculture plays an important role in the livelihood of people as more than 70% of the population live in rural areas and depend on agriculture and related livelihood opportunities for their sustenance. The soils are red lateritic and black with low fertility and salinity problem. There is recurrence of droughts and severe cyclonic storms. The important crops are rice, cotton, groundnut, pigeon pea, sunflower, black gram and sorghum.

Problems

i. **Fragmented Landholdings:** According to Agriculture Census 2015-16, the average size of land holdings in the state has declined to 0.94 ha from 1.06 ha in 2010-11. 88.6% of land holdings are in the hands of marginal farmers (69.3%) and small farmers (19.3%), who operate in only 58.4% of the area. Medium and large farmers account for 11.4% of land holdings and operate in 41.7% of the area. The number of holdings has increased from 76.21 lakh in 2010-11 to 85.24 lakh in 2015-16.

ii. **High Indebtedness -** According to NAFIS, Andhra Pradesh has the 2nd highest level of indebtedness (77%) as against an All-India average of 47%. The proportion of households that took any loan was 76% as against All India figure of 40%. The high incidence of indebtedness could be attributed to recurring crop failure, majority of the farmers not covered under crop insurance, thus forcing the farmers to resort to loan to mitigate the distress.

iii. **Crop production and trends in cropping pattern:** Cropping intensity is one of the indices for assessing the efficiency of crop in agriculture sector. The cropping intensity of the state is 123% as against Punjab and Haryana with cropping intensities at 191% and 181% respectively, which are the national benchmarks. Further crop diversification is vital for the state. Paddy, maize and cotton are the important crops.

iv. **Irrigation facilities:** About 50% of GCA is irrigated, the rest being rain fed. The productivity gap between rain fed and irrigated areas is large for all the major crops. Empirical evidences suggest that assured or protective irrigation encourages farmers to invest more in farming technology and inputs leading to productivity enhancement and increased farm income. A rapid expansion of irrigation systems is, therefore, critical for realizing the full potential of agriculture and enhancing farming incomes.

v. **Farm Mechanization and Power supply:** There has been a considerable progress of mechanization in agriculture, its spread has, however, been most uneven. Some of the problems in farm mechanization are the small & scattered size of farm holdings, financially challenged farmers & issue of dryland agriculture. The average supply of farm power has to be increased to 4kw/ha in order to achieve the desired crop production and productivity levels.

Prospects

i. **Crop Diversification -** Promotion of crop diversification to less water consuming high value crops like vegetables and more water conserving systems like SRI, other irrigated dry (ID) crops along with increasing water use efficiencies through various measures including massive promotion of micro irrigation in the state is critical for realizing the imperative of "more income per drop" for the benefit of farming community.

ii. **Horticulture -** Horticulture has emerged as a good enterprise by offering wide range of crop diversification options to farmers. Horticulture sector has been recognized by the Government as an essential component for food and nutritional security in the state and continued its ascendency, showing an impressive GVA growth of 17.16%, a reflection of State Government's initiatives such as Sprinkling/ Drip Irrigation, Polynets/Shade nets, Panta Sanjeevini, Panta Raksha, etc. Horticulture has crossed agriculture in terms of value addition, with the state aiming to establish Rayalaseema region as a Horticulture Hub.

iii. **Livestock** - Livestock sector has emerged as an alternative and dependable source of income generation even during times of severe drought. Increase in the production of Milk (13.53%), Meat (13.68%) and Egg (12.32%) resulted in an encouraging GVA growth rate of 13.05% in the livestock sector. The fodder policy and timely interventions have helped the livestock sector to bypass all the other sub-sectors under Agriculture and allied groups.

iv. **Water Resources -** There is good scope for bank financing of new irrigation/ recharge structures, pump sets, water conservation technologies, etc. NABARD has identified minor irrigation as a thrust area for development. Better quality pumping power also needs to be provided with greater promotion of renewable energy systems. It is estimated that the agriculture sector consumes around 26% of the total energy consumption in the state. Therefore, promoting energy efficient water pumping devices, replacing low energy efficient pumps with high efficiency pumping system, greater use of solar pumping systems particularly in off-grid areas and optimizing agricultural water demand through appropriate crop planning, efficient use of water, ground water recharging and rainwater harvesting, etc. are some of the measures which need to be adopted by way of policy interventions

v. **Aggregation of produce** - Taking into account, the shrinking size of land holding and a preponderance of small and marginal farmers, aggregation is relevant for production as well as marketing of farm produce. It reduces transaction costs for availing services/inputs and also enables the producers to negotiate for better prices. Cooperative farming, Collective Farming, Producers Organizations, joint liability groups (JLGs) and contract farming are some of the possible ways of aggregation.

Conclusion:

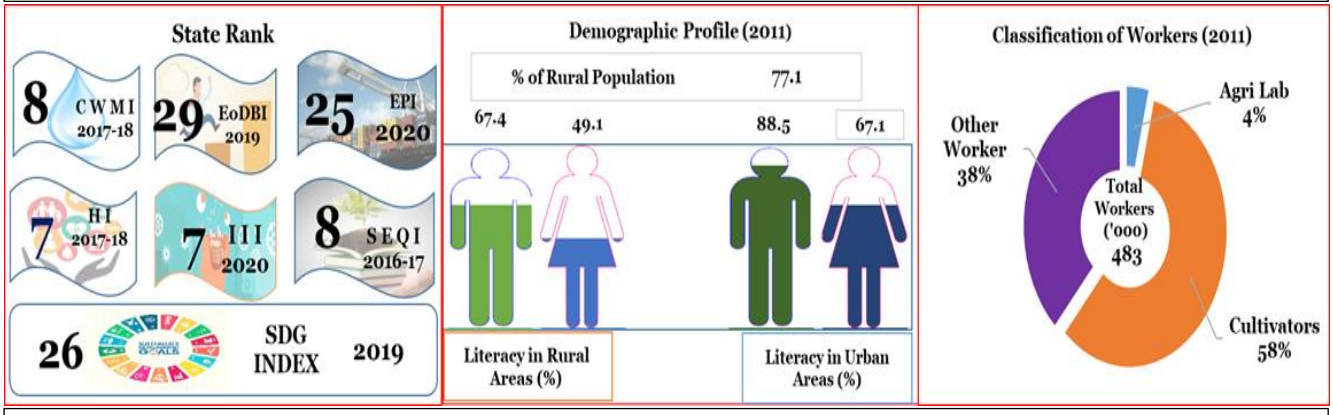
Aggregation and custom-hiring centres, crop diversification and focus on water-use efficiency are vital for the state to increase farmer incomes and achieve efficiency in production.

Arunanchal Pradesh

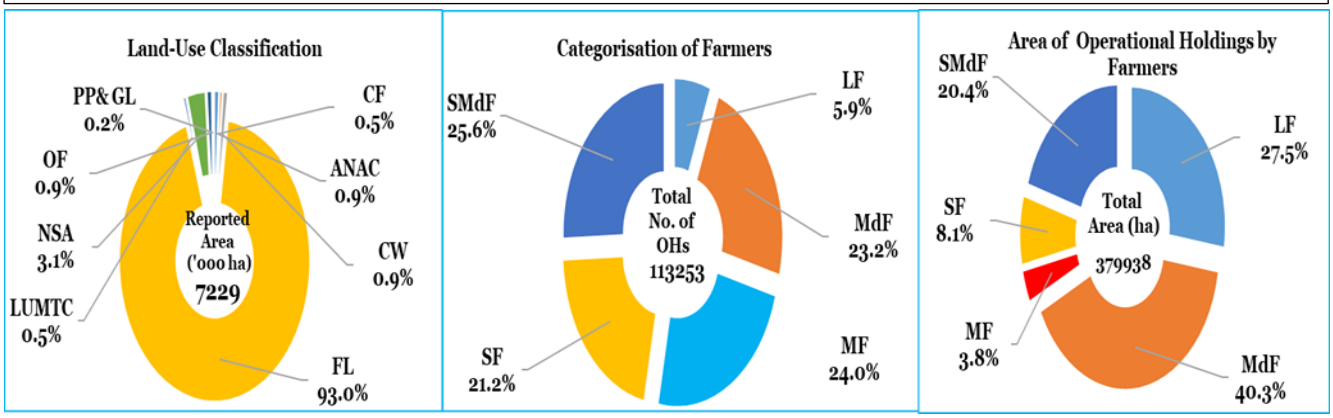
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
4	25	1779	2913.6	112	5589

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
139588	24603	8374	1384	1066

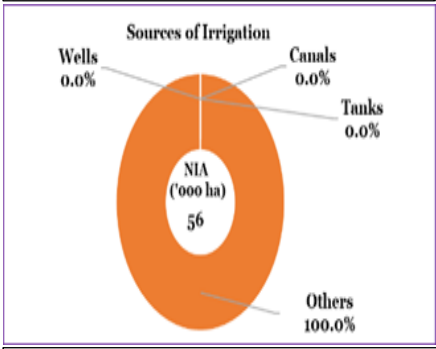
General Demographic Profile



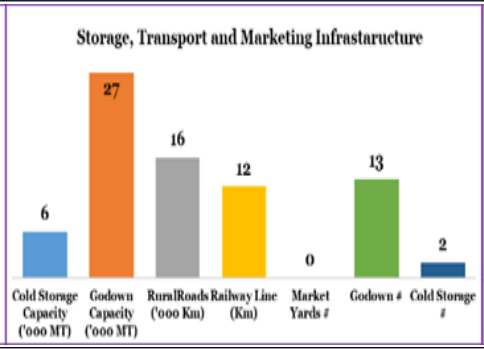
Land Usage (2015-16)

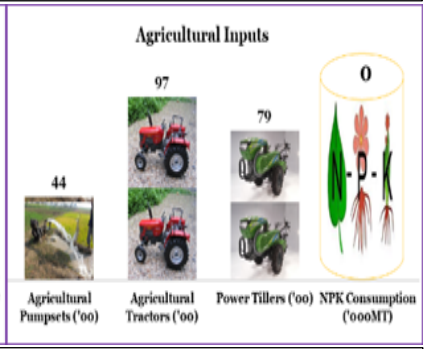


Irrigation

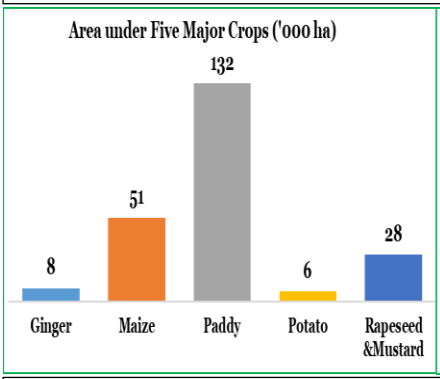


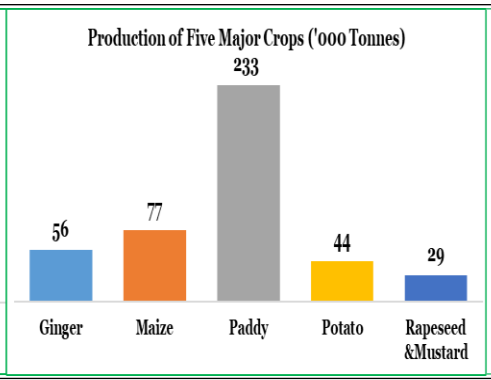
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

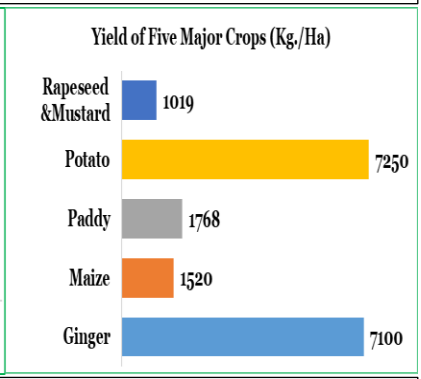




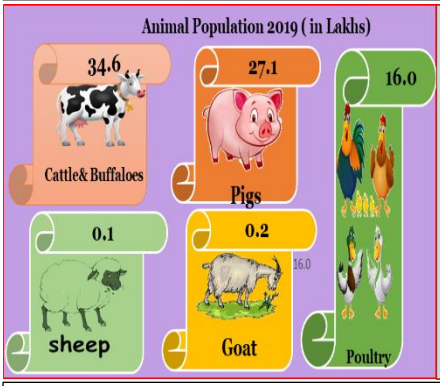
Area, Production and Yield of Five Major Crops 2017-18

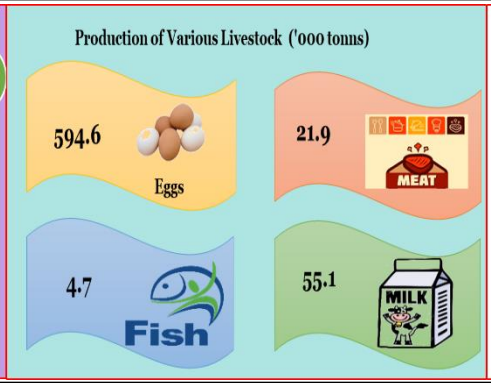


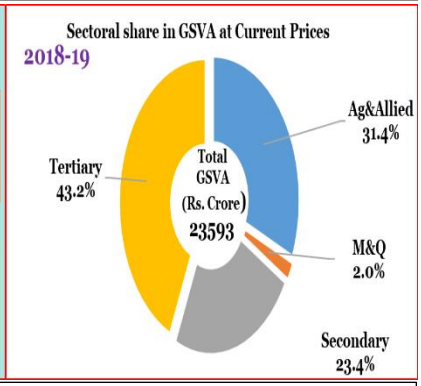




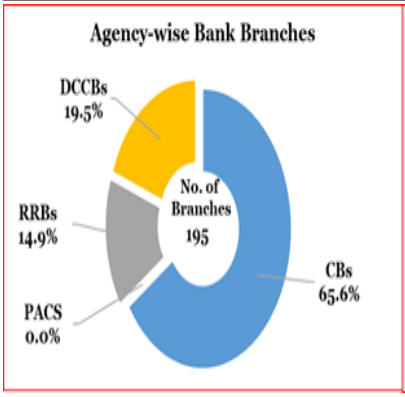
Allied Activities

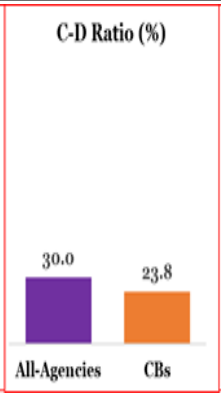


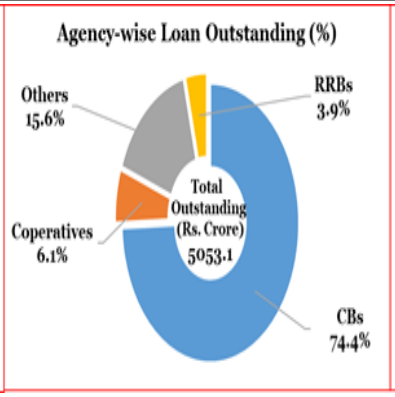


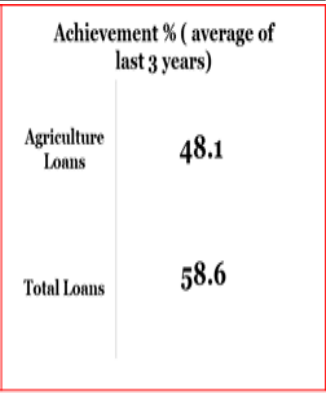


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Arunanchal Pradesh

Arunachal Pradesh, the '**land of rising sun',** is the place where the sun first strikes in India and shines upon its wild jungles and tribal communities. Arunachal Pradesh is a mountainous state characterized by per-humid climate, elevated ridges and intermontane valleys. It is a landlocked area surrounded by the countries of Myanmar, Bhutan and China to its east, west and north respectively and shares common boundaries with the Indian states of Assam and Nagaland to its south. It is an agrarian state where more than 70% of the population is dependent on agriculture. Jhum cultivation or "slash and burn" – a primitive form of agriculture is still widely practiced in the state. It accounts for 11.5% of GSDP of all North Eastern States except Assam in 2017-18 (Base year 2011-12). The share of Agriculture, Industry and Services in GSDP in 2018-19 (as per 2011-12 series) was 31%, 25% and 44% respectively.

Problems

Farmers in general practice subsistence farming. Being an agrarian state and practicing old agriculture techniques, the state is generating low income from agriculture.

i. **Prevalence of primitive agriculture:** Jhumming continues to be a dominant mode of food production and the economic mainstay of many rural households. The social organisation of hill tribes is often built around concepts of community ownership, participation and responsibility. Access to credit for shifting cultivators is denied because of inability to offer land as collateral for loans in the absence of land titles.

ii. **Low institutional credit flow:** The state has been experiencing low credit off-take primarily due to low recovery and credit potential. Its Credit Deposit Ratio as on 31 March 2020 was 32.5%, which is just half of the national benchmark level of 60%. The agency wise CD ratio as on 31 March 2020 was lower in Commercial Banks (26.22%) and APRB (22.03%) as compared to Cooperative bank (94.7%). The overall recovery percentage of loan extended to agriculture sector stood at 18.5% as on 31 March 2020.

iii. **No formal ownership**: Major portion of land under cultivation has no formal land tenure system. It means no formal 'ownership right' of cultivable land has been issued to farmers. People exercise customary rights on land possessed and cultivated by them which varies from tribe to tribe, wherein an individual, a family, the clan, a village or the community can own land.

iv. **Low agriculture productivity**: Due to subsistence farming and low farm mechanization, the state has one of the lowest agriculture productivity. Crop insurance scheme is hampered in the state on account of lack of adequate data and infrastructure, adversely impacting commercialization of agriculture in the state.

v. **Absence of marketing infrastructure**: The role of a strong marketing infrastructure is a logical requirement of any strategy to revive agriculture and horticulture. Scattered land holdings at difficult terrain which render aggregation of produce and market access difficult, thereby affecting price realization by the farmer.

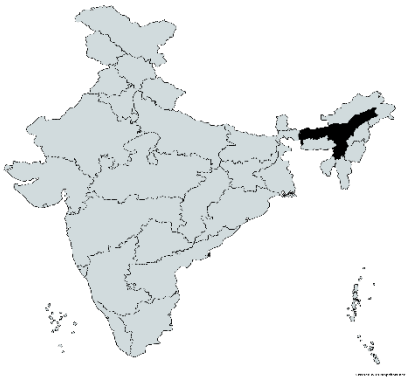
vi. **Large dependency on Central aids**: State's development plan largely depend on Central assistance as state has limited scope of internal mobilization of resources. As a result, planned economic activities are stagnant and suffer due to insufficient funding which also includes investment in agriculture sector.

Prospects

i. **Expanding area under cultivation**: The net sown area in the state is just 2.69% (2.25 lakh ha) of its total geographical area which can be increased significantly.
ii. **Increase irrigated area**: Only 20.6% of total area under all the crops is irrigated. It has the highest average run-off of 350 Billion Cubic Meter (BCM). More than 3,000 small and big river tributaries contribute about 80% of mean annual flow of River Brahmaputra. Arunachal Pradesh has 2.56 BCM annual replenishable ground water resources. There is immense opportunity for exploitation of Ground water for irrigation, as its Ground water level is in the safe zone.
iii. **Organic certification**: The most spectacular feature of the entire farm operations in the state is its organic nature. More than 80% of the crop production is without chemical fertilizers and agro-chemicals and therefore has huge potential for the growth of some unique field crops like sticky rice and many horticulture crops like wakro oranges (GI tagged), kiwi fruit, etc., and if cultivation of these crops is done on scientific as well as commercial lines, the state can become the most sought-after destination for export of these crops as most of these horticultural crops are grown organically.
iv. **Horticulture*:*** The state with its varied agro-climatic and physiographic regions has a wide range of tropical, sub-tropical and temperate fruits, vegetable, spices, medicinal and aromatic plants, flowers and mushroom. Expanding area under cultivation of lucrative crops such as apple, mandarin, kiwi and walnut have huge potential.
v. **Agroforestry:** Large-scale plantation of fast-growing timber and economically important tree species with intercropping of ginger, turmeric, black pepper, and lemon grass has proved to be ecologically viable, economically sustainable and socially acceptable and the prospect is high in the state. In addition, there is a great scope for cultivation of Non-Timber Forest Produces (NTFP) like bamboo, cane, broom grass, orchids etc., for economic development of the rural people given the ideal agro-climatic conditions and diverse altitudinal zones in the state.
vi. **Agro processing:** The state has high prospect for agro processing industries for crops like kiwi, apple, mandarin, ginger, king chilly, bamboo and broom grass. Most of the crops are bought at low price by middlemen due to non-presence of adequate agro-processing activities and poor agriculture infrastructure especially cold storage and efficient marketing. The establishment of a kiwi refinery in the state has raised the price of kiwi and its cultivation is expanding with scientific inputs.

Conclusion: Promotion of agriculture and allied sectors with comparative advantage in agro-processing industries, modernization and development of sericulture, investment in manufacturing units based on the resources available in the region, harnessing the large hydroelectric power generation potential and developing services such as tourism will help in accelerating development and create productive employment opportunities in the state. There is a need to explore ways for a proper land tenure system in the state for addressing the problem of collateral security for access to formal credit.

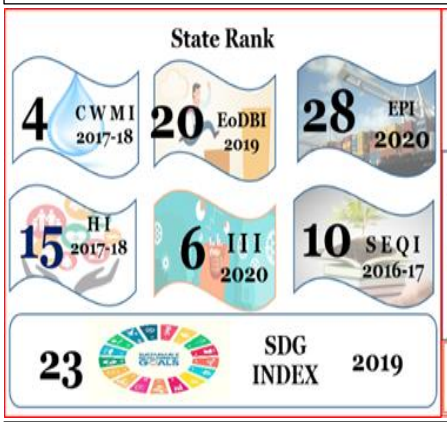
Assam

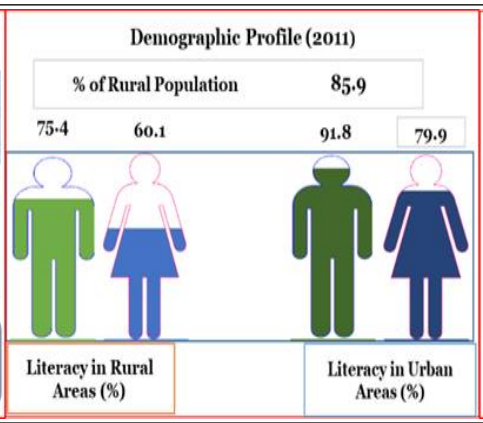


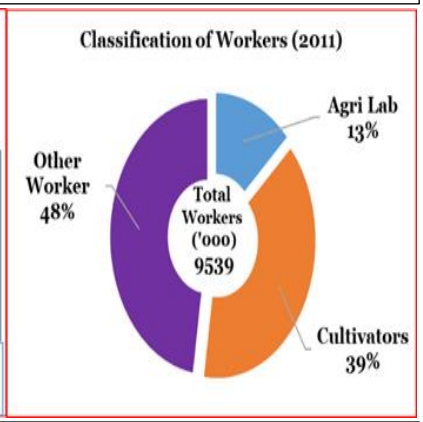
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
6	33	2202	2239.4	219	26395

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
82837	315881	7844	31206	26807

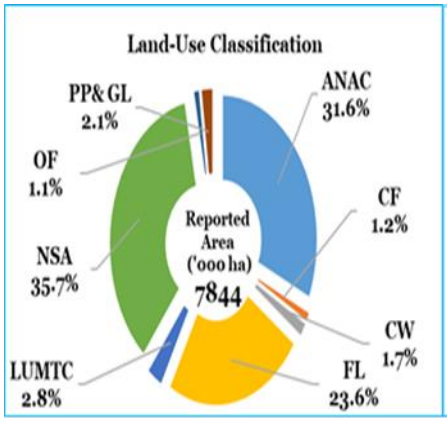
General Demographic Profile

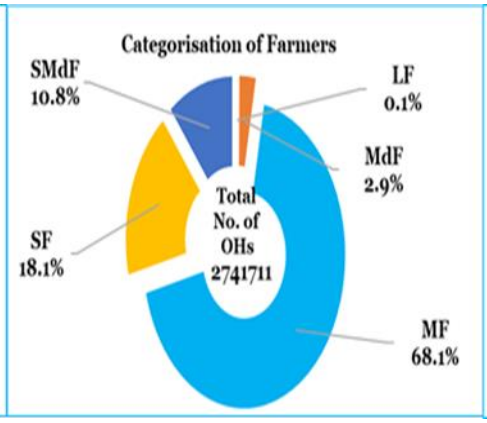


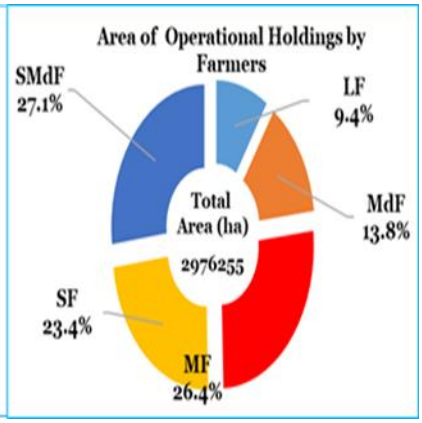




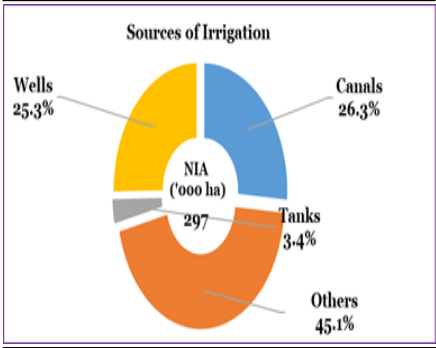
Land Usage (2015-16)



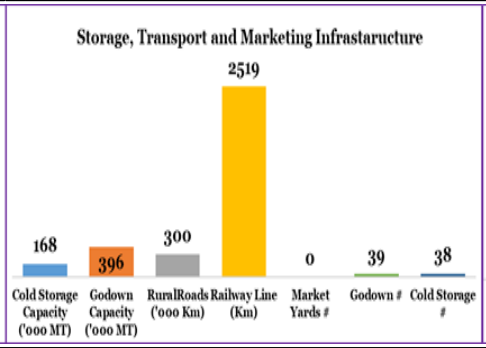


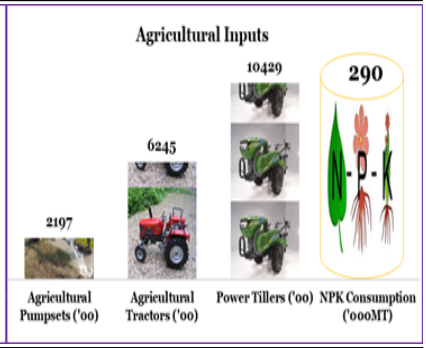


Irrigation

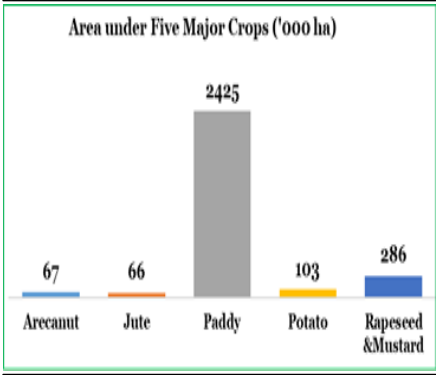


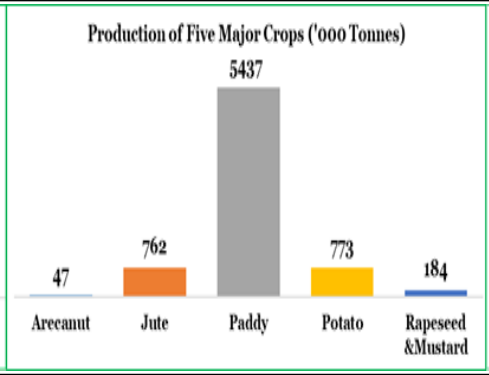
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

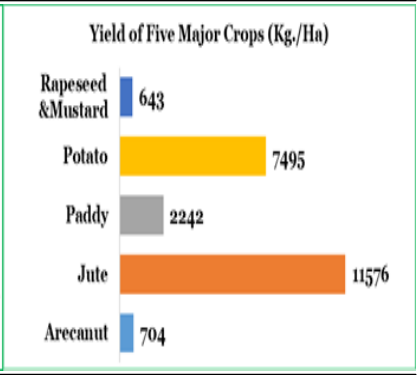




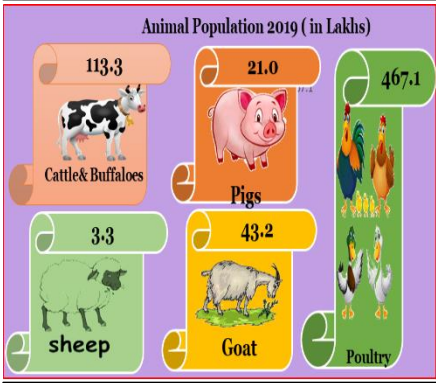
Area, Production and Yield of Five Major Crops 2018-19

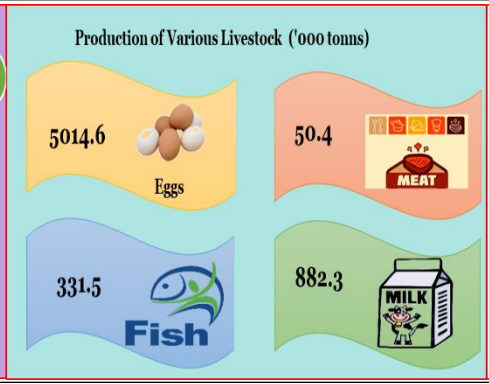


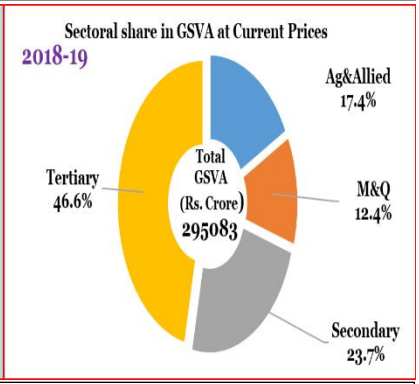




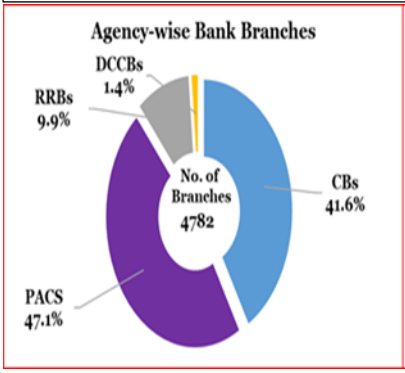
Allied Activities

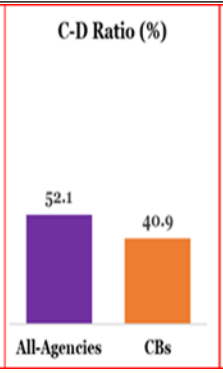


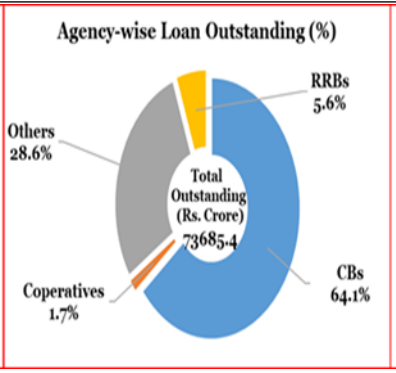


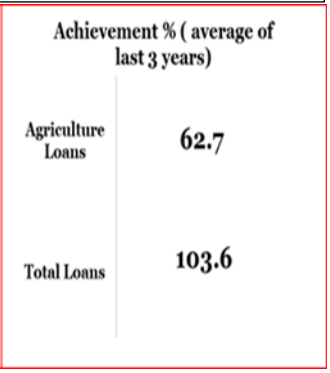


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Assam

Assam, the gateway to the North East India is the largest State in the North East bordering seven states viz. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal and two countries viz. Bangladesh & Bhutan. The State is endowed with abundant fertile land and water resources with total geographical area of 78,438 sq.km. of which 98.4 % area is rural. The State has been blessed bountifully by nature. The mighty Brahmaputra truncating the state, the Barak River in the south and their tributaries provide abundant water resource; the dense forest cover is home to a wide range of valuable timber, bamboo & medical plants; the state reserve of oil and natural gas; the fertile valleys & hills lopes nourish tea gardens and horticultural crops while the rich and fertile soil lends itself to raising vital food-grains. Agriculture, Manufacturing, and Service sector, during the FY 2019-20, is estimated to contribute 17%, 39% and 44% to the economy respectively. However, the economy of Assam continues to be predominantly agrarian with nearly 53% of the total labour force still dependent on agriculture and allied activities. The state is known for its tea, petroleum resources, muga silk and bio-diversity and popular destination for wildlife tourism. Pineapple, banana, cauliflower, broccoli, rose and bougainvillea are among high yielding varieties of horticulture crops. Horticulture crops occupy about 15 % of the gross cultivated area of Assam. About 300 types of medicinal herbs and plants are found in the state. It is also the largest bamboo producing state in the country.

Problems

i. **Irregularities in Rainfall and Natural Calamities:** Floods and dry spells are the principal natural disasters faced every year by farmers causing widespread devastation to standing crops. The principal source of floods is the Brahmaputra River and its tributaries. Inadequate irrigation facilities have also resulted in low agricultural output.

ii. **Lack of Access to Credit to Tenant Farmers -** Loans from banks or other credit agencies, is not generally accessible to tenant farmers. The tenant farming/share cropping system is traditionally practiced in the State by about 6 lakh landless farmers (who constitute 14.77% of total 40.61 lakh cultivators) while institutional credit is near negligible in absence of an enabling legal and operational framework necessary for strengthening financing of such farmers through Joint Liability Group mode. As a result, borrowing from unscrupulous lenders at an extremely high interest rate is common.

iii. **Inadequate Agriculture Marketing and Storage facilities:** Agricultural markets are under-developed. Often farmers sell to the nearest dealer/buyers, immediately after harvesting when the price is at the lowest, instead of trying to find the best market for their products. Geographical isolation, weak transportation and communication systems, poor marketing facilities, poor or non-existent market intelligence (e.g., information on price and place to sell) are some of the major problems in the marketing sector.

iv. **Lack of awareness and education**: Level of education and training related to agricultural development for framers is very poor. There is lack of modern farming techniques like selection of suitable crop varieties, accurate methods of sowing, control of pest and pathogen, application of proper amount of fertilizer, etc in the area. These minimizes the production even the best traditional methods of crop selection, sowing and harvesting are followed.

Prospects

i. **Hi-Tech Agriculture** - Introduction of Hi-tech agriculture, improvement/modification in agricultural practices like hydroponics, soil-less farming, aeroponics, poly-house/green-house cultivation of fruits, vegetables, flowers, medicinal/aromatic plants, etc. Implementation of precision farming approaches and grid analysis of soil samples will ensure use-efficiency of natural resources including water. All these may provide immense opportunity towards making agriculture remunerative and commercially viable even on smallholdings. (**Success story of flower production in Assam is given in box)**

ii. **Organic Farming** - Huge cultivable fertile land area, free from pollution is available. The proper use and management of this land may enhance the agricultural production. As the farmers are continuing the traditional farming systems with available organic manure mostly in the form of cow-dung, the region can lead to organic farming by adopting proper technology of decomposition and vermi- composting. Proper market linkages to urban centers by entering into pre-harvest payment mode agreement with the farmers thus ensuring produce procurement can further boost the sector.

iii. **Aggregation and collectivization**: - Formation of Farmer Producer Organizations (FPOs) will help farmers with better price realisation. At present 110 FPOs/ FPCs have been promoted and supported by NABARD, SFAC and State Agriculture Department. NABARD has collaborated with 36 Producer Organization Promoting Institutions (POPIs) to promote FPOs.

SUCCESS STORY OF FLOWER CULTIVATION IN KAMRUP DISTRICT

- An energetic young farmer named Shri Prabhat Das, S/O – Late Lakkhi Das, aged about 40 years hailing from Kulhati village under ADO circle Gerua of Kamrup district has cultivated different types of flowers viz. (1) Gladiolus, (2) Tube Rose, (3) Tissue Zerbera, (4) Red Zerbera in about 12 (twelve) bighas of land of his own under Horticulture sector, 2014-15 & 2015-16. Shri Prabhat Das is an educated young farmer whose qualification is Bachelor of Arts (BA).

- He has earned approx. Rs. 1.50 – 2.00 lakhs yearly by selling his produce in the wholesale and retail markets of greater Guwahati.

- Previously, he cultivated different types of field crops in the same plot of land. But, at that time he did not get enough profit by selling those produce in comparison to the money he is getting at present by selling the flowers from the same plot of land.

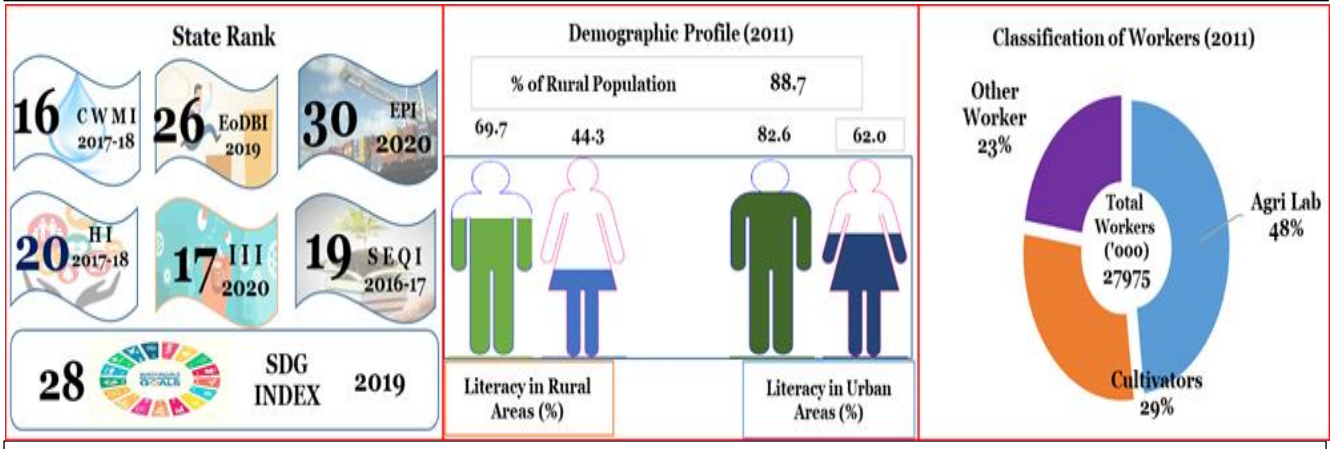
Conclusion: Active participation of people and Government machinery and understanding the Vagaries of nature, adaptation and mitigation of climate change will help in increasing the production, productivity and profitability in agriculture sector and also in Gross State Domestic product of the state.

Bihar

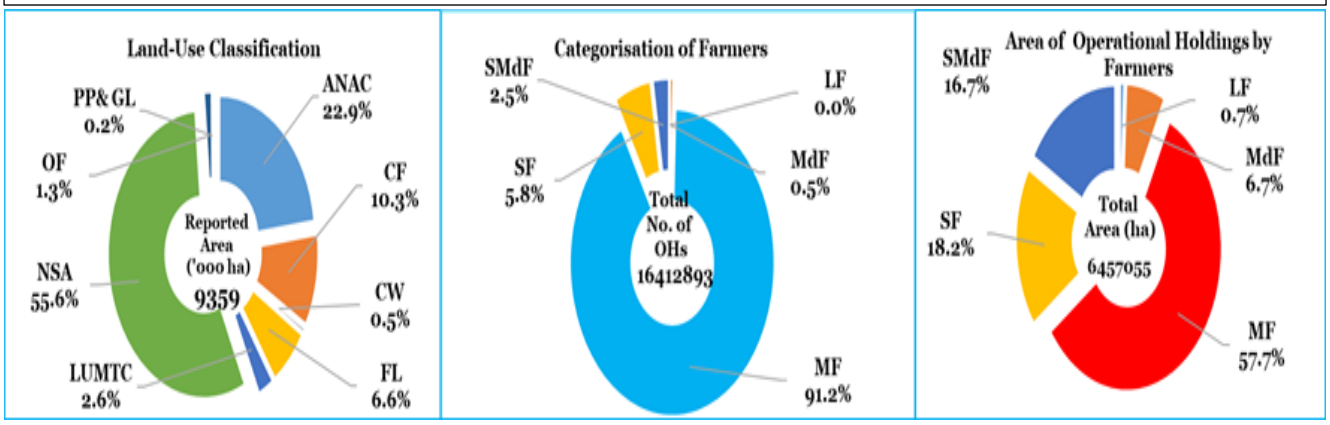
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
4	38	8471	1192	534	39073

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
46664	611804	9416	104099	92341

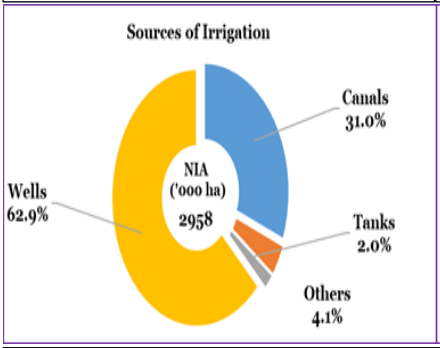
General Demographic Profile



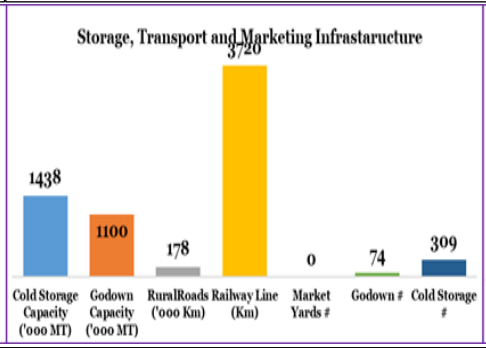
Land Usage (2015-16)

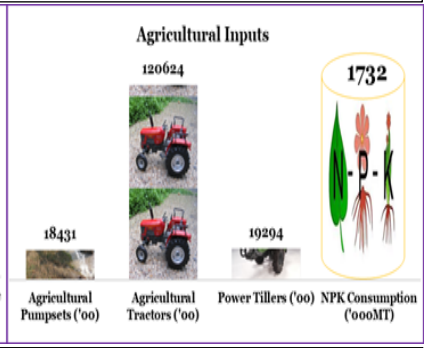


Irrigation

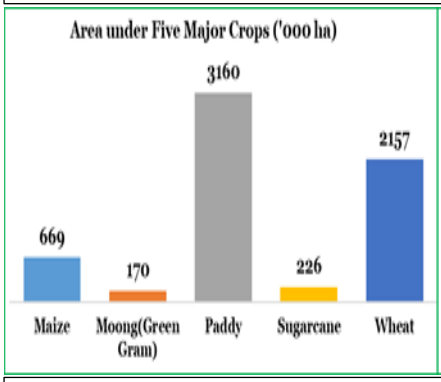


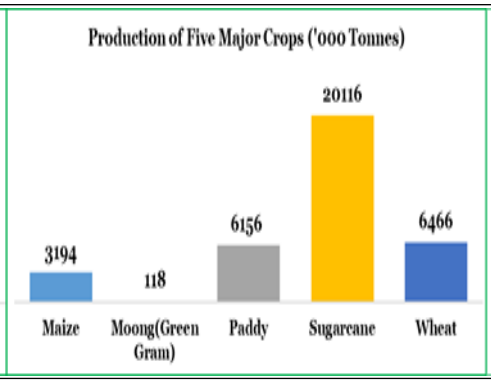
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

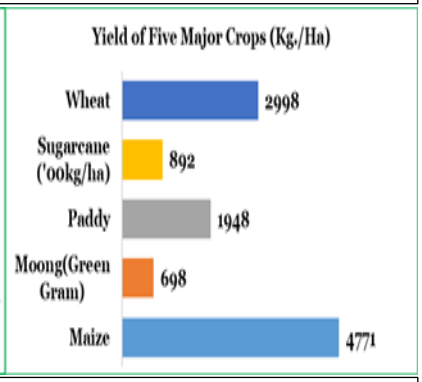




Area, Production and Yield of Five Major Crops 2018-19







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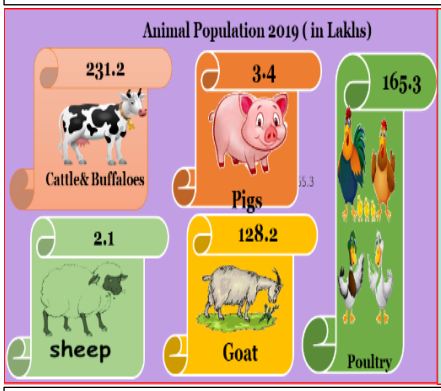
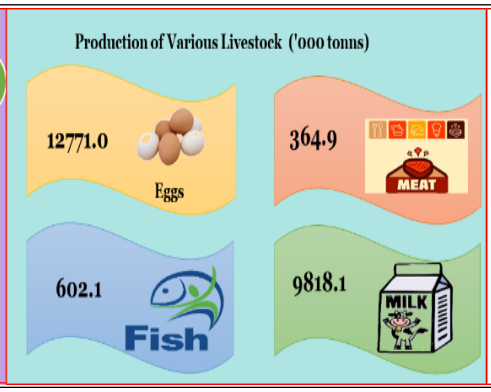
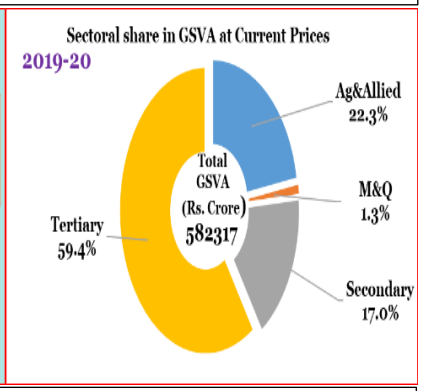
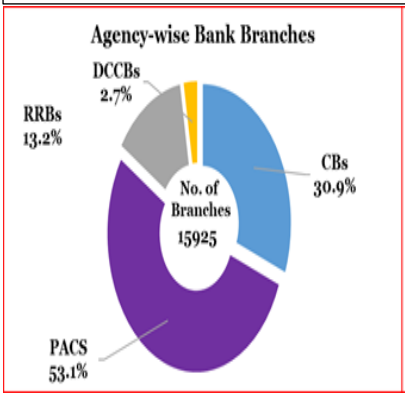
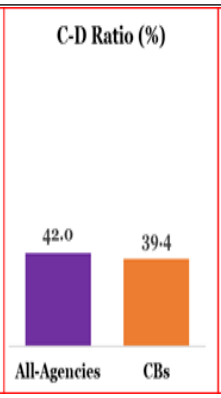


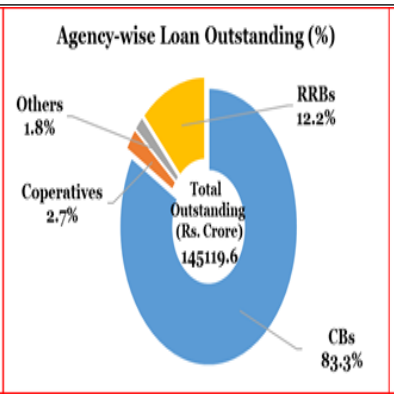


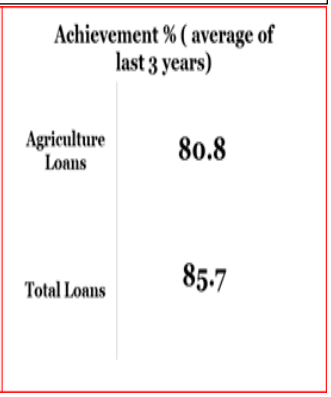


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Bihar

Bihar is a landlocked state located in the eastern part of the country. It is divided into two unequal halves by the river Ganges which flows through the middle from west to east. Situated in Indo-Gangetic Plains, it has fertile soils and abundant ground and surface water resources with average annual rainfall of 1009 mm. A number of rivers flow through the state, mostly through north Bihar. High population density, with 8.6% of the total population of India dependent on 2.86% of the total geographical area, is one of the major limitations as well as strengths of the state. Rural population of the state is around 88% and they are directly/indirectly dependent on agriculture and allied activities for their livelihood.

Problems

i. **Dominance of Small Holders -** Of the total, 91.06% of the Operational Land Holdings (OLH) in the state belongs to Marginal Farmers (MF). The average size of land holding is 0.39 ha for all social groups in comparison to all India average of 1.08 ha. The profound small size of land holdings, along with large scale fragmentation, creates problem for farm mechanization, technology transfer and affects productivity as well as farmers' holding /bargaining powers.

ii. **High share of Leased-in land -** Share-cropping / tenant farming is one of the dominant features in the state. It increased from 11.76% to 22.67% of operated area of agricultural land during 2002-03 to 2012-13 in comparison to all India level of 10.88% in 2012-13 (NSSO 70th Round Survey) this hinders the credit flow in the sector as most of the agreements are oral which is evident from the low CD ratio of 40.95% as on 31.3.2020 in comparison to 70% at all India level.

iii. **Low level of Income of Agri-Households** - As per the NSSO 70th Round Survey, the average monthly income of Agri-Households in Bihar was Rs.3558 and expenditure was Rs. 5485, leaving thereby a negative surplus income (Rs. -1927 p.m.). Low cropping intensity (146%), small average size of holding (0.39 ha. and low level of farm mechanization leading to lower farm productivity are some of the reasons for lower monthly income of agriculture households. This hampers capital investment in the sector.

iv. **Irregularities in Rainfall and Natural Calamities** - Bihar's agriculture is mainly rainfed and only around 57 % of the cultivated area in the state is irrigated. Neither the rainfall nor the distribution of the water resources is uniform across the state, also on account of erratic and year-to-year variations in rainfall, coupled with siltation in rivers, frequent floods in north Bihar and droughts in south Bihar the agrarian economy is severely affected.

v. **Inadequate storage infrastructure -** The estimated production of food grains for 2018-19 was 156 lakh MT (RBI-Handbook of Statistics on Indian Economy 2019-20), while the available godown/warehouse storage capacity is around 42 lakh MT**.** Similar situation is witnessed with regard to cold storage too with existing functional capacity of 12.85 lakh MT while the production of potato in Bihar for 2017-18 itself was 77.40 lakh MT, which indicates the need for more cold storage facilities. The problem is further accentuated for small & marginal farmers, as they have a hand to mouth existence, and lack of scientific storage infrastructure forces them to sell their produce at unremunerative prices further spiralling them into debt and poverty.

vi. **Low CD ratio -**The low access to institutional credit of farmers is getting reflected in low CD ratio of 40.95 % as against 70 % at all India level. Low penetration of KCC among farmers also denies them working capital for farming leading to low farm production and productivity.

Prospects

i. **High value Crops -** Fruits and vegetables cultivation especially catering to urban and metro markets has tremendous potential. Cultivation of off-season and exotic vegetables under greenhouse for exports (asparagus, celery, bell pepper, sweet corn, green and lima beans) may be undertaken by the state. Furthermore, exclusive production of crops for processing/ specific to user industry needs/ under contract farming arrangements- i.e. gherkins, potato, fruits and select vegetables for processing, flowers (for extracts), medicinal and aromatic plants should be explored.

ii. **Agricultural Storage, Markets and e-NAM-** It is essential to develop product-specific storage and marketing infrastructures / facilities at various locations which are accessible to farmers and primary processors. In the absence of any transparent price discovery mechanisms for the farmers' produce and the farmers being left at the mercy of middlemen / cartel of traders, the development of major mandis and its linkage with e-NAM and setting-up of e-RaKAM at localised centres is required at the earliest to raise the farmers share in the consumer rupee.

iii. **Contract farming-** Ministry of Agriculture & Farmers' Welfare, GoI has come out with a draft Model Contract Farming Act, which says "While protecting interest of small farmers, will ensure smooth flow of raw material to industry". Once the state comes on board and adopts the proposed law, farmers can enter into agreements with private entities/buyers who may, in turn, invest in technology and bring in improved seeds/ ingredients and management skills to increase productivity and reduce transaction costs.

iv. **Increasing Irrigation Potential -** Bihar Agriculture Road Map 2017-22 prepared by the Department of Agriculture, Govt of Bihar envisages increasing irrigation potential from existing 29.69 Lakh ha to 36.31 Lakh ha and irrigation intensity to 209% by 2022 mainly through private tube-wells, which requires heavy investment in the form of bank finance.

v. **Dairy Development -** While, on an average, livestock contributes about 12 % of farmers' income in India, the same for small and marginal farmers and landless labourers is 36 % Furthermore, while farmers' income is growing at 3.5 % annually, income from livestock is growing at about 14.5 %. Therefore, in order to double income of farmers, it is important to focus on the dairy sector for these categories of farmers. The annual milk production in Bihar during 2018-19 was 98.18 lakhs MT. It can be accelerated further with the support of Dairy-processing Infrastructure Development Fund (DIDF) maintained in NABARD.

vi. **Fisheries Development** With enhanced credit support the State may obtain optimum productivity level and export surplus to other states. Extending working capital for Fisheries covered under KCC facility for supporting their production activities and provision for hygienic marketing / dressing outlets with aquarium type storage / transportation facilities will give a boost to the sector. The recently created Fish and Aqua Development Fund in NABARD can be utilized by the state government to create fisheries infrastructures in the state.

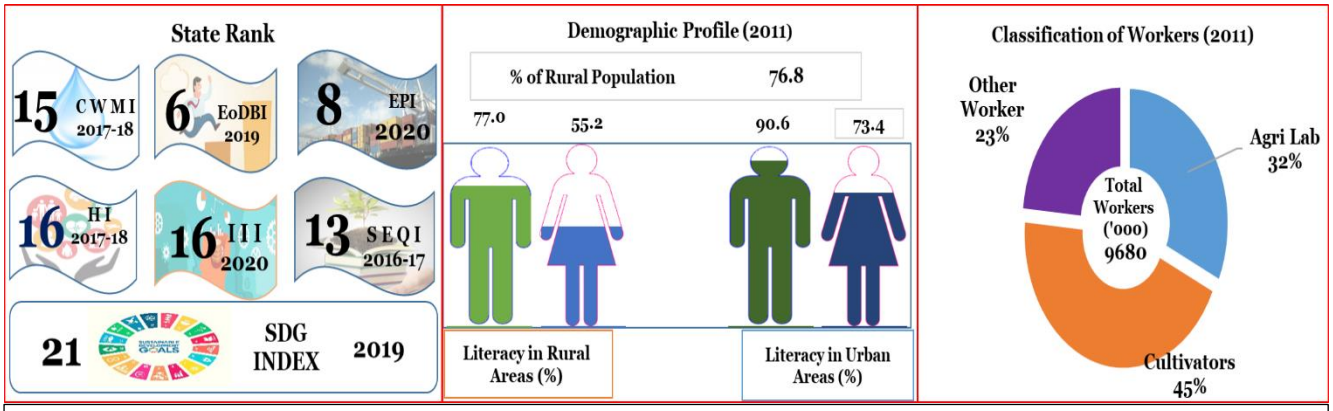
Conclusion - Bihar, being one of the most backward states of the country has a lot of potential particularly in agriculture and allied sectors which needs to be exploited through concerted efforts of all stakeholder viz. State Govt., Banks, NGOs and other stakeholders.

Chhattisgarh

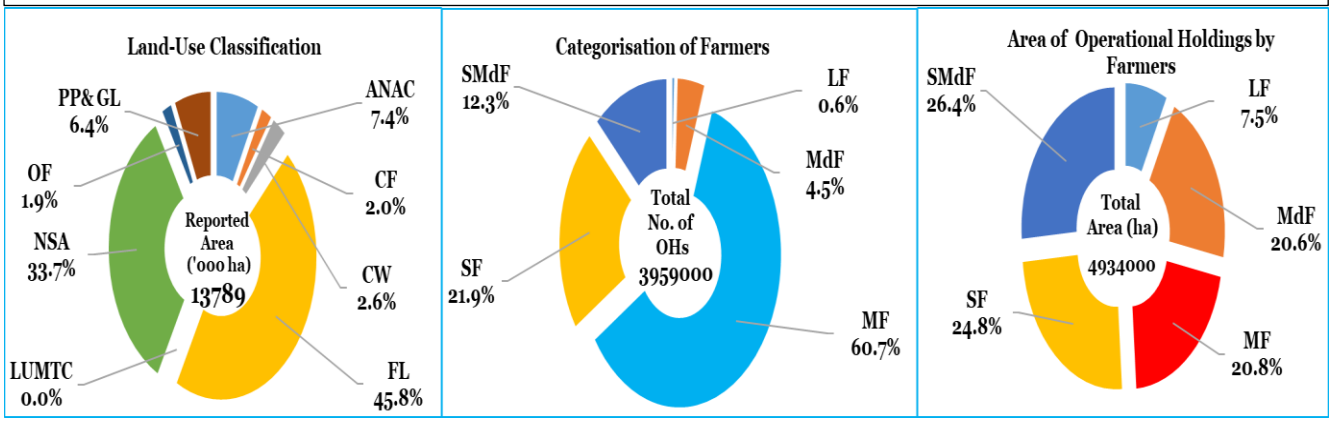
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	28	11664	1281.1	146	20619

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
98281	329180	13519	25545	19608

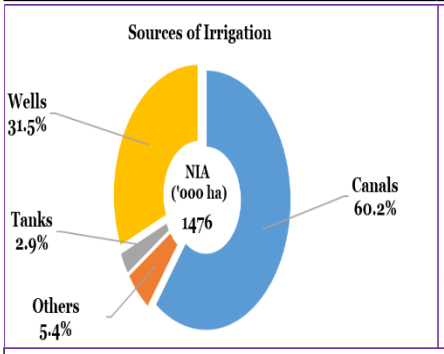
General Demographic Profile



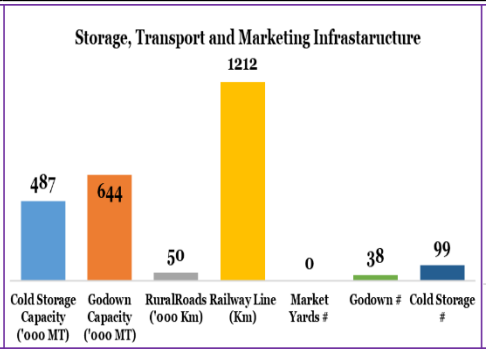
Land Usage (2015-16)

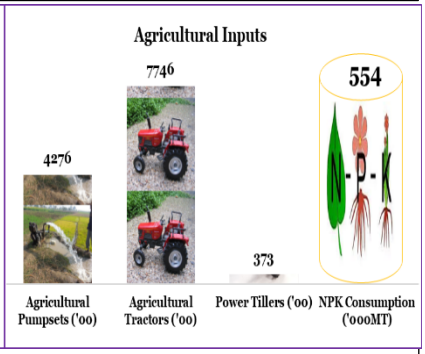


Irrigation

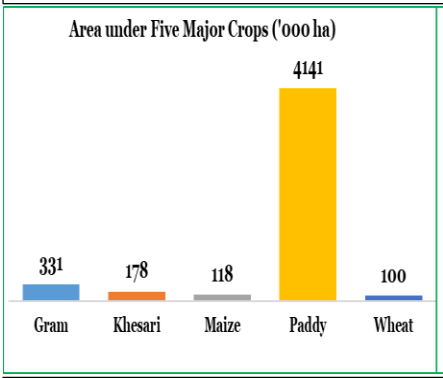


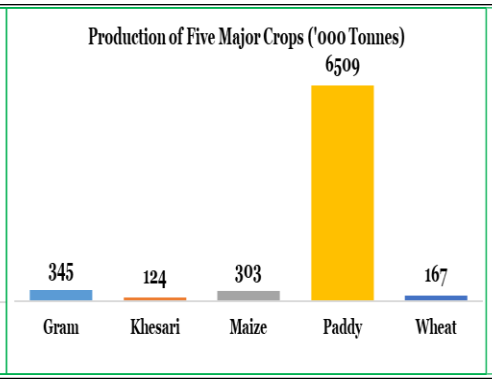
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

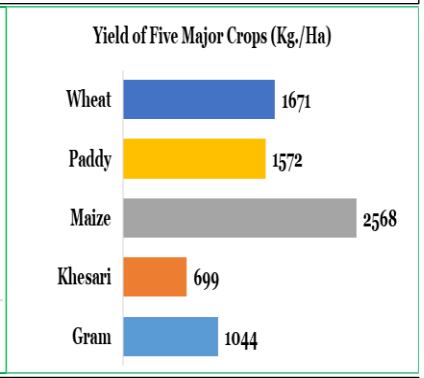




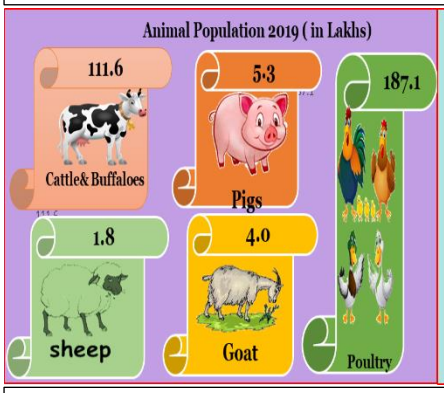
Area, Production and Yield of Five Major Crops 2018-19

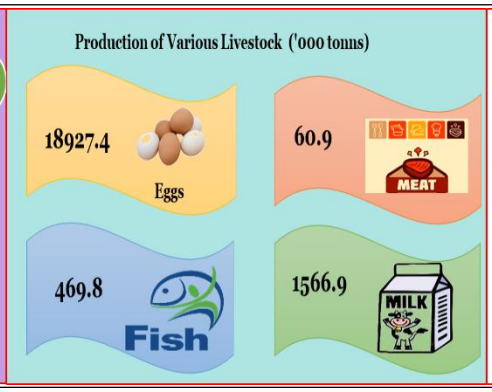


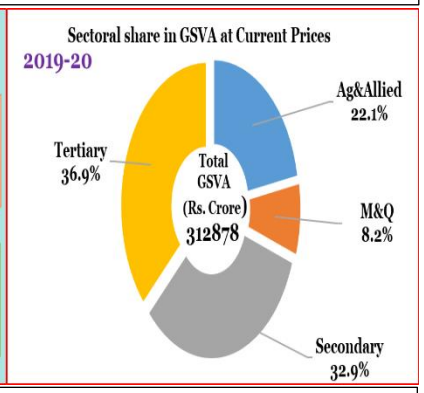




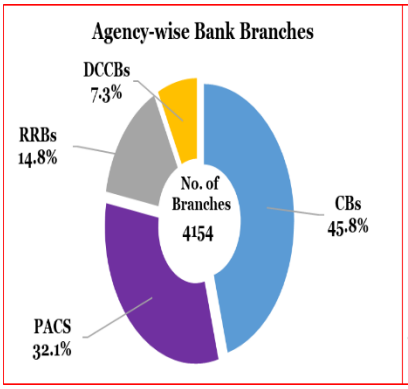
Allied Activities

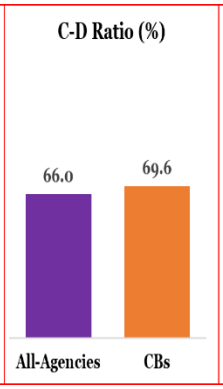


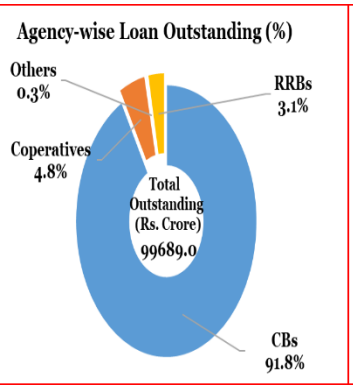


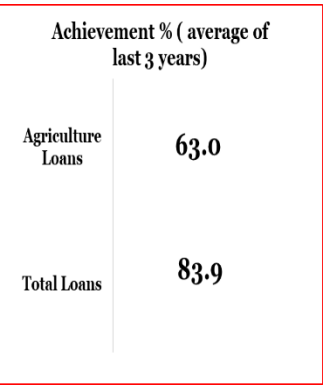


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Chhattisgarh

Chhattisgarh's topography broadly comprises of Bastar plateau in the south, central plains along the Mahanadi basin & its tributaries and Northern Hills region. The southern & northern regions of the state are home to rich and diverse forests which cover about 44.2 percent of the geographical area of Chhattisgarh. Its agriculture is characterized by low incomes, low productivity, and high dependence on rains, large number of small-marginal farmers, low investments, and mono cropping. Only a third of its geographical area is sown and just 7 percent is under double crop. About 80 percent of its population is engaged in agriculture and 43 percent of the entire arable land is under cultivation. Paddy is the principal crop and its central plains are known as rice bowl of central India. Other major crops are coarse grains, wheat, maize, groundnut, pulses and oilseeds.

Problems:

i. **Dominance of Small Holders** - The rural economy in the State is dominated by small farmers (<2 ha) comprising over 75 percent of the total farm households. The average size of land holdings is 1.4 ha. Smallholders suffer from poor access to quality inputs, institutional credit and other resources, organized markets, modern farming technologies, etc. These small farmers do not reap the benefits of economies of scale and they also have limited bargaining power in the marketplace for outputs due to their low individual marketable surplus.

ii. **Decreasing Water Table and Soil Quality** - The farmers in Chhattisgarh used to practice crop cycle and in summer, oilseed, millets and pulses used to be the favourite crops for farmers. However, many farmers have started sowing the paddy crop during the dry season (February-May) which is worsening the water crisis in the state. Farmers are attracted by the initial good yield for summer paddy, but it destroys the agricultural field in the long run leading to depletion of humus and other soil nutrients.

iii. **Limited Irrigation** - Area under irrigation is only 36% of the net sown area. Due to difficult terrain and fragile ecosystems, there has been inadequate irrigation infrastructure development in the area. This has direct bearing on the development of agriculture.

iv. **Poor Storage and Marketing Infrastructure** - Though the state has geared up the production of horticulture by increased yield through National Horticulture Mission (NHM) but there has been a considerable post-harvest loss of the produce due to lack of post-harvest management practices. Lack of proper market linkages leads to increase in number of intermediaries, which results in low value realization to the producer. Lack of supply of inputs at the right time and in right quantity coupled by inadequate extension work leave the farmers to practice less efficient agriculture.

v. **Low Livestock Productivity**- Despite the huge potential of animal husbandry, the Government's resolve to provide it as an additional source of income for the farmers and the rural mass, issues such as low productivity of milch animals, non-availability of quality animals, vulnerability of poultry on account of increasing feed prices, inadequate integration for milk production impede growth of the sector and need to be addressed urgently.

Prospects:

i. **Crop Diversification**: The varying climatic and soil conditions offer natural advantage for crop diversification. In regions, where growing of high yielding variety is not feasible or not suitable for diversification of crops, value addition to the existing produce would be of immense use. For example, the hills form a natural habitat for growing crops like finger millets, barnyard millets, amaranthus, and buckwheat etc., crops that are rich in nutrients. A number of products can be prepared from these crops to provide nutritional security. This will also co-benefit in sustainable agriculture and on the other hand help in checking migration.

ii. **Organic Farming** – Chhattisgarh is giving huge importance to Organic Farming and under State Organic farming Mission it has successfully converted five districts fully organic. The state model of organic farming where cow dung collected at village level, converted into organic manure and later sold, not only provide employment to villagers and facilitate organic farming but at the same time make animal husbandry commercially profitable, prevent open grazing by cattle and solve the problem of stray animals on roads and helps in environment conservation.

iii. **Livestock** - In a largely rainfed production environment of Chhattisgarh, livestock rearing remains a significant risk-mitigation strategy for livelihood and income security for large number of households. 20th Livestock Census reveals that more than 52% of the households in the state are engaged in livestock rearing. While the percentage in the central region is 46% but it is as high as 70% in northern hilly regions and bastar district. Thus, the sector is key for income diversification of farm households in the state.

iv. **Horticulture** - Diverse agro-climatic conditions prevailing across state offers significant opportunity in horticulture sector. The State Government is keen in the growth of horticulture sector, including bamboo through research, technology, extension, post-harvest management, processing and marketing. Horticulture crops are the best alternate cropping system to combat uncertainties in availability of surface water and would fetch constant income with generation of farm employment opportunities.

v. **Agro-Forestry** - In the State of Chhattisgarh the Forest Cover is 5.98 million ha (44.2% of Gross Area) and Reserve Forest Area is 2.58 million ha (19.08% of Gross Area). Thus, a good scope is available for increasing the forest cover in conventional forest area. Agroforestry, in addition to the economic benefits provide environmental gains leading to resilience of agriculture through adaptation/mitigation strategies in respect of climate change. Being perennials, the trees provide an element of long-term economic stability to the farmer in the event of a crop failure.

Conclusion:

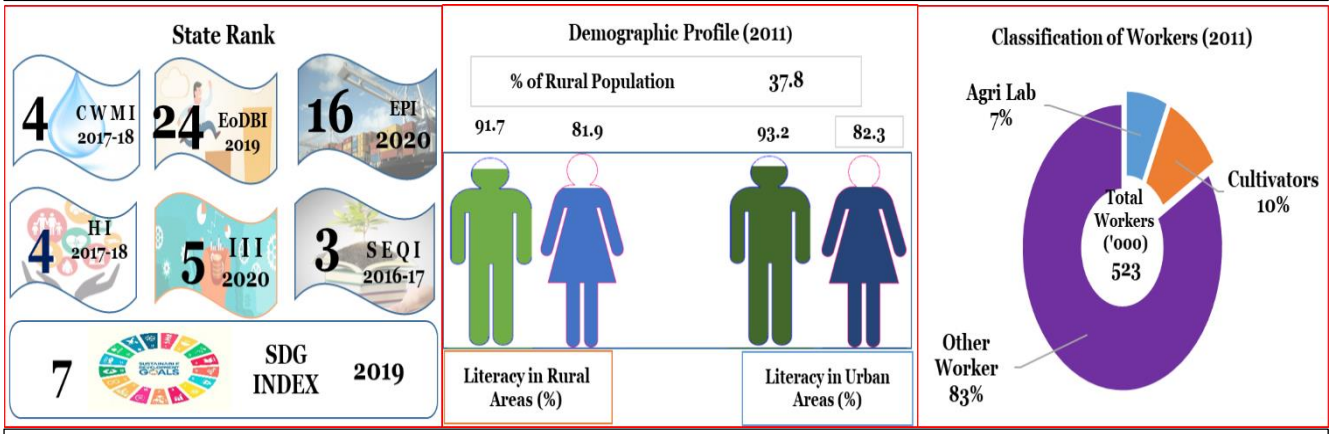
With fragmentation of agricultural landholdings, difficult terrain and lack of proper market linkages, Chhattisgarh would have to focus on production, productivity and profitability in order to ensure sustainability in agriculture. Focus on aggregation, crop diversification, organic farming, and better techniques would yield beneficial results. The region is also suitable for growing mango, banana, guava, other fruits and a variety of vegetables; with 44 percent of its area under forests it has one of the richest bio-diversity areas in the country. It has abundant minor forest produce like tendu leaves, sal seed, medicinal plants, bamboo, lac and honey.

Goa

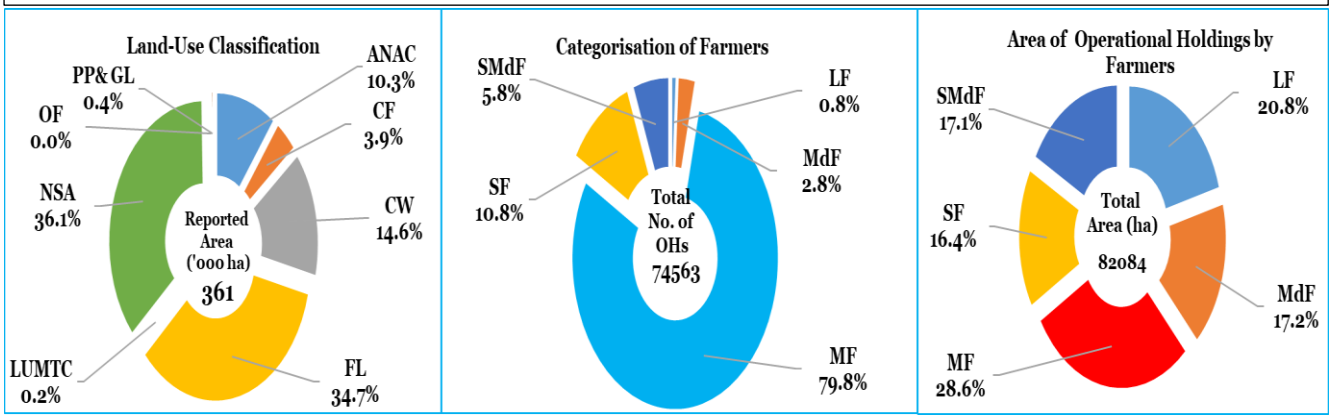
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
	2	190	3270.5	12	353

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
430081	73170	370	1459	552

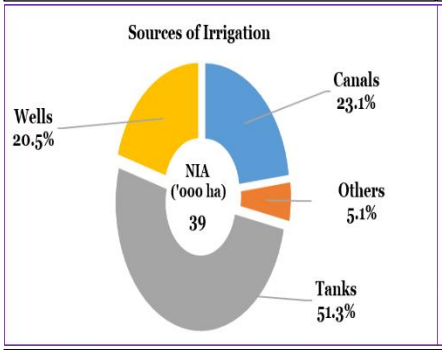
General Demographic Profile



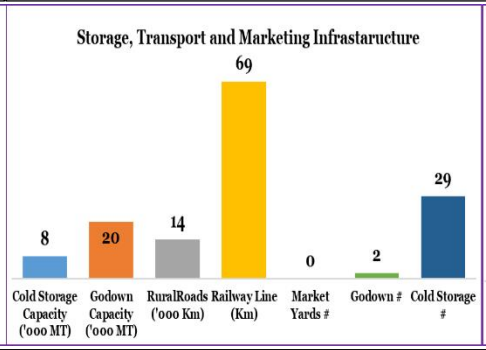
Land Usage (2015-16)

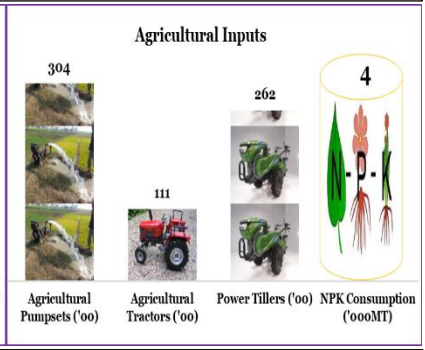


Irrigation

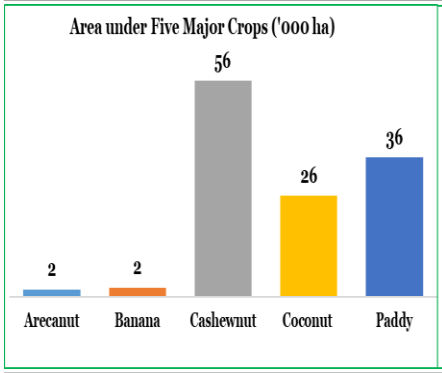


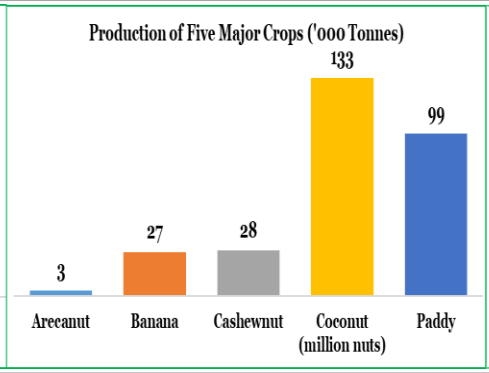
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

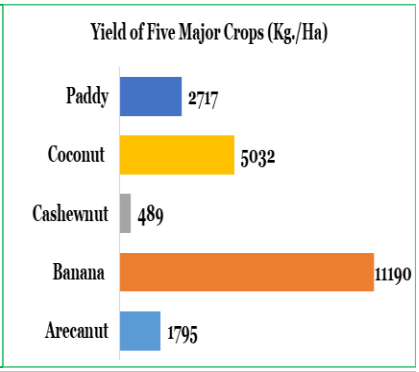




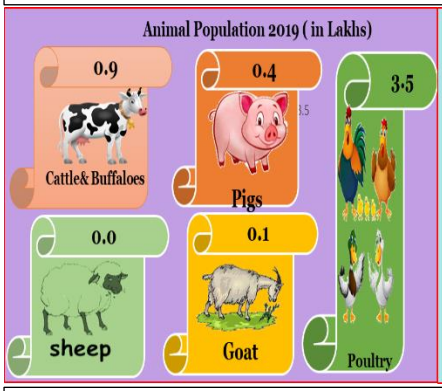
Area, Production and Yield of Five Major Crops 2018-19

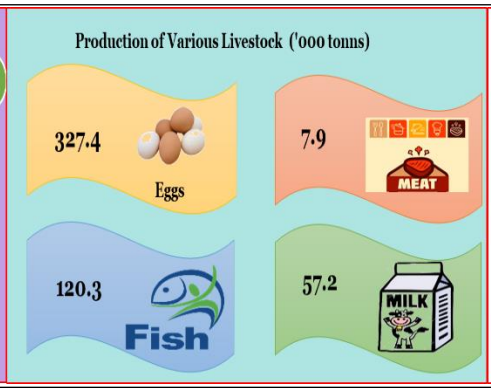


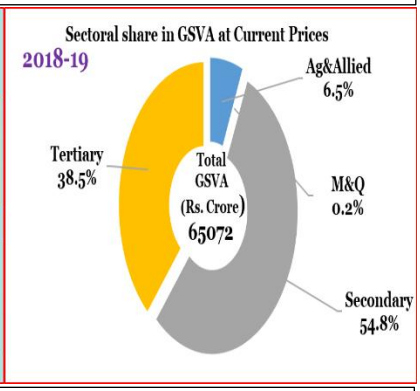




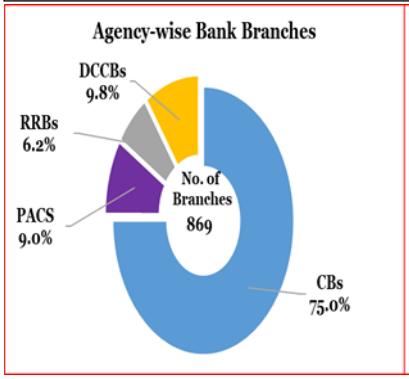
Allied Activities

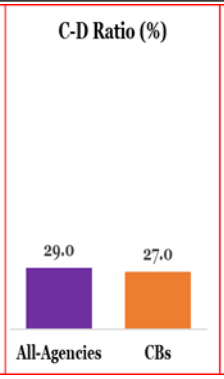


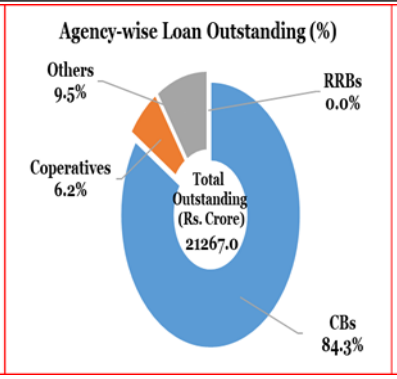


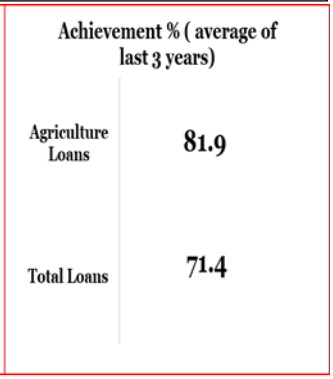


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Goa

Goa is the smallest State of the Indian Union covering a geographical area of 3.61 lakh ha that is 0.11% of the total geographical area of the country. Out of the total geographical area, 36% is under crop cultivation and 35% under forest cover. The Net Sown Area is 1.26 lakh ha with the cropping intensity of 116%. A gradual shift in the cropping pattern from garden crops to horticultural crops is noticed in the State due to better returns, lower risk and lesser maintenance requirements. Agriculture has been providing livelihood to nearly 12% of the population. The state also has abundant forest cover in addition to its pristine beaches which have made Goa a preferred holiday destination for both domestic and international tourists.

Problems

i. **Declining Importance of Agriculture Sector** - The general agricultural scenario in the State is witnessing a downward trend. The Sectoral growth rate of Agriculture as per 2018-19 quick estimates at constant prices was negative for the state and the primary sector contributed only about 7 % to GSDP. The cropping intensity for the state is 116% which is very low as compared to national average. Only 12% of population depends on Agriculture for livelihood which is distinct from the national level picture.

ii. **Low Demand for Credit** - Most of the agriculture activities in the State are supported by up front subsidy assistance ranging from 50 to 90 percent. Hence, the demand for credit is very limited. The CD Ratio for the state is just 28% in the year 2018-19 which is very less as compared to national average. Further, the issues relating to titles to properties restrict access to institutional credit.

iii. **Encroachment on Agricultural Land –** Paddy dominates in the state with 40% share in area under crops. Goa has seen a decline in paddy cultivation in recent years because farmers and landowners have been reluctant to practice the conventional, labour-intensive method of raising nurseries and transplantation. This has led to large parcels of arable land lying fallow, which have in recent years become prime targets of real estate developers. Environmentally destructive activities such as mining, coastal development and irresponsible building construction is threat to food security of the state.

iv. **Lack of proper Land Records** – The Portuguese legacy and various Land Acts (Alvara, Mokasso rights, etc) have resulted in a complicated and undesirable situation where the cultivator is unable to provide satisfactory land titles for creating effective mortgage for bank loans. Though the tenant is a deemed owner, it does not provide clear and marketable titles, thus depriving him of institutional credit. Steps have been taken to remedy the problem but proper updation and access to institution is the need.

v. **Poor Management of Land** - Goa being a small and coastal state has large proportion of area which is coastal and marshy. Poor management of Khazan lands and Marshy land has led to low soil PH, high erodibility, low soil fertility and low water retention capacity.

Prospects

i. **Making Paddy Profitable** - Paddy has a significant place in the economy of Goa. Availability of cheap labour is a major problem in the state. Mechanisation of transplanting of paddy as well as harvesting has helped reduce time and labour cost. Contract and community farming can help revamp paddy cultivation, under contract farming government has encouraged farmers who have fragmented farms, to join hands, thus covering larger tracts of farm land and reducing the cost of cultivation and also giving a proper yield. Contract and Community farming of paddy can be viable

options, at a time of rising unemployment and disenchantment, due to the grounding of mining activity and the downswing in tourism.

ii. **Coconut - A Lucrative Business:** Coconut is an important plantation crop in Goa and is cultivated in an area of 25,730 ha with an average yield of 5014 kg per hectare. Increased wages of farm labourers and lack of value addition are some of the reasons holding back coconut production on commercial scale. Coconut oil, powder, sugar, cream, milk, virgin coconut oil (VCO), coconut shell powder, are some of the value-added products, which have a huge demand in the national and international market and thus the potential can be tapped through proper policy support.

iii. **Fisheries –** Annual fish catch in the state during 2019 was 75,748 tonnes of which, the marine sector is contributing 95%. Sizeable portion of the catch is processed, about 30% of the value addition in agriculture and allied sectors in the state comes from fishing. While Maximum Sustainable Yield level (MSY) has reached in marine waters there is ample potential to tap the inland water bodies, mangroves, 4000 ha of Khazan lands for commercial fisheries especially through farming of prawns. About 4885 ha of fresh water, perennial and seasonal water bodies are available in the state for fish culture. Fish being in high demand from locals and tourist has huge potential for providing employment for workforce.

iv. **Optimum Utilisation of Land** – According to a report on 'Agriculture Land Use Planning of Goa State' Goa has 13,193 hectares of fallow land, which amounts to 3.6 per cent of Goa's total area. The importance of this can be gauge from the fact that Fallow land in Goa is equal to its 10.1 per cent area used for food crops, 8.4 per cent of total area sown for other field crops, 31.4 per cent of the gross area under rice, 122 per cent of the area under other cereals, pulses and other oil seed crops, 22.1 per cent of the total area under different cash crops of the state. Proper land regulation policy can help save and reclaim Khazan Lands which are under huge demand for construction and pisciculture. Such land can be optimally utilized for paddy cultivation and for horticulture crops which have great demand as the state being a tourist and wedding destination.

v. **Food Processing Industry** - Cultivation of paddy, pulses, sugar cane, garden crops like coconut, cashew, areca nut, mangoes, jackfruits, bananas, and pineapples are done on large scale in the state, thus creating scope for processing. Cashew processing has been a traditional industry in the state. Cashew apple is used in the production of feni, a local liquor, which has become internationally popular. Coconut being an important plantation crop in the state, ancillary industry based on preservation and packing of tender coconut water in pouches, coconut water concentrate, coconut jelly, coconut chips, bottled coconut milk, activated carbon and coconut shell-based handicrafts can be encouraged and promoted on commercial basis. New products and ways of processing in fisheries sector should be explored as it is one of the major employers in the state. Farmers Producers Organizations can be set up in all the tehsils with emphasis on organic products. Brand Goa should be used to tap the strength of the local agricultural sector.

Conclusion:

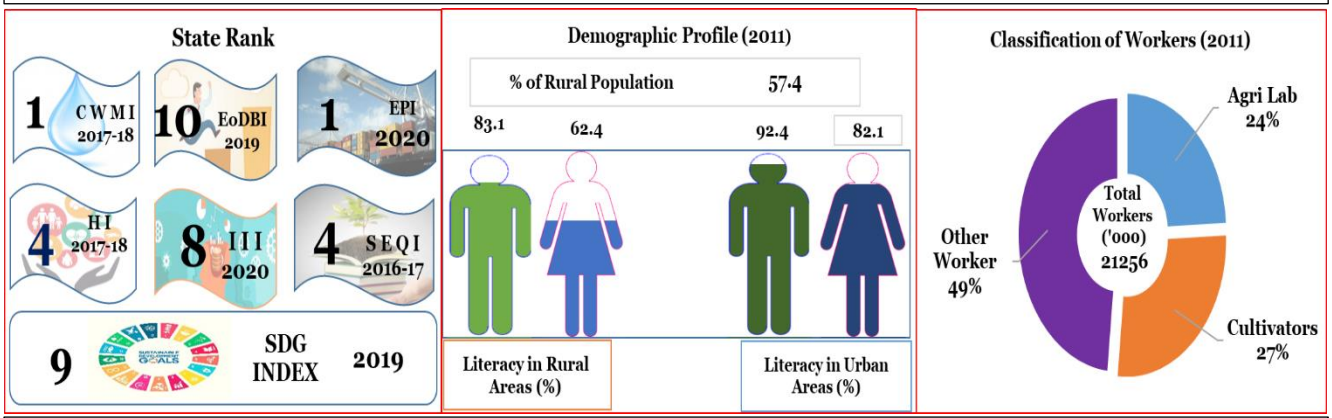
Strategy like reclamation of problematic soils through Agri-Horti interventions, Soil and nutrient mapping for the districts and identification of saline tolerant high yielding varieties suitable for saline affected areas will help in bringing more land under productive cultivation. Higher purchasing power of consumers, high spending national & international tourist inflow creates large scope for production of high value crops, vegetables, flowers and fruits, scope for organic farming. Value addition and marketing should be given topmost priority as the environment in the state is conducive for the growth. So, an integrated approach of agro-tourism will help in achieving the sustainable growth of agricultural sector in the state.

Gujarat

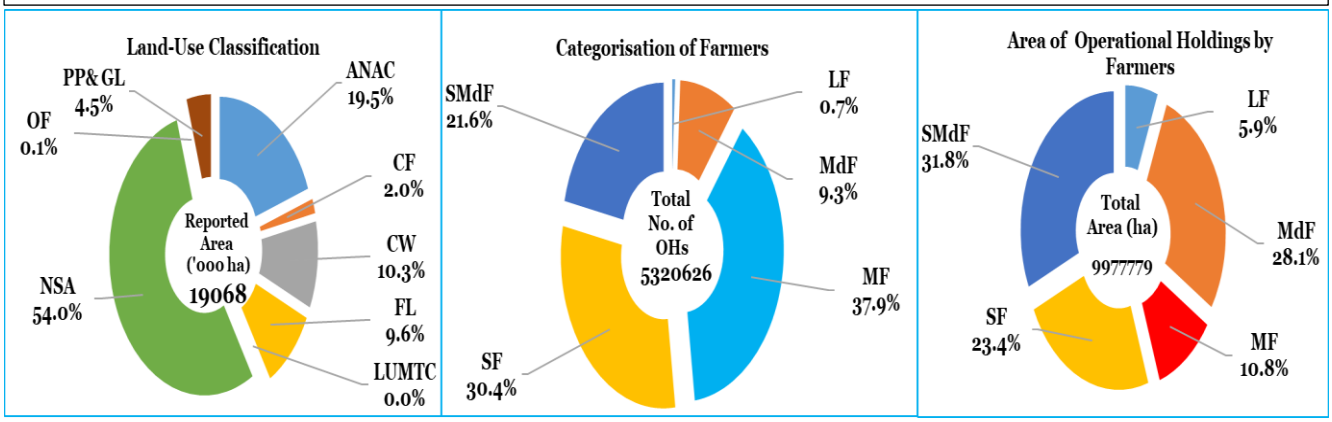
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
8	33	1365	727.2	250	17843

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
195845	1502899	19602	60400	34695

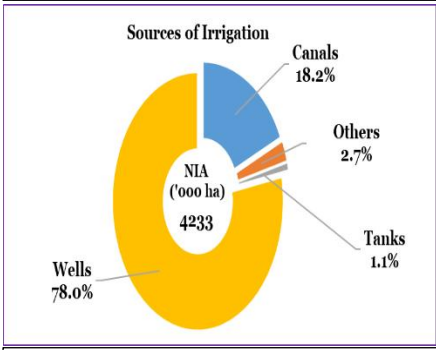
General Demographic Profile



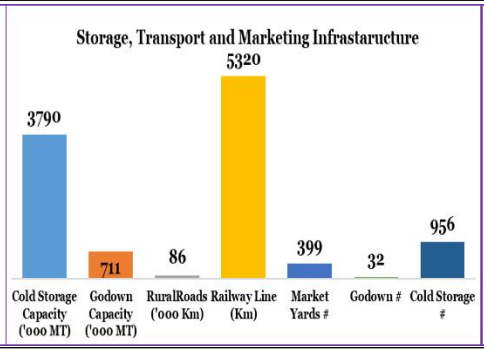
Land Usage (2015-16)

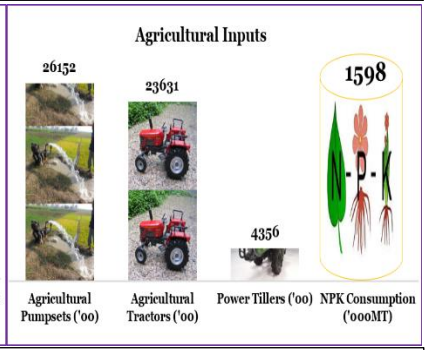


Irrigation

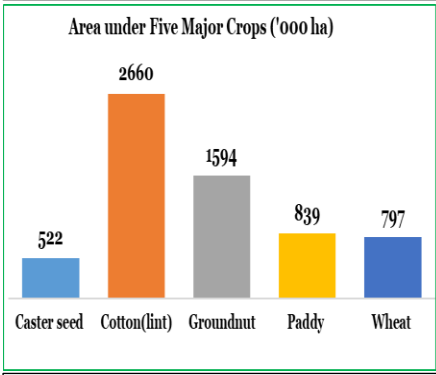


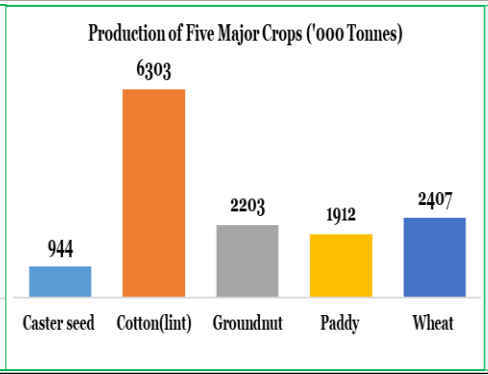
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

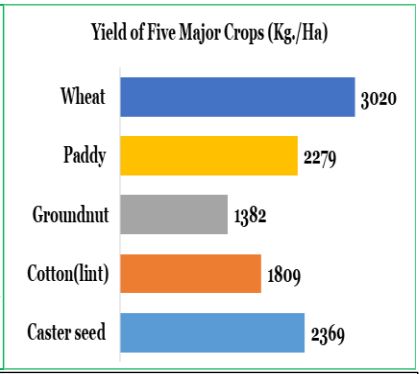




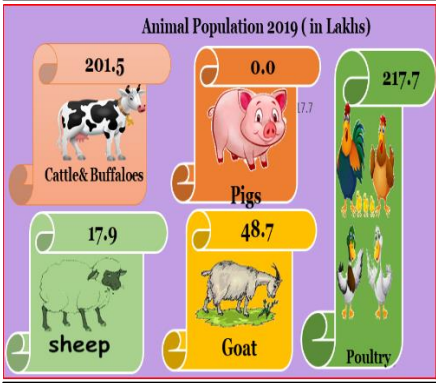
Area, Production and Yield of Five Major Crops 2018-19

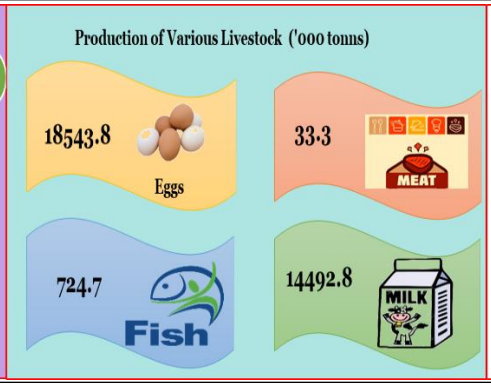


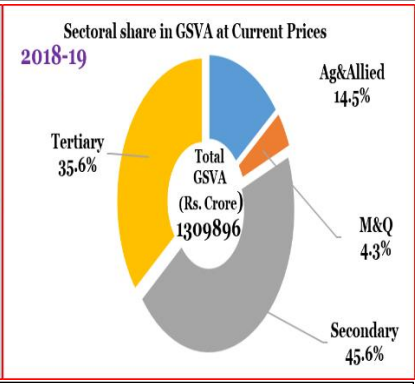




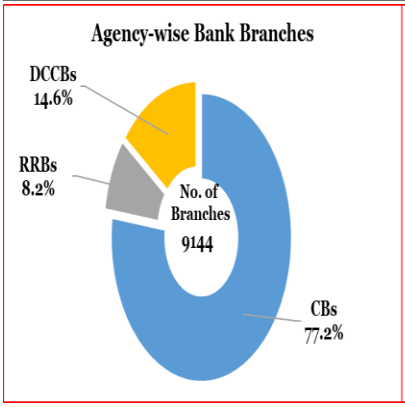
Allied Activities

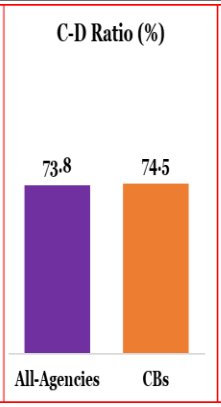


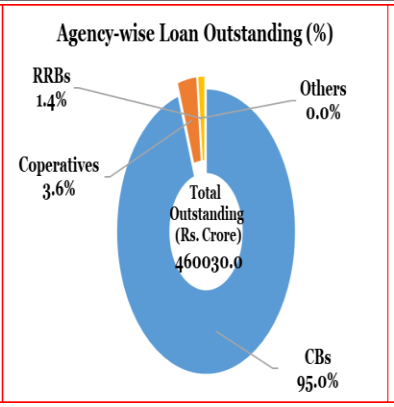


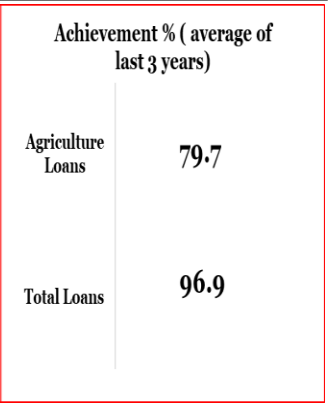


Agricultural Credit Details as on March 2017









Problems and Prospects of Agriculture in Gujarat

Gujarat is the westernmost State of India occupying about 6.2% of total geographical area with 5% of total population of India. Around 50% of its population is dependent on agriculture. It has the 5th largest economy in India. The share of primary, secondary and tertiary sectors has been reported at 19.1 percent, 45.3 percent and 35.6 percent respectively to the total GSVA in 2018-19 at current prices. Share of agriculture towards GDP of Gujarat is about 20%. Therefore, due emphasis needs to be given to systematic development of agriculture so that the sector is not neglected in terms of priorities in resource mobilization, policy framework and enabling ecosystem.

There are 8 Agro Climatic Zones based on characteristics of their agriculture and climate viz, South Gujarat (Heavy Rainfall) Zone, South Gujarat, Middle Gujarat, North Gujarat, North-West Gujarat, North Saurashtra, South Saurashtra, and Bhal & Central.

Agriculture in Gujarat has witnessed a shift towards high value crops like cotton, groundnut, fruits and vegetables and condiments and spices from low value cereals and other crops. It has accorded priority status to horticulture in agriculture, as it has a vast potential in improving the socio-economic conditions of farmers. At present, horticultural crops contribute about 20% to the total agricultural economy.

Problems

i. **Agro Climatic Factors-** It has huge area having alkaline and saline soil. It has 19.8 lakh ha cultivable waste land. Almost 70% of the area is rain fed and drought prone. Well drained deep fertile soils of Central Gujarat are having shallow and undulating soils with poor fertility in hilly and rocky areas. In North West Arid zone, moisture starved denuded and low-lying water logged and saline area predominantly exists. Many of the areas are prone to frequent water scarcity, cyclones or floods.

ii. **Post-Harvest Management of crops** is a major issue, very much as in the rest of India. This leads to distressed-sale at low prices in harvesting season and higher prices later. There is strong need to increase the processing level of food crops and develop good Post- Harvest Management system to achieve the goal of food security and stable food prices

iii. **Highly perishable fruit crops -** Major fruit crops like Banana, Papaya, Mango, Date Palms and Sapota which are are highly perishable and seasonal in nature leading to strong need of increasing processing level.

iv. **Land Utilization pattern**: Land is a costly resource in the State. Of the total land, 14% is barren and 6% is uncultivable. Under non-agricultural use, 20 % of land is cultivable waste, 10% forest, 5% pasture and 3% other fallow land.

Prospects

i. **Agro climatic conditions are** conducive for development of various horticulture crops. Horticulture crops contribute 14% share in area and about 20 % in the overall farm income of the state. Farmers are well versed with the advantages of fruits and

vegetables cultivation showing increased preference So, the export potential of the sector may be exploited/explored.

ii. **FPO Policy:** A clear state level policy will give more clarity to the entities directly promoting FPOs and also encourage agri-tech start-ups to join hands with FPOs for undertaking agri-business. FPOs may be encouraged to participate in Forward Markets, as it facilitates marketing and price discovery of many agricultural products to reduce uncertainty in prices.

iii. **Farm Mechanisation**: There is a need to popularise farm mechanisation by inculcating custom hiring practices among the farmers, mainly to help small and marginal farmers. The costly equipment such as Tractors, Rotavator, Laser leveller, Harvester etc, may be made available through government departments, NGOs, big farm houses/farmers, PPP mode etc. in a big way to reduce the cost of cultivation and increase the production & productivity of the farm.

iv. **Food Processing Sector:** Food processing potential is broad-based covering almost the entire spectrum of "food". Impetus needs to be given towards development of small-scale food processing units rather than limiting focus merely to Mega Food Parks. The sector may be strengthened by providing appropriate capital subsidy, credit support and infrastructure in the form of silos and cold chain.

v. **Co-operative Model for agriculture: The cooperative model of dairy movement** can be harnessed to mobilize the farmers in matters of agriculture also, - spreading awareness and leveraging the members for fostering economic cooperation and promoting social good.

vi. **Fisheries:** Coastal length of 1,600 km., continental shelf of 1.84 lakh sq. km., 121 fish landing centres and more than 62,000 families' together in marine fisheries indicate the importance of fisheries. Though this sector has huge potential for exports as well as generating livelihood opportunities, bank financing to the sector is insignificant. KCCs may be made available to fish farmers to take care of their working capital needs.

Conclusion

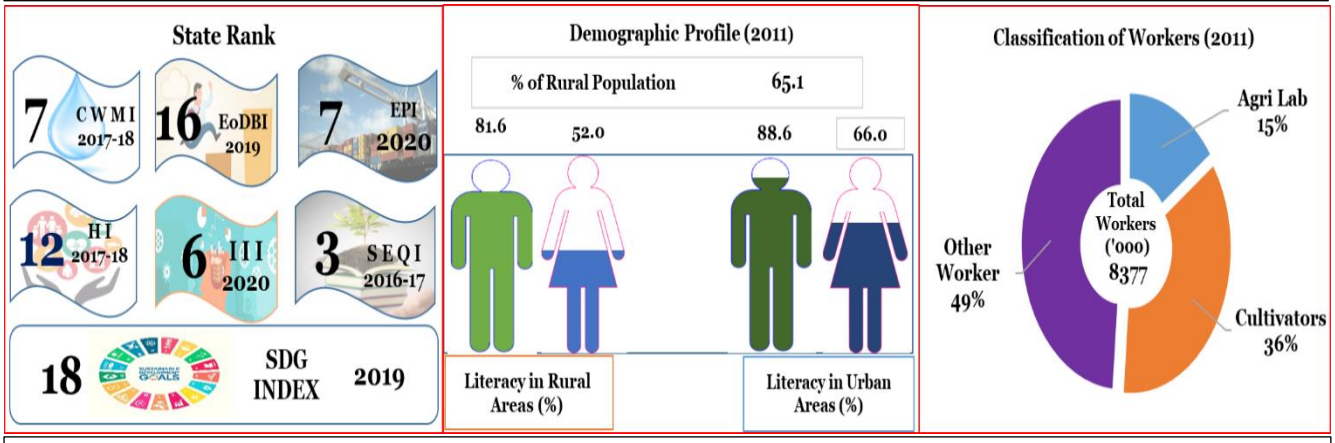
Agriculture sector in Gujarat has some unique advantages such as lesser pressure on land compared to many States, presence of a strong cooperative dairy movement, a growing SHG movement, strong network of PACS etc. The cooperative model that emerged in villages from the dairy movement can be harnessed to mobilize the farmers in matters of agriculture and allied sectors also by spreading awareness and leveraging the members for fostering economic cooperation and promoting social good**.**

Haryana

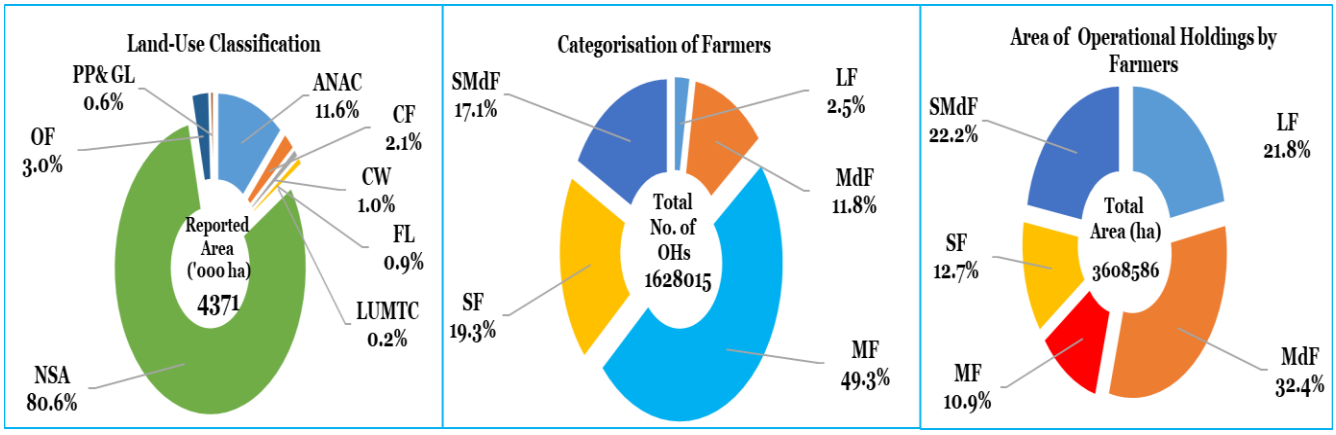
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	22	6197	528.3	140	6841

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
264207	831610	4421	25351	16509

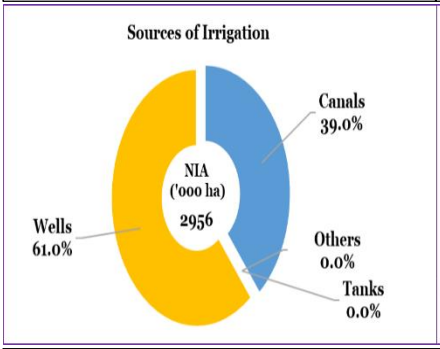
General Demographic Profile



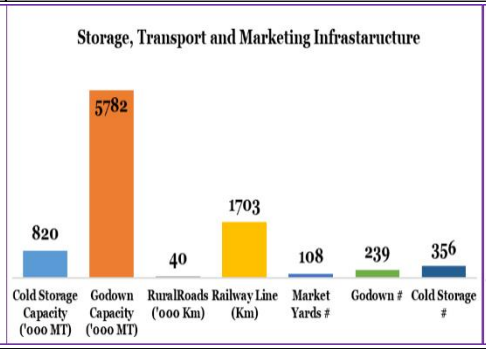
Land Usage (2015-16)

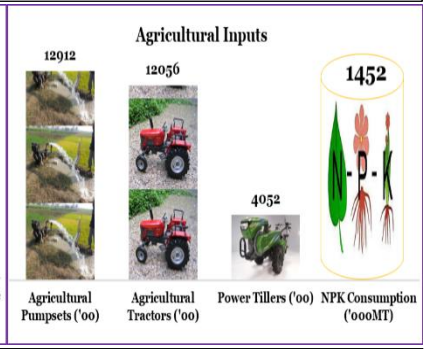


Irrigation

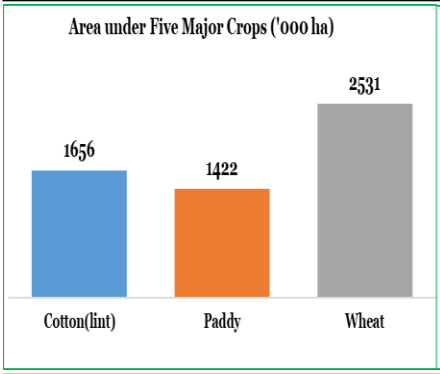


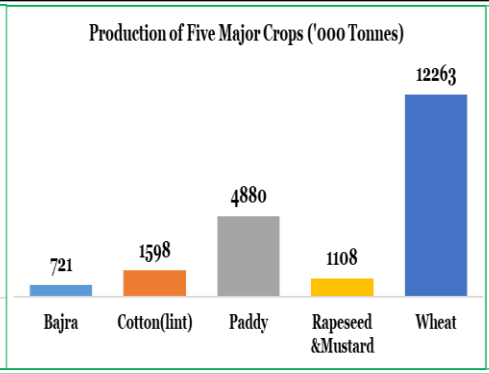
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

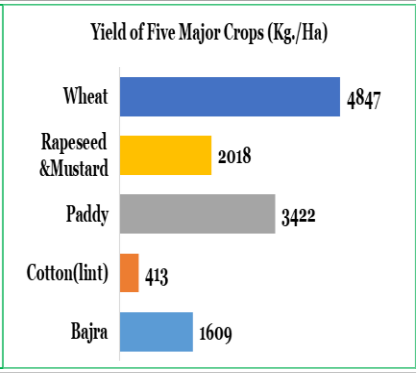




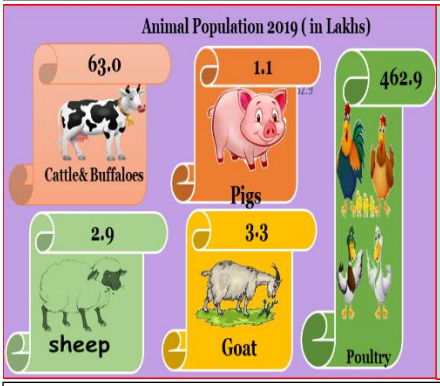
Area, Production and Yield of Five Major Crops 2017-18

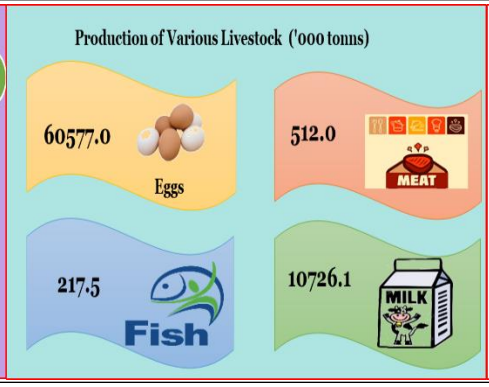


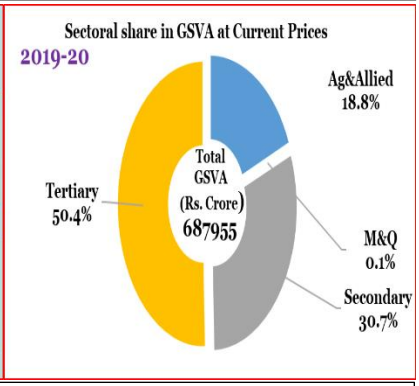




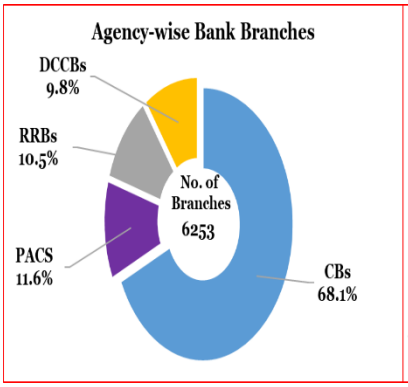
Allied Activities

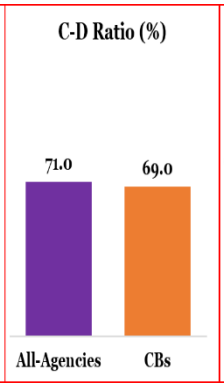


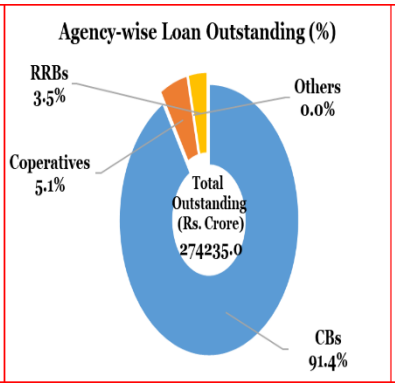


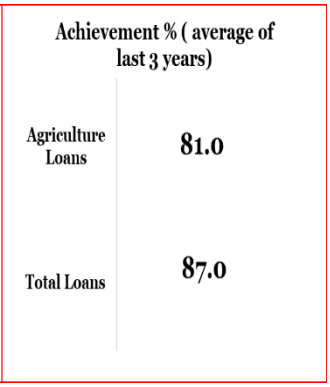


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Haryana

Haryana, located in the northwest part of the country with its arid to semi-arid climate has two agro climatic zones. Agriculture still remains the mainstay of its economy. It has made rapid strides in agricultural production and is a leading state in wheat and mustard production and productivity. It is the 2nd largest contributor of food grains to the Central Pool. Wheat, Rice, Sugarcane, Cotton, Oilseeds are the major crops of the state. There is a scope to diversify the cropping pattern, specially away from paddy. The total reported area of the state is 44.21 lakh ha, with cultivable area of 37.44 lakh ha while net sown area is 34.99 lakh ha, which is 93.5% of total cultivable area and 79.14 % of the total reported area. Gross cropped area and gross irrigated area is is 64.52 lakh ha and 57.37 lakh ha respectively with a cropping intensity of 186%.

Problems

i. **Small landholdings and lack of credit** - In terms of number of land holdings, the Small and Marginal Farmers account for 68% of the total holding in the State. As per the NABARD Financial Inclusion Survey Report (NAFIS) 2016-17, loan taken by agricultural households through the institutional sources stands at 72% and the rest 28% credit requirement was met through noninstitutional sources. This indicates a sizeable portion of agricultural household are still left out of formal credit system. Tenant farmers / Oral lessees, in particular, face a range of problems like credit availability, input subsidies, relief measures etc., dominantly stemming from the lack of official recognition of tenancy and the fact that their status as actual cultivators are nowhere recorded.

ii. **Poor Seed Replacement Rate (SRR)** - The SRR is poor in Paddy (30.48%) & Wheat (33.8%). There is a strong co-relationship between the quality of seed, the seed replacement rate and the yields.

iii. **Twin problem of Soil and Water** - The twin problem of soil salinity and water logging is reaching an alarming proportion in Haryana. As per Central Soil Salinity Research Institute (CSSRI) nine districts of Haryana have this problem. Falling soil health due to excess use of NPK has become wide spread and soils are exhibiting minor and micro-nutrient deficiency, thereby impacting crop productivity.

iv. **Stubble Burning:** There is a problem of paddy (wheat also to a small extent) stubble burning leading to huge carbon dioxide release/smoke over northern part of the country in a particular time (mainly winter) of the year resulting in environmental pollution and wastage of valuable organic matter. This also kills the micro-organisms in the soil and enhances water requirement for the next cropping season.

v. **Stagnation in productivity:** Adoption of HYV/Hybrids along with production and protection technologies, supported by appropriate infrastructure and policies, led to many significant achievements. However, yields of many crops are plateauing**,** which has resulted in increased cost of cultivation. The low response to higher inputs especially, nutrient application. Decreasing size of farm holdings and cultivable area and lack of required processing, value addition and storage facilities for agricultural commodities are issues to be addressed.

Prospects

i. **Crop Diversification** - Due to non-stop paddy sowing, groundwater table of Haryana depletes about one metre every year this has also impacted soil health which is deteriorating. States is incentivising the farmers for diversifying their produce. Crop diversification helps in improving soil health thereby increasing productivity and profitability. Diversified cropping pattern also mitigate the risk faced by farmers such as harvest losses and price shock.

ii. **Horticulture** - Haryana is fast emerging as one of the leading State in the field of Horticulture in India. Currently horticulture crops cover 4.9 lakh hectare area which is 7.5% of the gross cropped area of the State. Marketing infrastructure and post-harvest management facilities like pack house, primary processing centre, grading-sorting machine, storage facilities, refer vans, input and quality control facility should be created and promoted to have forward and backward linkage for effective marketing of horticulture produce. The state has added advantage in the form of huge urban market of Nation Capital Region and National Capital Delhi for the consumption of its horticulture produce.

iii. **Adoption of Water Saving Technology** - Haryana, without any perennial source of surface water has to depend upon its share on various Interstate agreements. State's present agricultural practices that have high consumption of water, fertilizers and pesticides needs to be addressed. Developing new varieties of water aerobic rice, improved biotic stress tolerant Indian mustard and molecular breeding of chickpea for survival in a drought-prone environment would allow the state to move ahead on climate smart agriculture. Judicious utilization and uniform distribution of water resources through efficient management, adoption and maintenance of modern water-saving technologies like sprinkler/drip/pressure irrigation/volumetric measurement, among others would increase the efficiency of water systems of Haryana.

iv. **Livestock Sector** - Haryana is the only State in the country to make available pasteurized A-2 cow milk through VITA booths in the State. The per capita per day milk availability in the State is 878 grams as compared to the national average of 329 grams. Programmes for genetic improvement of the livestock as well as keeping it disease-free for their optimum production need to be taken as the sector provides supplementary employment and sustainable source of income to many small and marginal farmers.

v. **Food Processing** - The state has high productivity and therefore reaps a surplus in food grain, fisheries, poultry production. For example, it has a higher freshwater fish yield (6,800 kg per hectare per annum) than national average (2,900 kg per hectare per annum). Similar patterns are manifested in the availability of milk (835 g of milk per capita per day) and eggs (179 eggs per capita per annum) in Haryana as compared to India (309 g of milk per capita per day and 64 eggs per capita per annum). Close proximity to urban markets of National Capital adds to its advantage thus the state offers vast potential in processing of high value-added product

Conclusion

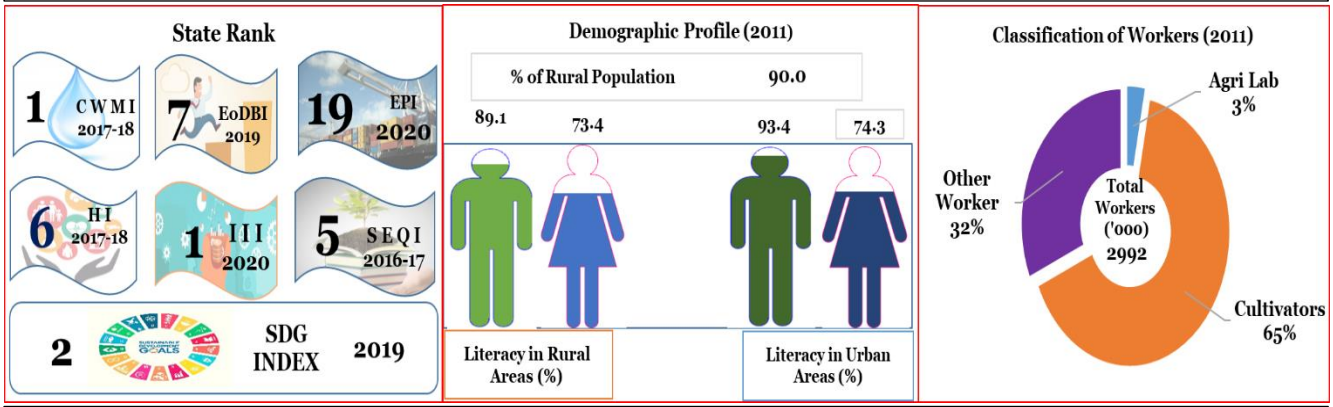
Haryana was an early adopter of Green Revolution technology and major beneficiary of various policies adopted to spread modern agriculture technologies in the country. However, overtime growth rate and yields growth have hit a plateau and agriculture does not seem sustainable in its current form. In this scenario, deep-seated change is required in terms of cropping pattern, marketing and diversification of agricultural activities in the form of dairy, poultry, horticulture and bee keeping, etc. for enhancement in income.

Himachal Pradesh

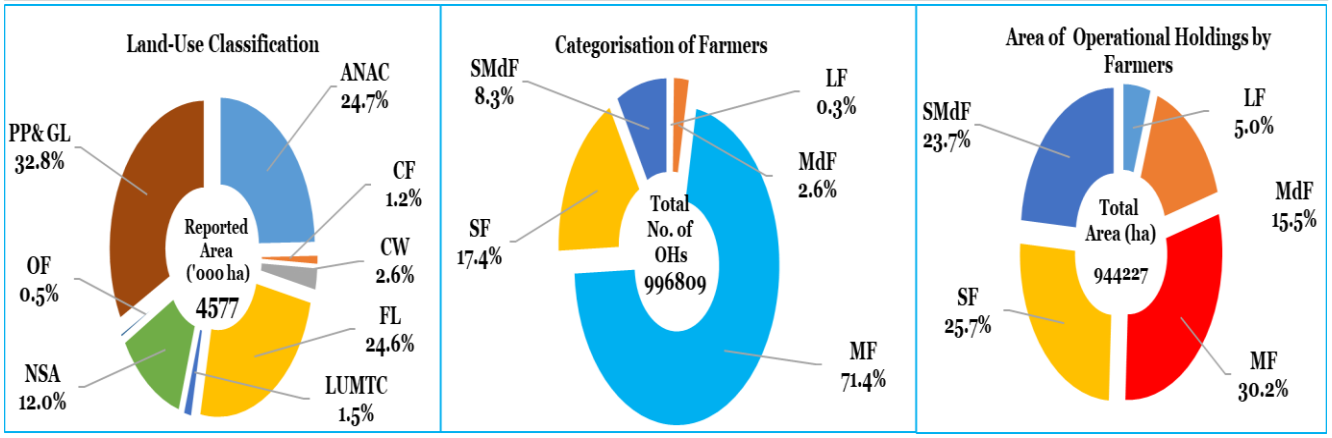
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
4	12	3226	1291.2	78	20690

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
195255	165472	5567	6865	6176

General Demographic Profile



Land Usage (2015-16)



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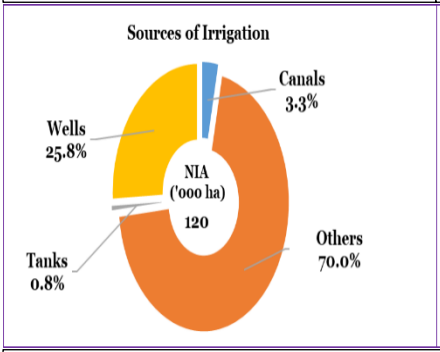
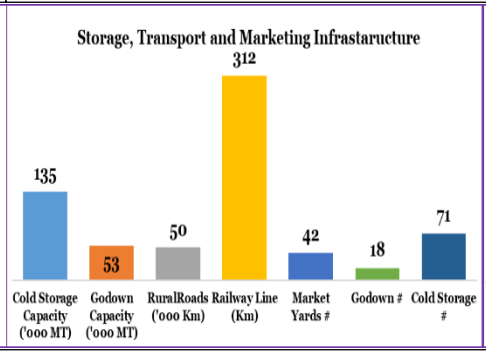
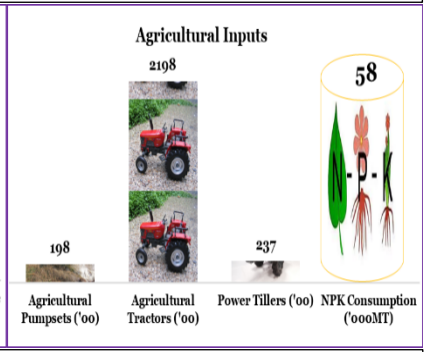
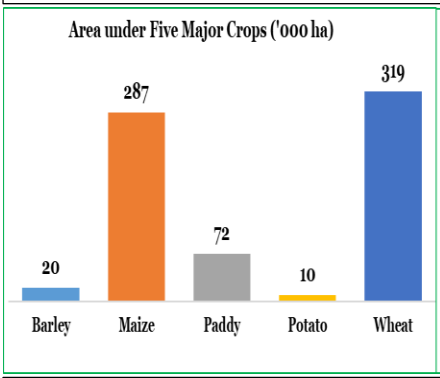


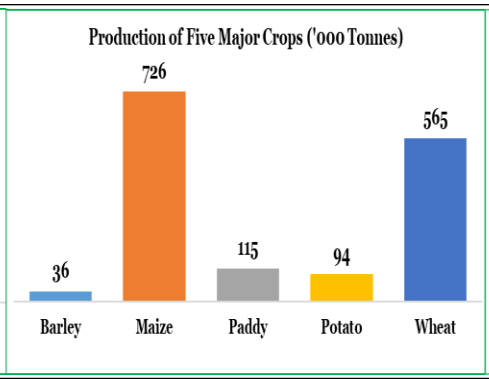
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

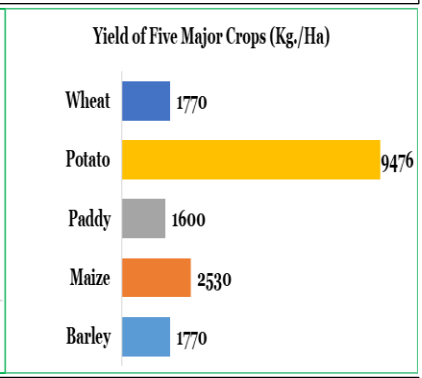




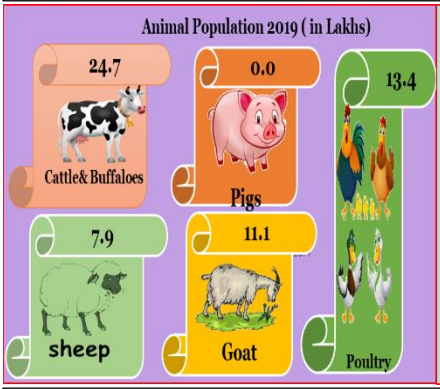
Area, Production and Yield of Five Major Crops 2018-19

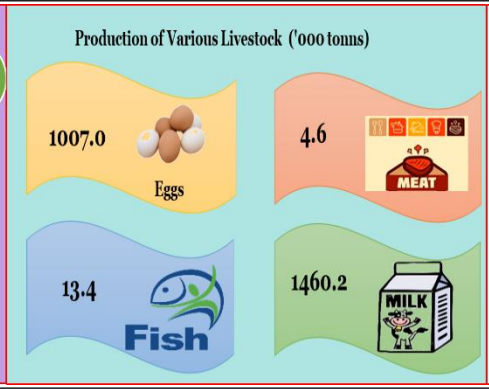


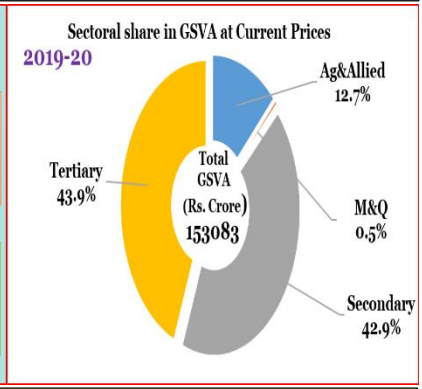




Allied Activities







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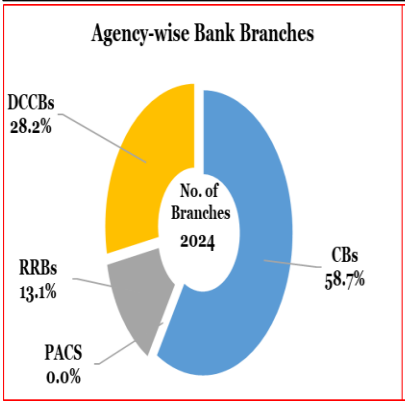
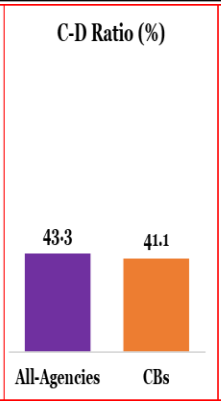
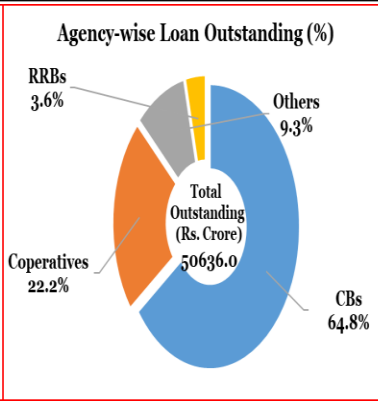
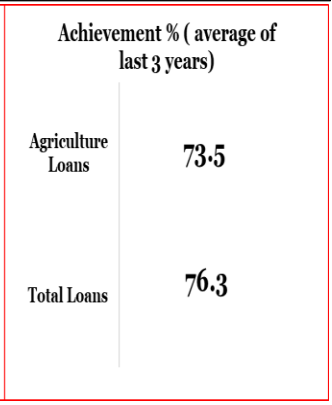








Problems and Prospects of Agriculture in Himachal Pradesh

Himachal Pradesh, a small hilly state having an area of 55,673 sq. km. is situated in the lower Himalayan region. It is known for its numerous mountain ranges and rich natural resources. It has a net sown area of 5.83 lakh ha, accounting for 9.8% of the total geographical area. As per agriculture census of 2011, there were 9.61 lakh land holdings.

Fruits, vegetables and flowers dominate the cropping pattern in high and mid hills while low hills mostly cultivate food grain crops. Rice, Wheat & Maize and Urad, Moong, Rajmah & Gram are important cereal and pulse crops respectively. Besides, food grains, it grows a variety of horticultural crops namely apple, stone fruits, citrus etc., and variety of off-season and exotic vegetables. It is amongst the major fruit growing States in the country and has earned the name of "Horticulture State of India". Since agriculture is the single largest occupation, its development is essential to usher in prosperity in the lives of people of the state.

Problems

i. **Dominance of Small Holders** - Agriculture in the state is characterised by small and marginal landholdings. The average size of the landholdings is 1 ha while 86.2% (Agriculture-census 2015-16) of total landholdings belong to small and marginal farmers.

ii. **Rain fed Agriculture and Topographical Issues** – Around 80% of the cultivated area is rain-fed and thus, the agricultural productivity of the State is low. The steep slopes and rugged terrain are not conducive for providing low-cost irrigation facilities. Besides soil is subject to splash, sheet and gully erosion resulting into degradation of the soil. There is also biotic pressure on land which directly impacts the health of the soil. The terrain also results in weak market linkages for the farm operations due to long distances for buying necessary inputs and for disposing of marketable surplus, which adds to the production costs.

iii. **Low CD Ratio** - The CD ratio of the State, stood at 43.14% as on 31 March 2020, which was 43.30% as on 31st March 2019. Seven districts had CD Ratio below 40%, which is a matter of concern.

iv. **Issues in Horticulture Sector** – Himachal Pradesh has evolved as a major horticulture producing state but even the horticulture sector is plagued with inadequate supply of quality planting material at reasonable cost, frequent climatic vagaries like frost, rains, hailstorms etc., improper harvesting and handling of the produce, inappropriate packaging and transport, improper market infrastructure, shortage of storage and processing facilities etc., Another problem is the lack of diversification of its horticulture produce. The state is a leading producer of temperate fruit and off-season vegetables. However, apple is the principal cash crop of the state and constitutes about 49% of the total area under fruit crops and about 79% of the total fruit production. This makes the incomes of farmers' dependent on the success of a single crop.

v. **Poor Marketing Infrastructure** - The agro-climatic conditions prevailing in the state offer excellent opportunities for the development of floriculture, an avenue yet to be tapped. It also has a rich diversity of medicinal plants that can cater to the health and pharmaceutical industry. However, the trade in medicinal plants is largely unregulated, secretive and exploitative.

vi. **Wild Life Menace** - Monkey and wild life menace cause huge loss to crops annually in the state. Present practice of crop protection by manual guarding does not ensure adequate crop safety.

Prospects

i. **Horticulture** - Apple is the major fruit crop of Himachal Pradesh, which constitutes about 49% of the total area under fruit cultivation. Area under Apple, Temperate Fruits, Citrus Fruits, Nuts and dry fruits has increased mani-fold. This pace of development is impacted at times due to the erratic apple production, owing to weather vagaries and market fluctuations. It is necessary to explore and harness the vast horticulture potential of the hill State through diversified horticulture production in varied agro-ecological zones. The aged and senile apple orchards are posing a big challenge as the per unit area productivity is on the decline particularly for the main horticulture crop i.e. apple. Rejuvenation of old orchards along with introduction of new germplasm and introduction of high-density planting can be explored as a solution for declining productivity. Scientific infrastructure for storage, packaging, transportation, organised marketing system and postharvest handling facilities has to be prioritized for preventing wastage of these horticulture produce.

ii. **Forestry** - There is 11.26 lakh ha of Forest Land which is approximately 20% of the total area reported. However, there is a huge gap in demand and supply of wood especially for packaging cases used for marketing of agricultural / horticultural produce along with Non-Timber Forest Produce (NTFP) like fuel wood & fodder in the State. This gap can be abridged to a good extent by promotion of farm forestry / agro-forestry land use systems in the State. Considering the wide gap between demand and supply position of forest produce, the focus has shifted towards growing of trees on private land as well. At present, social forestry and agro-forestry can be considered good promising activities in the state for diversifying income.

iii. **Organic Agriculture Tourism** - Floriculture and Medicinal plants are also seeing a growing demand and have vast growth potential. Expansions of tourism to rural home stays by involving villagers as also by showing off their agri farming of high value medicinal and aromatic plants, orchids and flowers etc. to tourists, villages can become attractive tourist destination. In the light of increasing demand for raw material, the medicinal plants sector holds a vast potential to augment rural livelihoods. Banks may introduce appropriate credit products to encourage commercial cultivation and processing of Medicinal Plants.

iv. **Agro-Processing Industries** - Agro-processing industries, grading and packing units need to be encouraged particularly in the field of processing of maize, tomato, apple, milk, medicinal and horticulture products by giving incentives and marketing support as the tourism industry in the state provides readymade market for such products.

Conclusion

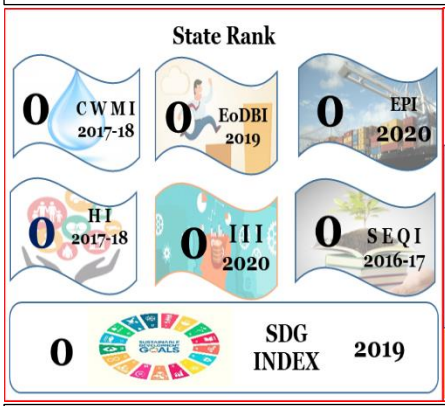
There is a lot of potential in the agriculture and allied sector that is yet to be fully harnessed. The vision of Doubling Farmers' Income can be achieved in the state by focusing on diversification of cropping patterns, aggregation of produce and adoption of technology to promote sustainability in agricultural incomes.

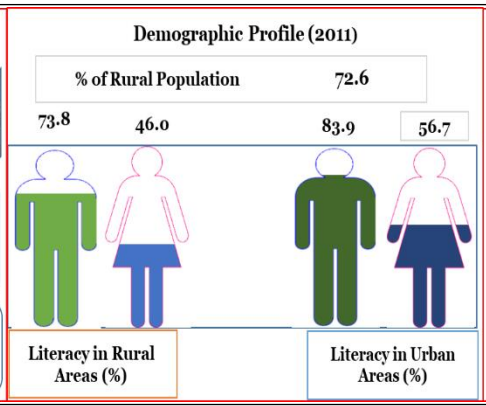
Jammu & Kashmir

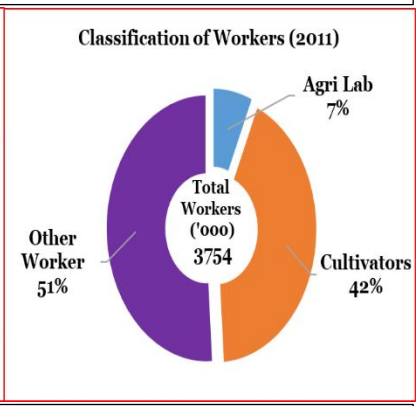
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	22	3940		284	6312

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
92347	155956	22224	12541	9108

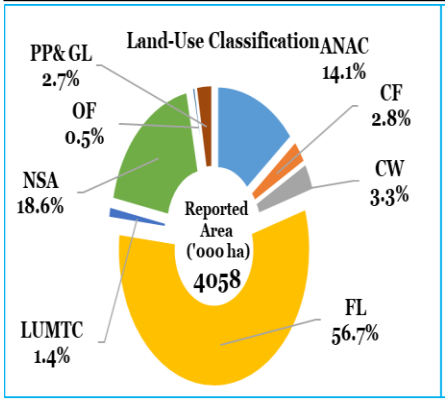
General Demographic Profile

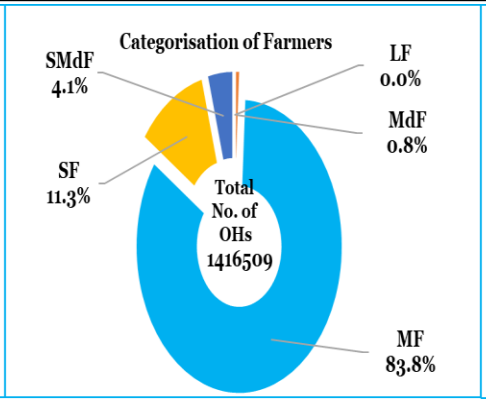


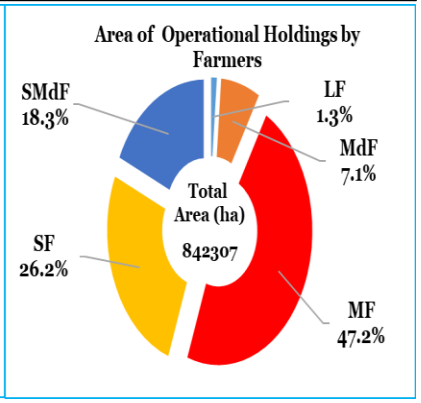




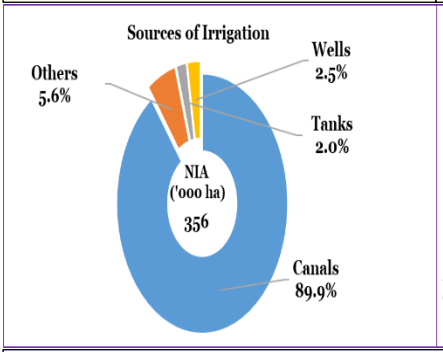
Land Usage (2015-16)



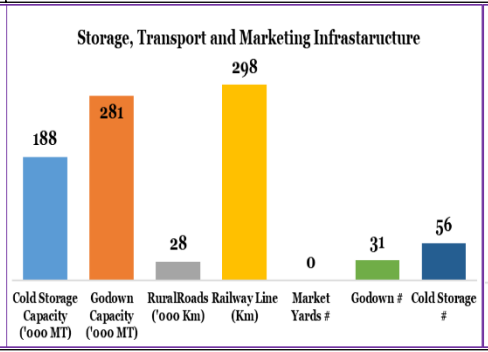


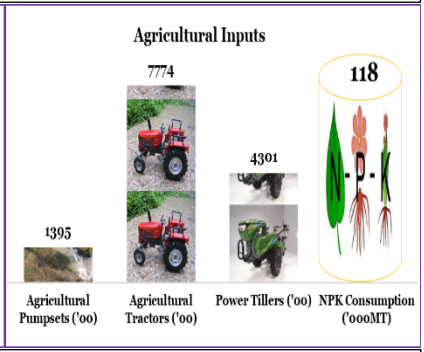


Irrigation

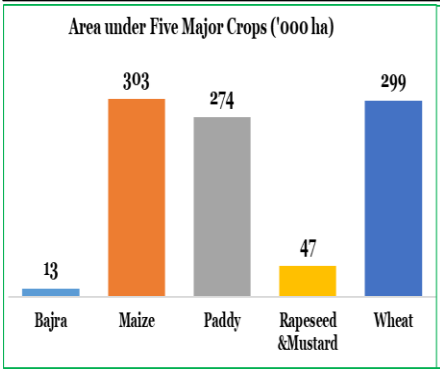


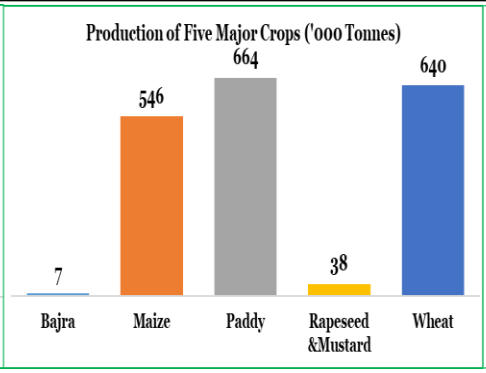
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

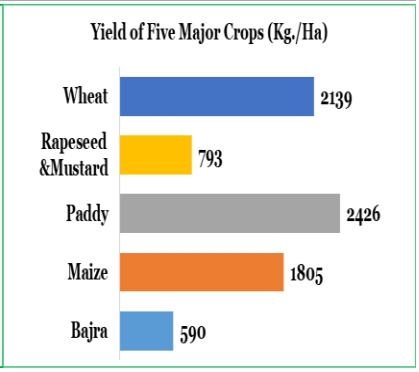




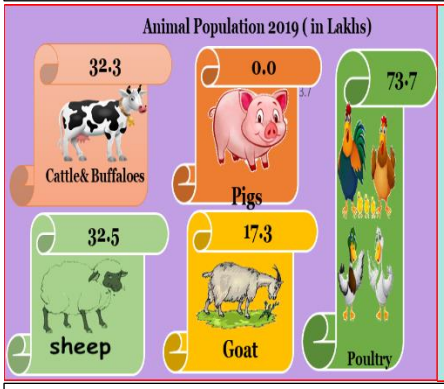
Area, Production and Yield of Five Major Crops 2017-18

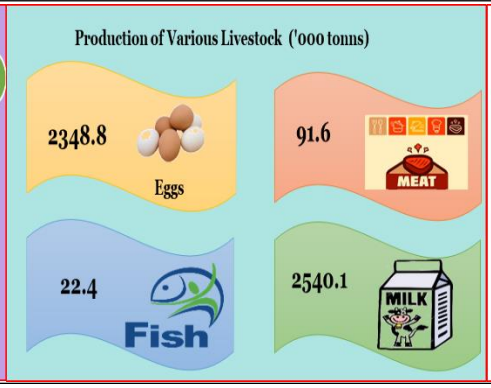


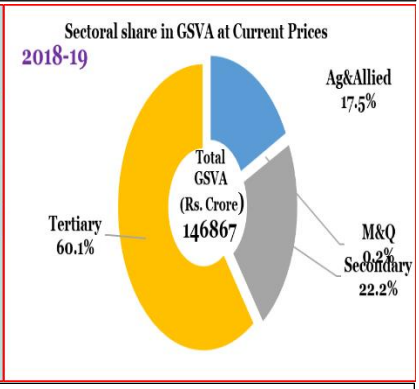




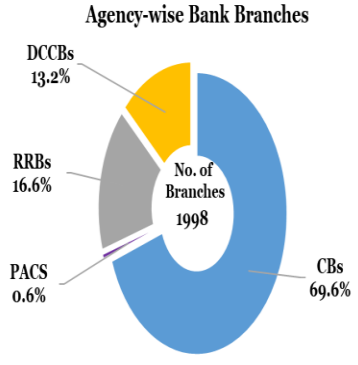
Allied Activities

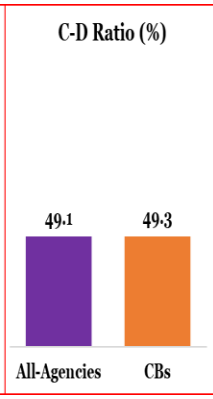


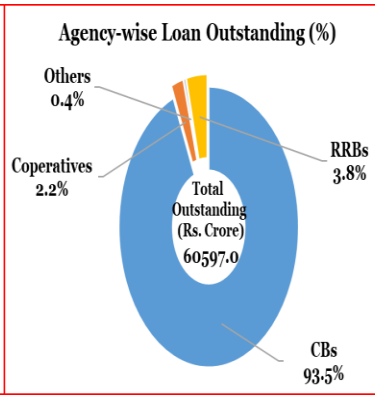


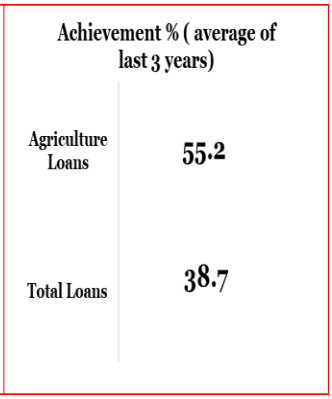


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Jammu and Kashmir

Union territory of Jammu & Kashmir with a total area of 1,25,535 sq.km and 1.22 crore population occupies 3.81 % of the country's geographical area. Agriculture is predominant sector of the economy of Jammu and Kashmir and supports about 73 per cent of its population. It grew 348 sq. km of forest cover. The Jhelum is the only major Himalayan River which flows through Kashmir Valley. The Tawi, Ravi and Chenab are the other major rivers flowing through the J&K.

Agriculture constitutes about 16.17 % of GDP of J&K and registered a growth rate of 6.81 % in 2018-19. The production of three major crops viz., paddy, maize and wheat in J&K is more than 90% of the total food grain production. The rest is shared by other cereals and pulses. It faces massive deficit in food grains (40%), Oilseeds (70%) and vegetables (30%). There are around 7 lakh families comprising of about 33 lakh people who are directly or indirectly associated with horticulture. A variety of temperate fruits like apple, pear, peach, plum, apricot, almond, cherry and subtropical fruits like mango, guava, citrus, litchi, phalsa and ber etc. are grown in the UT. The Area under fruits cultivation in J&K has increased to 3.31 lakh ha in 2018-19 from 2.95 lakh ha in 2007-08.

Problems

i. **Deficit Production -** Jammu and Kashmir has to import nearly 7 lakh MT of food grains every year. The deficit in production is mainly due to geographical and climatic conditions leading to mono-cropping, small fragmented holdings which minimise the scope of mechanisation and other scientific practices as well as the conversion of agricultural lands for non-agricultural purposes.

ii. **Fragmented Holding -** Being a mountainous state and with very little land under cultivation, agricultural holdings in J&K are smaller than the national average. This applies even more to the Valley, where most farmers hardly own half-a-hectare land. The small and marginal holdings constitute 94.78 % of the total no. of holdings in the UT and the average land holding is 0.66 hectare.

iii. **Issues in Dairy Development** – It is deficit in dry fodder, green fodder and concentrate feed. Non-availability of good quality milch animals is also a cause of concern.

iv. **Floriculture Issues -** The major problems faced by J&K flower growers are non-availability of hi-tech production & propagation structures, lack of knowledge of current advances of flower production, lack of knowledge about diseases, insect-pests and their control method, lack of knowledge about floriculture schemes, lack of exporting agencies, middlemen's/agent's huge share and high cost of inputs.

v. **Marketing Bottlenecks -** The absence of marketing and storage facilities for the farmers at suitable locations has been a limiting factor for the farmers.

vi. **Lack of Irrigation Infrastructure:** The irrigation infrastructure needs augmentation in the UT. Only 43% (48.3% National Average) of cultivable area has irrigation facility. Predominantly hilly terrains pose difficulty in developing irrigation infrastructure.

vii. **Low Farm Mechanisation –** There is a lack of access to farm machinery and tools customized for farming. This can be attributed to the fact that the economic conditions of the farmers is poor as majority of the farmers are marginal and small. Also the

undulating topography and terraced irregular shape fields make mechanization difficult with farm equipment currently available in the market.

Prospects

i. **Rural Connectivity** - A large population (72.62%) of J&K live in rural areas, remote places and steep terrains where the road network and transportation infrastructure are poor. The poor connectivity dis-incentivizes the farmers to go for high value cash crops/perishable agro produce. Strengthening of post-harvest infrastructure like pre-cooling, grading, packing, efficient transportation (refrigerated vans), cold storage, processing, canning, etc, need to be encouraged by public private participation (PPP) which will help in better realisation of farmer's produce.

ii. **Training Farmers** - Agriculture has registered a 38% and 27.09% SRR of rice in Kashmir valley and Jammu Division respectively whereas SRR in respect of maize was observed at 25% and 35.38% at respective location. SRR in respect of fodder crops is also very low. These facts point to the need for creating local capacity to produce and supply quality seeds to the farmers. Farmers should be given technical training on seed production to save high investment on planting materials as there is conducive soil & environmental conditions for the production of virus free quality seeds for flowers and vegetables. They should also be linked to the market and given technical assistances as they can be exported to other states as well.

iii. **Horticulture Potential** - There is an imperative need to explore and harness the vast horticultural potential existing in the UT through increasing the area, productivity and diversification. Ever increasing demand for offseason and exotic vegetables from neighbouring States, improved infrastructure facilities including micro irrigation and poly-houses, transportation etc., would provide impetus to the vegetable cultivation in the UT. There is also conducive agro-climatic conditions for development of commercial floriculture, aromatic & medicinal plants, olive, kiwi fruit and pecan-nuts.

iv. **Aggregation and Collectivisation** - Adoption of aggregation model by Farmer Producer Organisations (FPOs) both in production and marketing is the best option to manage vegetable supply chain in effective manner. The e-NAM would be a very good platform for vegetable farmers in the coming days. Dairy co-operatives should be encouraged to take up value chain activities including fodder cultivations, extension services and input supply centres. Banks need to encourage setting up of primary milk processing units, taking advantage of subsidy under DEDS. Formation of Producer Companies of goat farmers may be promoted to increase the benefits through collective investment. The goat rearing should be taken up by farmers through JLGs, SHGs and tribal groups particularly in hilly tracts with support from local bodies.

v. **Efficient Utilisation of Waste Land** - Most of the brackish water areas are either left unused or used unscientifically. There is a need to evolve a strategy for optimum utilization of these potential resources. Diversification of farming using alternate species like shrimp is necessary for sustainable development of brackish water sector.

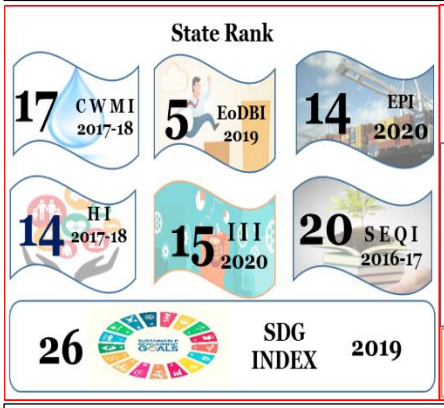
Conclusion: Jammu and Kashmir's unique topography and its new status as UT offers immense potential and creates unique challenges in the agriculture sector. There is a need to promote value addition in the processing industry to give much required support to the farmers. With the paucity of regulated markets, it is imperative to promote collectivization of the farmers.

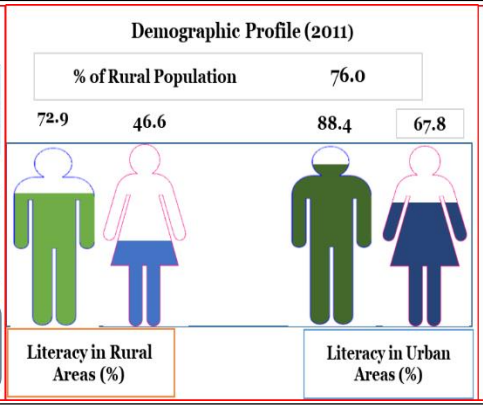
Jharkhand

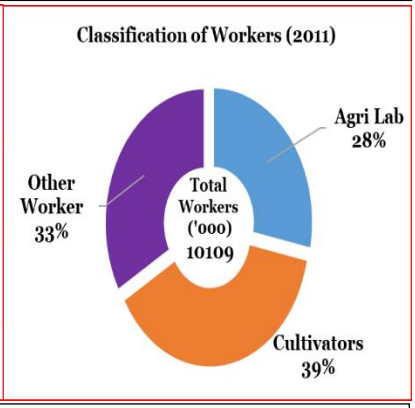
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	24	4398	1256.5	263	368273

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
79873	328598	7972	32988	25055

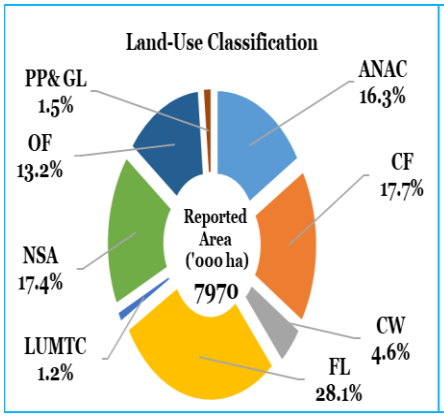
General Demographic Profile

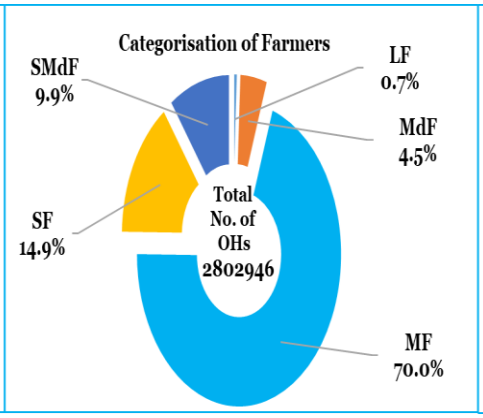


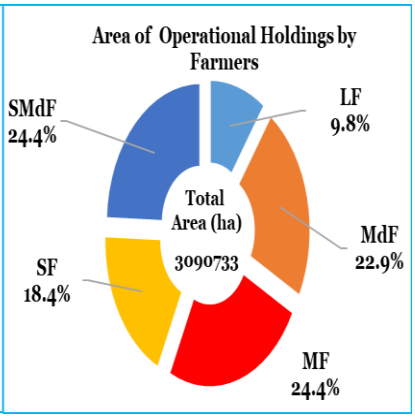




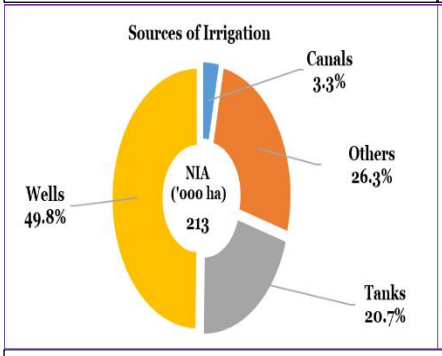
Land Usage (2015-16)



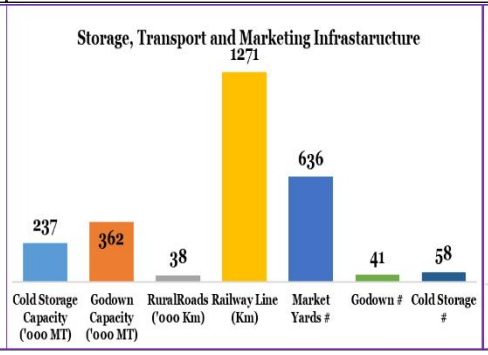


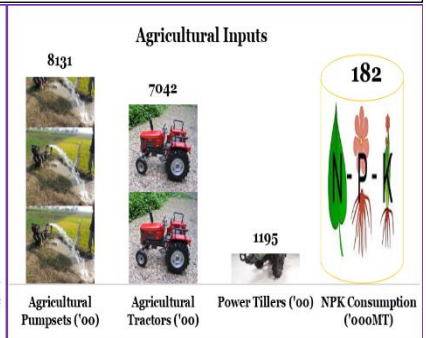


Irrigation

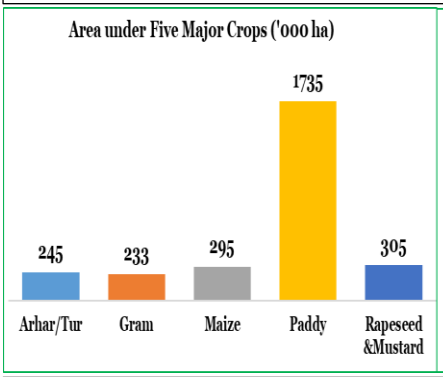


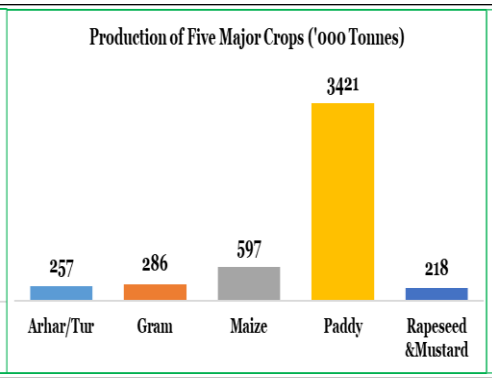
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

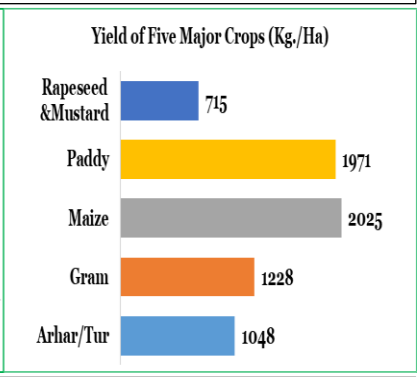




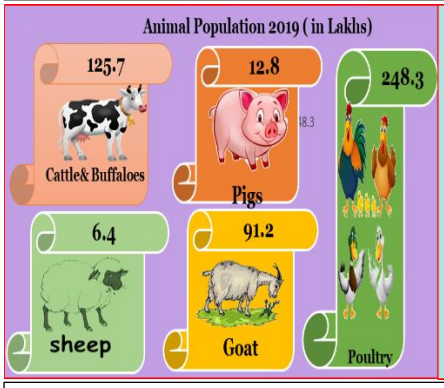
Area, Production and Yield of Five Major Crops 2017-18

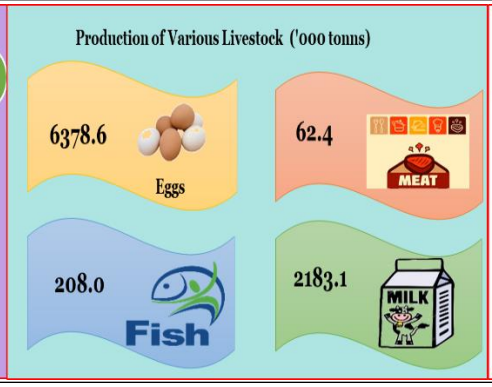


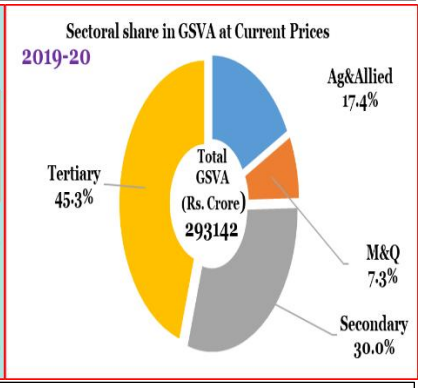




Allied Activities







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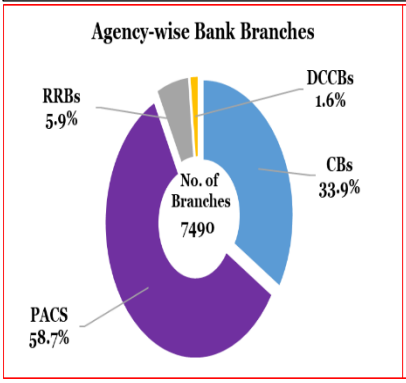
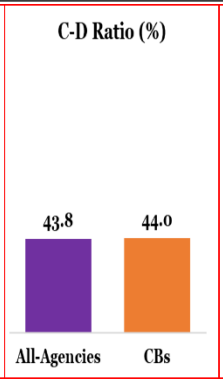
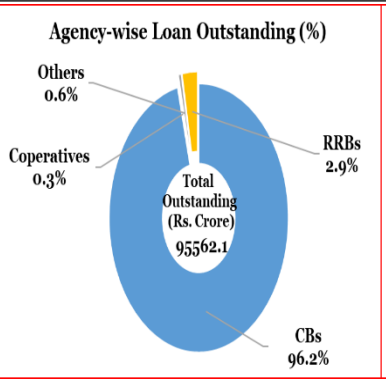






Problems and Prospects of Agriculture in Jharkhand

Jharkhand consists of around 2.42% area of the country and 2.7% of total Indian population. It is known for its mineral wealth (estimated to be 40% of India). Its real Gross State Domestic Product (GSDP) was estimated to be ₹2,21,587 crore in the financial year 2018-19 with an estimated growth rate of 6.8 per cent. The total cultivable land is 38 lakh ha i.e., 48% of the Total Geographical Area (TGA). The net sown area is only 28.36 lakh ha i.e., 36% of TGA. The major crops are paddy, maize and pulses. The average land holding is 1.17 ha. The share of land holdings of small and marginal farms to the total holdings is 83% covering 37% of the operational area.

Problems

The agricultural economy of the state is characterized by heavy dependence on monsoon, low investments, low productivity, mono-cropping (paddy covering 80% of total cropped area). The major challenges facing the agricultural sector are listed below:

i. **Low Farmers' Income:** As per NABARD All India Financial Inclusion Survey (NAFIS) 2016-17, the income levels of farmers are far below the national average and the lowest among 29 States covered in the survey. The farmers reported an average income and surplus of ₹5,854/- and ₹310/-, respectively, per household per month. The total BPL population is 37% as against all India level of 21.90% and the rural and urban poverty is 40.84% and 24.83% as against the all-India level of 25.70% and 13.70% respectively. The STs and SCs poverty ratio stood at 54% and 58% as against the all-India level of 45% and 37% respectively.

ii. **Lower Cropping intensity:** It has a cropping intensity of 126% against the national average of about 140%.

iii. **Non-Diversified Crop Production:** About 90% of the cultivated area is used for production of food grains and only 4 to 6% of the land is used for growing cash crops. Among the foodgrains, paddy occupies an important position. About 80% of the cultivated area is used for single crop of paddy (kharif) in a year and rest 20% of the area is mostly used for vegetables.

iv. **Rainfed Farming:** It has total agricultural land of 29.74 lakh ha. It has so far created irrigation potential of 10.00 lakh ha while the net irrigated area is only 5.74 lakh ha.

Prospects

There is an immense potential in areas of plantation and horticulture, minor forest produce, dairy, fishery and animal husbandry. The major prospects of development of agriculture and allied areas are given below:

i. **Diversification of Produce:** There is a need to encourage diversification towards other high value crops such as pulses, oilseeds etc., and to encourage the production of bamboo. The agro-climatic conditions are conducive for commercial cultivation of fruits, vegetables, flowers and medicinal & aromatic plants and for development of agri-horticulture based sustainable livelihood model (*wadi*). (Case study is given in box).

ii. **Secondary Agriculture:** Encouraging setting up of processing units in collaboration with private sector under PPP mode would help to strengthen forward linkages for the growers and reduce post-harvest losses. It is a vegetable-surplus State and produces around 45 lakh metric tonnes of vegetables annually against the requirement of 30 lakh metric tonnes. Therefore, there is a good scope for vegetables and fruits processing industries.

iii. **Livestock:** Animal Husbandry and Dairying are important sources of livelihood and income generation activities especially for small and marginal farmers, women and landless people. The climatic conditions are suitable for commercial poultry farming as also backyard poultry. Sheep, Goat and pig rearing are important subsidiary occupation in providing additional income to small and marginal farmers and landless people.

iv. **Fisheries:** Demand for fresh water fish in the State is very high. Annually more than 40000 tonnes of freshwater fishes are brought from other States to meet the demand and supply gap. Therefore, the fish production can be increased by adoption of scientific fish culture in cages, adoption of new technologies and strengthening of fisheries extension services.

v. **Sericulture:** It ranks 1st in the production of Tasar silk and produces about 70% of the tasar silk of the country. To develop post-cocoon activities, Common Facility Centers (CFCs) may be established, where facility of reeling machines and other necessary equipment are provided for Tasar silk reeling.

Box: Papaya Cultivation for Ensuring Livelihood Security of Tribal Farmers

The Papaya being one of the important fruits crops in Jharkhand is mainly grown in the backyard gardens of the houses in the state. Even though, being grown in the homestead and consumed by the farmers, the scientific papaya cultivation is at its infancy among the state's tribal farmers.

Smt. Roopvanti Didi of Village Dubang of Lohardaga District planted 45 papaya plants of variety - Ranchi Local. With this, she obtained 38 fruiting plants and started selling vegetable purpose papaya after the plants attained 5 - 7 Months of age. She sold around 65% of her produce as vegetable papaya with net income of Rs. 8,550/- and rest of the produce as ripe fruits with net income of Rs. 7,400/- after 10 - 13 Months of planting. So, she earned a total of Rs. 15, 950/- by the cultivation of papaya variety - Ranchi Local.

Conclusion:

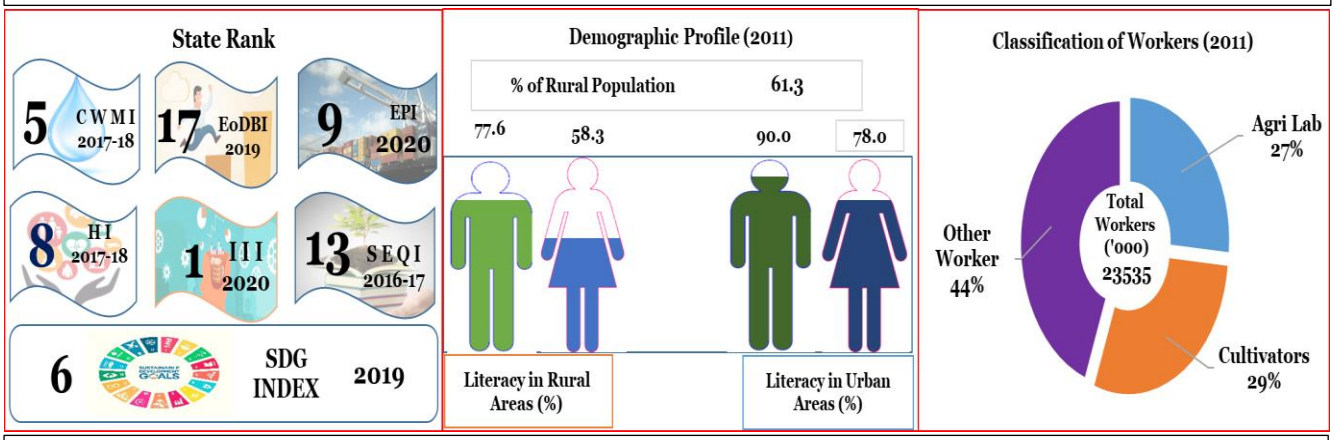
Jharkhand faces many challenges in order to achieve a sustained growth of agricultural sector. A higher agricultural growth is essential since it is expected to fuel the development of other sectors of the economy through its backward & forward linkages as well as help the state achieve desired social objectives. There is a need to provide an enabling environment to leverage the massive resource base of the state.

Karnataka

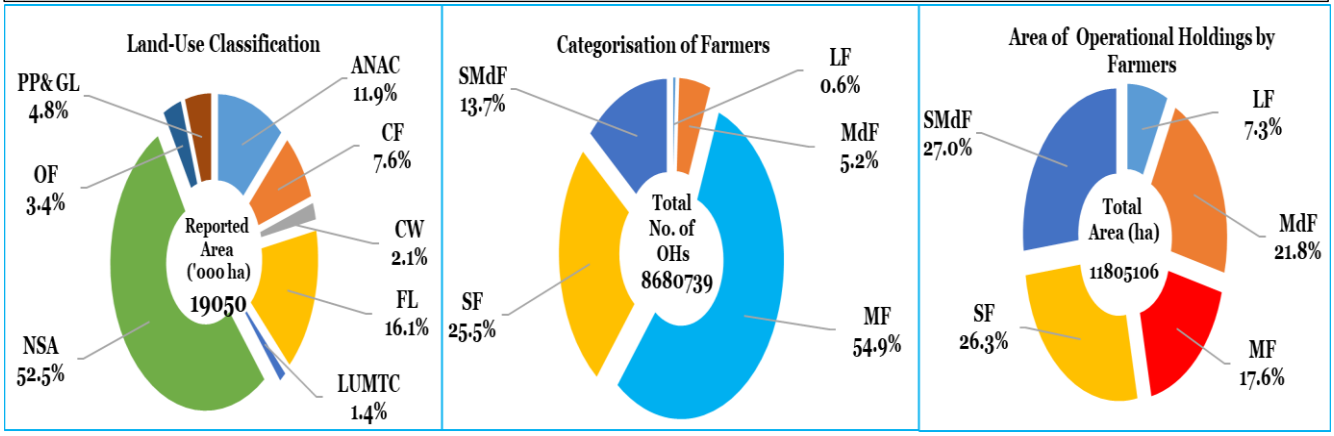
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
10	30	6022	1144.4	176	27397

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
231246	1699115	19179	61095	37469

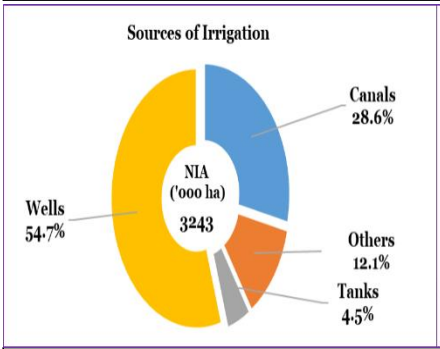
General Demographic Profile



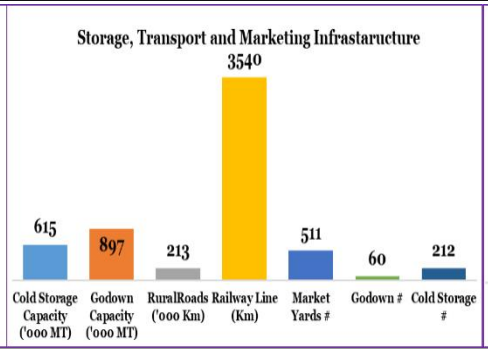
Land Usage (2015-16)

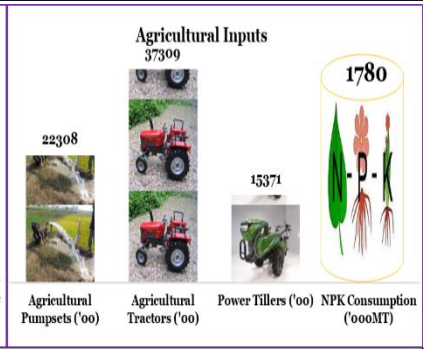


Irrigation

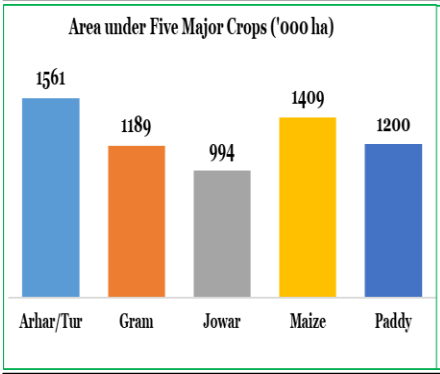


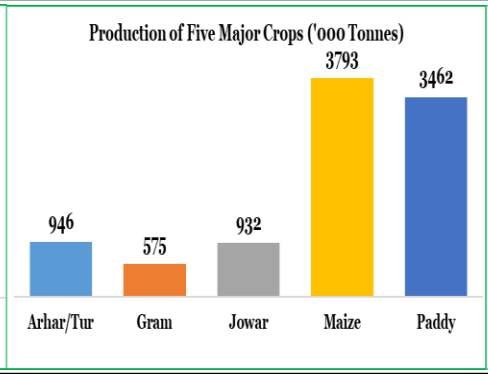
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

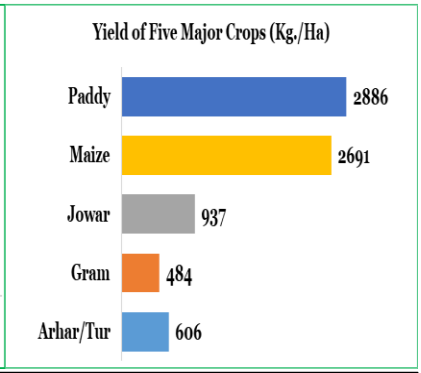




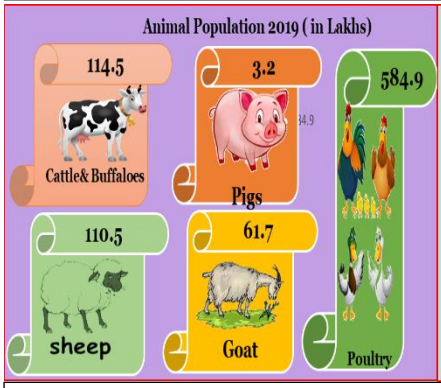
Area, Production and Yield of Five Major Crops 2018-19

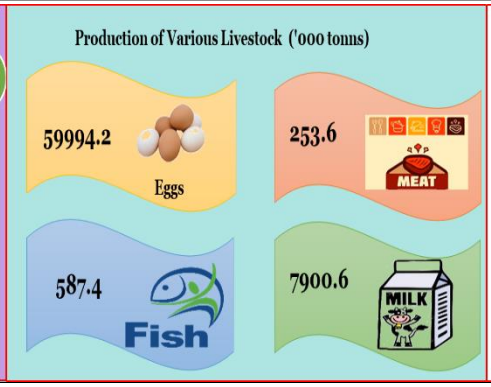


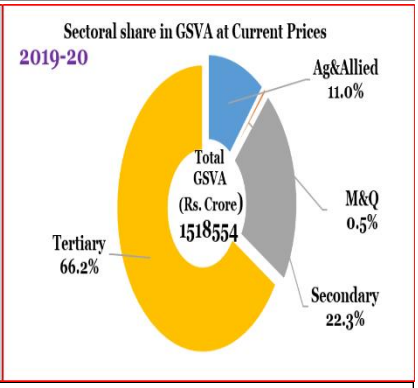




Allied Activities







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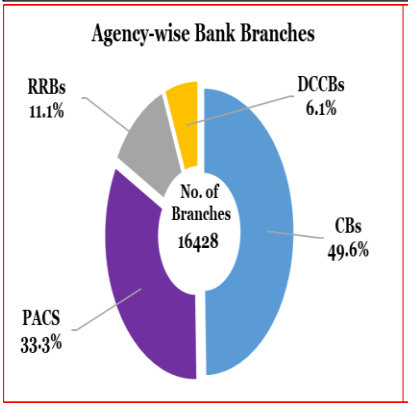
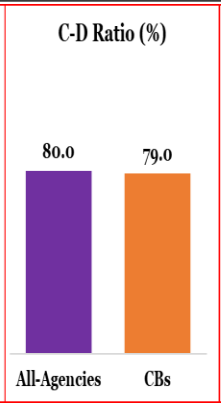
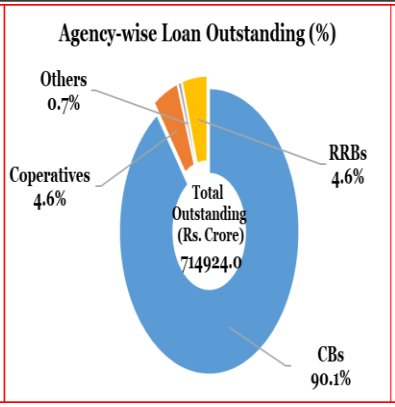
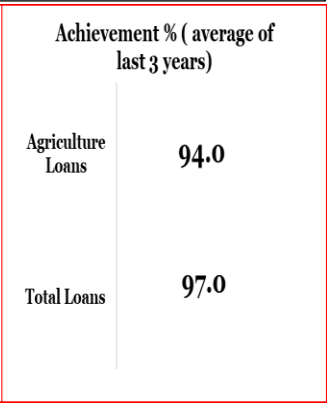








Problems and Prospects of Agriculture in Karnataka

Karnataka is the 7th largest and the 8th most populous state in the country with an area of 1,90,500 square kilometers constituting 5.83% of the total geographical area of India. Agriculture employs more than 60 % of its workforce. It has net sown area (NSA) of 98.55 lakh ha and ranks 6th among major states in Net Sown Area (NSA) occupying 7 % of all NSA in India. At current prices, Karnataka's gross state domestic product (GSDP) stood at Rs. 16.65 trillion (US$ 225.99 billion) in 2020-21. The state's GSDP increased at a CAGR of 9.76% between 2015-16 and 2020-21. Its development depends critically on the performance of agricultural sector. The State is blessed with varied agro-climatic features which is suited for raising almost all cereals, pulses, oilseeds and commercial crops. The major crops grown are cereals, pulses, paddy, groundnut, cotton and sugarcane which constituted about 80 % of the gross sown area. The State ranks first in production of coffee, raw silk, coarse cereals and sun flower.

Problems

i. **Smallholder Domination**: As per Agricultural Census (2015-16), the State has 86.77 lakh farm holdings covering 117.24 lakh ha. The share of small and marginal holdings is 80% of the total holdings accounting for only 44% of the total area covered. Semi-medium, medium and large holdings accounted for 20 % of the total holdings, but their share of operational land holdings was 56 %. The average size of operational holding size has declined to 1.35 ha in 2015-16 from 1.55 ha in 2010-11.

ii. **Water Scarcity**: Many districts are water stressed with perennial water scarcity and drought like situation. Less than 50% of its GCA is irrigated. Out of 176 taluks, 43 are categorized as Over-exploited, 14 as Critical, 21 as Semi-critical, and 98 are Safe.

iii. **Low Cropping Intensity:** As per the land utilisation statistics for 2018-19, Gross cropped area was 117.79 lakh hectares including 19.24 lakh hectares' area sown more than once, this works out to 120% cropping intensity which is significantly low.

iv. **Agrarian Distress**: As a result of drought situation in the major parts of the State during last five years consecutively, coupled with the rising stress/disputes over the water sharing agreements with the neighbouring states due to reported water shortages in upstream states, agrarian distress in the state is significantly evident.

Prospects

i. **Diversification/Alternate Sources of Income:** Cultivation of perennial horticulture crops, sericulture and apiculture are a good strategy for diversification at the farm level. Livestock farming including rearing of dairy animals, poultry units, sheep, goats, pigs, etc., can be taken up as a source of supplementary income by virtually all farmers and thereby improving their economic condition particularly the small and marginal farmers.

ii. **Focus on Water Availability:** Banks may finance small Lift Irrigation Schemes in suitable locations and extend credit support to farmers for construction of Artificial Recharge Structures of Bore wells, rain water harvesting schemes, farm ponds, small weirs/check dams, roof top water harvesting system, etc.

iii. **Dryland Farming:** Since many regions of the state experience continuous water shortage, there is need to focus on dryland farming.

iv. **Integrated Farming:** Adoption of Integrated Farming System (IFS), especially in dry land / rainfed region will help farmers in ensuring sustainable income levels. It can be a mix of farm-based activities along with allied and ancillary activities, efficiently utilizing resources available with farmers for increasing the productivity and profitability. Developing the location specific integrated farming models and popularizing among the farmers is desirable for increasing farm income. (Success story is given in box)

v. **Aggregation through FPOs:** Since an overwhelming majority of the landholdings in the state are small & marginal, aggregating the farmers through FPOs will enable them to reap the benefits of economies of scale.

vi. **Agri-Biotechnology & Tissue culture**: Karnataka has been at the forefront of biotechnology in India and is rightly known as the Biotech Capital of India. It is home to a large array of biotechnology enterprises, including large companies, medium-sized ones, and many promising biotech start-ups.

Sustainable Agriculture Through Integrated Farming System

Prasad Rama Hegde a young progressive farmer has set an example for the youths who are migrating towards the cities in search of jobs leaving their potential lands barren. He is resident of Kanakodlu, a remote village which gets cut off during rainy season as the small rivulet swells. He is growing 1000 different species in his 1.77 hectares of farm land.

Practices:

- Rain water harvesting by digging 40 percolation pits in the slope of betta land (The strips or patches of tree land on the hill slopes adjoining the areca garden).
- Practices arecanut based multi cropping system.
- Judicial utilization of bunds by planting mango (*Mangifera indica*), cashew (*Anacardium occidentale*), kokum (Garcinia indica), jackfruit (*Artocarpus heterophyllus*), sapota (*Manilkara zapota*), bamboo (*Bambusa* spp).
- Involved in conservation of 20 different traditional mango varieties, 12 local black pepper (*Piper nigrum*) varieties, 6 bananas (*Musa* spp) varieties, 3 jackfruits (*Artocarpus heterophyllus*) varieties. He has planted nearly 40 types of medicinal plants. Developed cinnamon (*Cinnamomum verum*) orchard in 0.4 ha land which is unique in itself, with 400 plants of 4 different varieties.
- **Apiculture and Dairy Unit:** 40 bee boxes of Apis *cerena indica* along with *Trigona* colonies and 7 cows fulfill the organic needs of the farm as well as dairy needs of the family. Management of labour scarcity through mechanization.

Conclusion

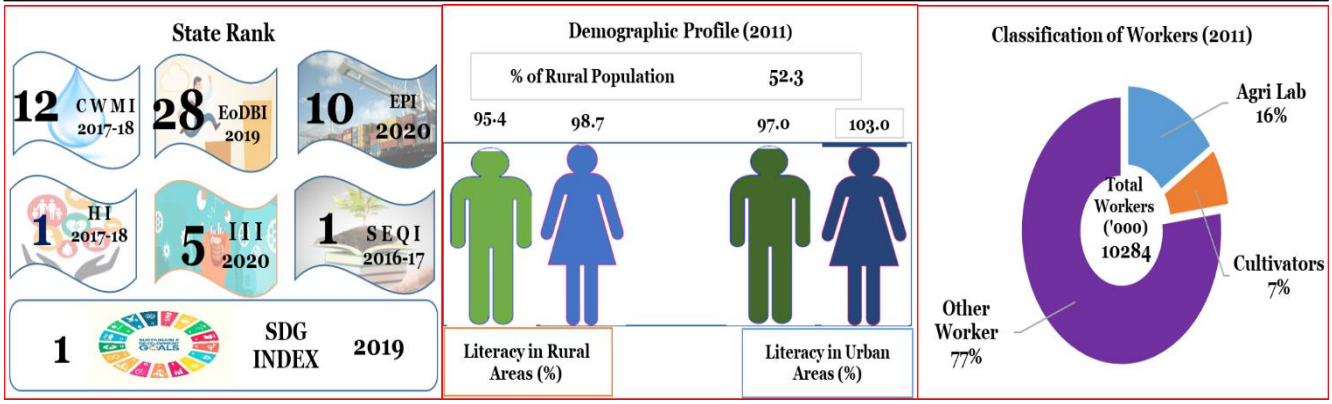
Karnataka is one of the states with higher per-capita income and growth. It is also providing a vibrant atmosphere for growth of many industries. The growth in agriculture sector can be boosted by investing in allied sector, improving the water-use efficiency, adoption of integrated farming and aggregation of farmers through FPOs. Further, we may explore the possibility of accelerating the growth of agricultural sector by forming partnerships with the industrial sector.

Kerala

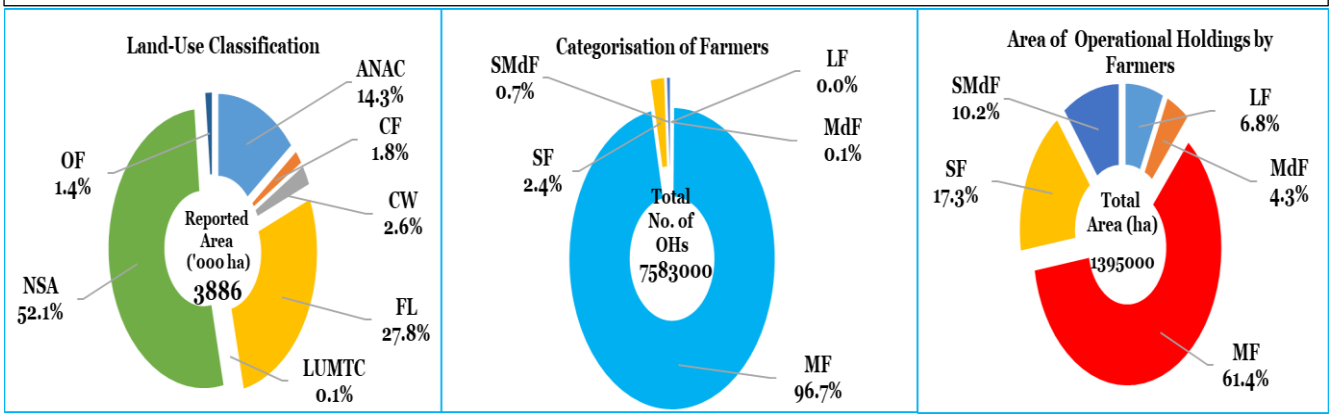
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
13	14	941	2924.8	152	1535

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
204105	781653	3886	33406	17471

General Demographic Profile

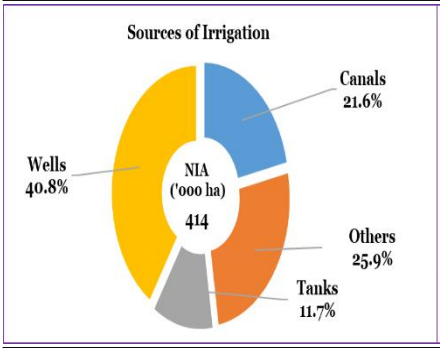


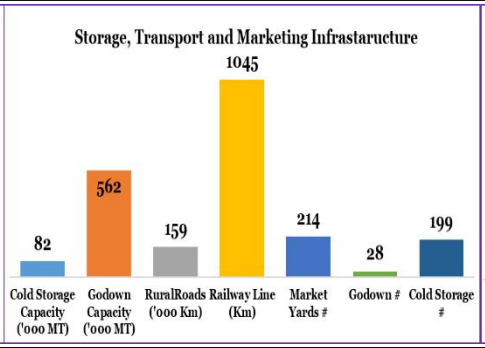
Land Usage (2015-16)

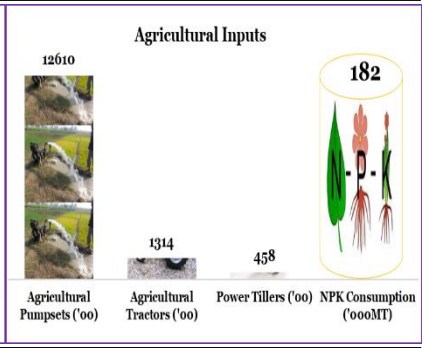


Irrigation

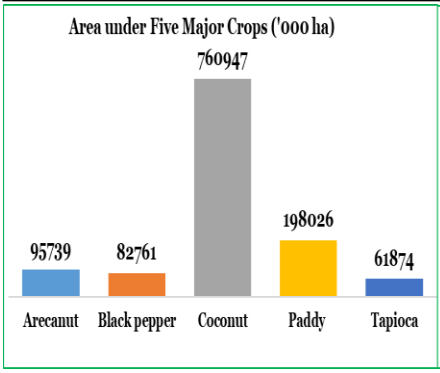
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

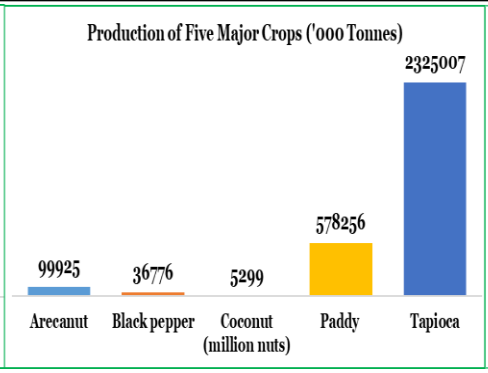


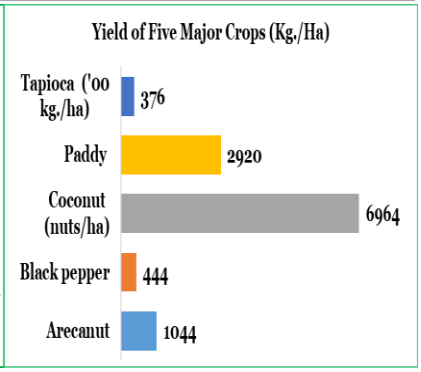




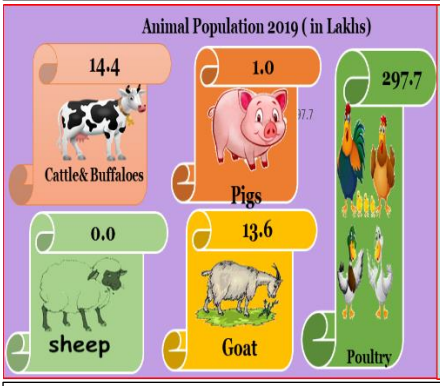
Area, Production and Yield of Five Major Crops 2018-19

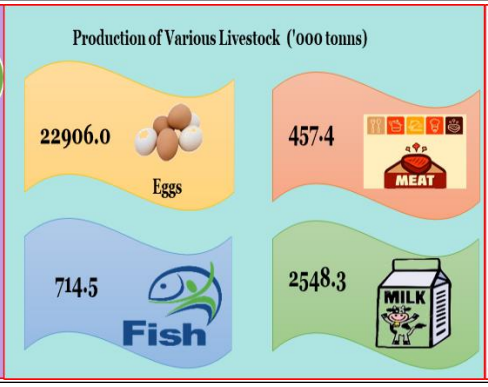


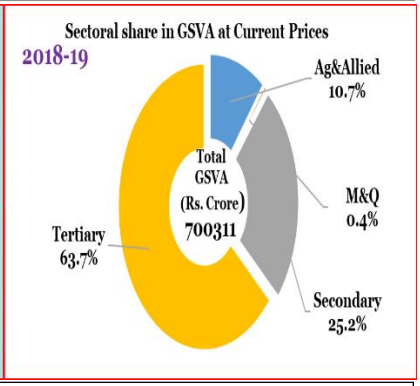




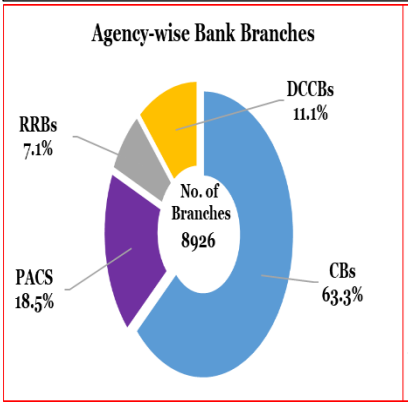
Allied Activities

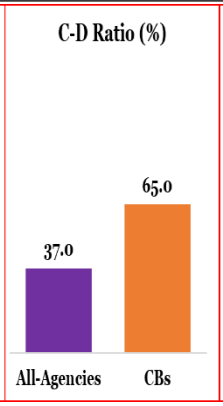


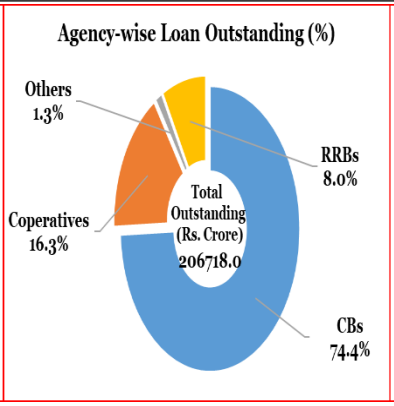


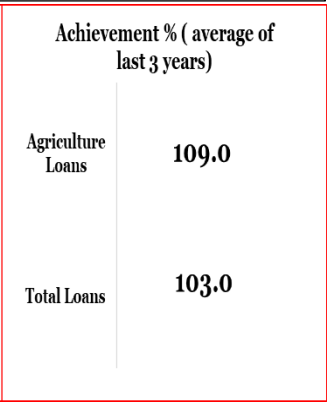


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Kerala

Kerala is the 23rd largest state in terms of area and 13th largest in terms of population with a density of 859 persons per square km. It is a highly developed state having achieved excellent levels of human development, exemplary health and education standards, social sector developments, high environment and developmental standards. According to Census 2011, it has a favourable sex ratio with 1084 females per 1000 males and is the most literate state in the country with an effective literacy rate of 93.91%. It ranks first among states in India, in the Human Development Index with a score of 0.784. During 2019-20, Kerala ranked first for the second consecutive year in a row on the Sustainable Development Goals Index brought out by the NITI Aayog. The agriculture sector in Kerala has undergone a significant structural transformation over time which has noticeably been captured in the continuous decline in share of agriculture in the Gross State Domestic Product (GSDP). The share of Agriculture in its Gross State Value Added (GSVA) has come down from 12.37% in 2013-14 to 8.03% in 2019-20. The severe natural disasters in the form of floods and landslides that plagued the State in recent times have had a heavy toll on the sector.

Problems

i. **Small Landholding Size:** Kerala has witnessed major changes in land use pattern over the years with the major change being the shift from the cultivation of food crops to non-food crops. This poses a challenge not just for its food security but also for the ecological sustainability. The total number of operational holdings in the State is 75.83 lakh in 2015-16. The average size of operational holdings has declined to 0.18 ha (2015-16) as compared to 0.22 ha in 2010-11 which is much lower than the national average of 1.08 ha. 97% operational holdings fall in the small and marginal category.

ii. **Topography and Soil related Issue: -** The State has an undulating topography with altitude upto 2694 metres above mean seal level. The foothills and coastal plains are vulnerable to floods, saline water intrusion and problems of poor drainage/water logging. Due to highly undulating/rolling terrain, high rainfall intensity and its uneven distribution, large areas especially in high-slope lands like western ghat regions are vulnerable to erosion, landslips and crop moisture stress. About 5.25 lakh ha low-lying areas in coastal tracts come under the 'Problem Area Zone' as per the NARP classification of agro-climatic zones. The soils in these areas, being inundated by backwaters almost for 8 months in a year, are generally acidic and develop salinity problems.

iii. **Lack of irrigation:** Kerala has a total Gross Cropped Area of 25.79 lakh ha of which about 5.40 lakh ha is reported to be irrigated. A major constraint in improving agricultural productivity in the state is lack of irrigation facilities and a rapid expansion in the sector is necessary to realize the full potential of agriculture and enhance farm incomes. The per capita water availability in the state is one of the lowest in the country and has been declining over time. The water availability is dependent on rainfall and other climatic factors with the poor retention capacity of soil impeding effective conservation of water availability through rainfall.

iv. **Poor Farm Mechanization:** The growing shortage of labour and rising wage rate is a perennial problem that has been plaguing agriculture in Kerala. Farm mechanization has been abysmally low. Even though labour availability for agriculture operations has decreased over the years, a commensurate improvement in mechanization did not take place. On a per hectare basis, the density of implements is found to be very low in the state.

v. **Distorted Credit Flow:** The credit flow to the sector has been distorted by indiscriminate use of agri gold loans without reckoning the end use of such credit. The

Cooperative Credit Institutions which are closer to farmers, are not able to meet their requirements due to structural issues related to regulation. Thus, the beneficial schemes of the government like Interest Subvention Scheme are not able to reach to the farmers under the cooperative fold to the extent desired.

vi. **Weak Extension Services and Poor Marketing Infrastructure:** The present extension network of the Government is not adequate to meet the demand of the farmers. The Krishi Bhavans which are the centres of extension activities are saddled with many other responsibilities and are under staffed. Hence, the quality of the services being provided by them is unsatisfactory. The absence of marketing and storage facilities for the farmers at convenient locations has resulted in low realization of prices by them.

Prospects

i. **Hi-Tech Agriculture:** Knowledge based commercial agriculture system making use of the latest technologies is the best option going forward for Kerala because of the high density of its population, shortage of farm labour, low per-capita landholding size, extreme climatic events with the possibility of recurrence, and fast pace of urbanization. High-tech agricultural practices having potential for productivity enhancement in the state are, protected cultivation under polyhouses, vertical farming, hydroponics, aeroponics, high density planting of orchard crops, hi-tech dairy farming, precision farming, re-circulatory aquaculture, Internet of Things (IOT) based agriculture and mass production of quality planting materials through tissue culture, etc.

ii. **Organic and High Value Crops:** The Government of Kerala has been promoting organic farming as one of the sub-missions of its Haritha Keralam (Green Kerala) Mission. Organic farming would not only ensure higher prices for farmers but also assure residue free produce. Organic cooperatives must be promoted in order to facilitate group dynamism since, it has a higher proportion of urban population (47.72%) compared to the national average (31.16%) which would provide a good market for organic produce.

iii. **The Allied Sector:** Livestock sector in the state is one of the fastest growing sectors of its rural economy accounting for 3% of the Gross State Value Added (GSVA) having a significant impact on urban and rural livelihoods. Efforts in animal resource development can contribute to enhanced nutrition, generate employment, alleviate poverty, provide food security and empower women. Rich in marine, brackish water and fresh water fish resources, fisheries and aquaculture contribute around 9.2% of the GSVA from the primary sector which is of significance to the State economy. The sector has high export potential and making a significant contribution in the export of marine products from the country.

iv. **Integrated farming:** Integration of shrimp/fish in rice fields leads to increase in productivity of land, per capita income of people and provides year-round employment. Also, it will check the pest and weed problems and avoid the use of pesticides, weedicides and inorganic fertilizers. Rice/shrimp rotational practice will lead to revival of fallow land and at the same time check the present undesirable trend of reclamation of wetland.

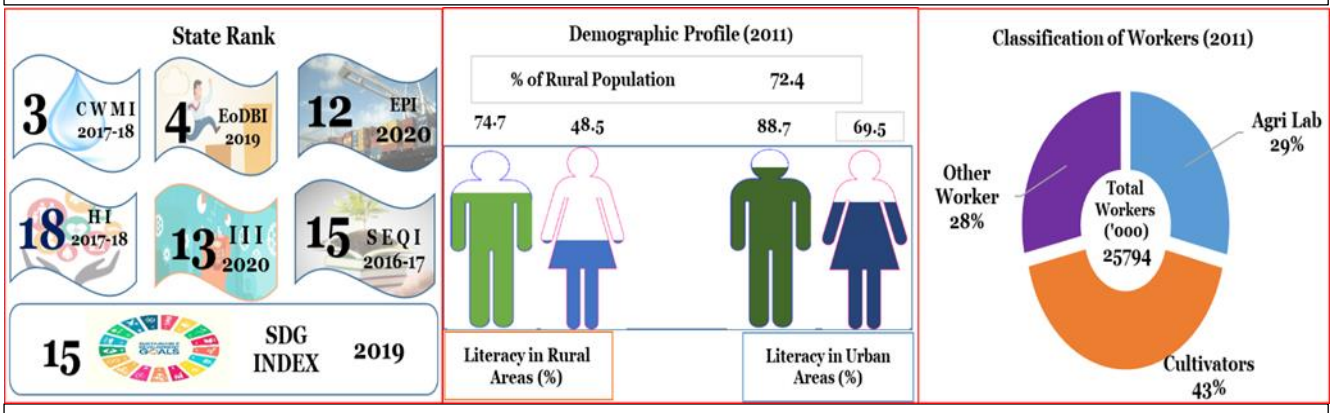
Conclusion: A robust Agriculture sector is vital to achieve the Sustainable Development Goals (SDGs) of no poverty, zero hunger, good health and well-being. With a decline in the size of agricultural landholdings, Kerala would have to focus on production, productivity and profitability in order to ensure sustainability in agriculture which would be of prime importance in the years to come.

Madhya Pradesh

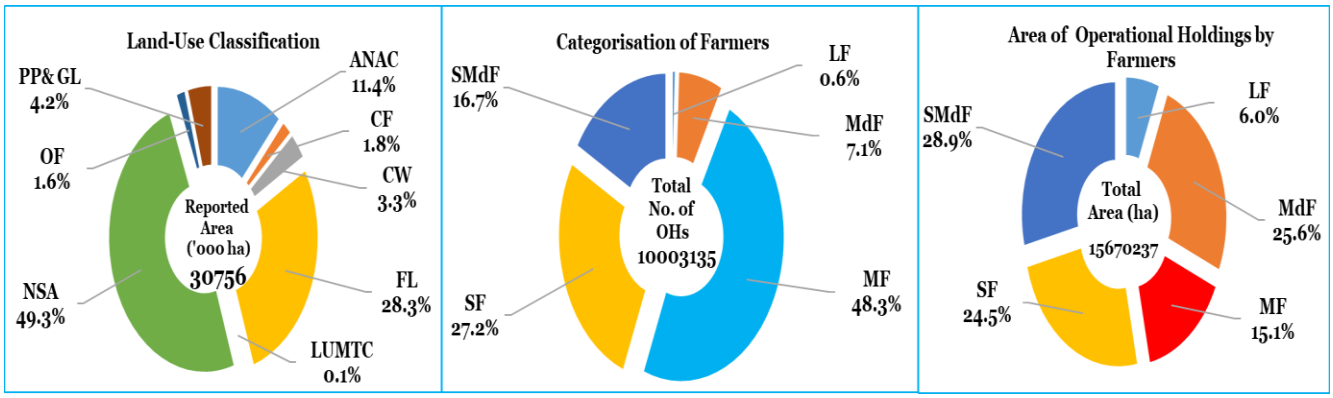
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
11	52	23043	1033.2	313	54903

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
99763	906672	30825	72627	52557

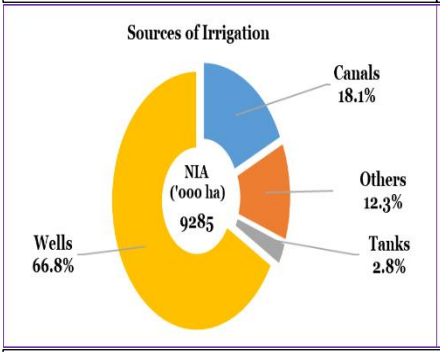
General Demographic Profile



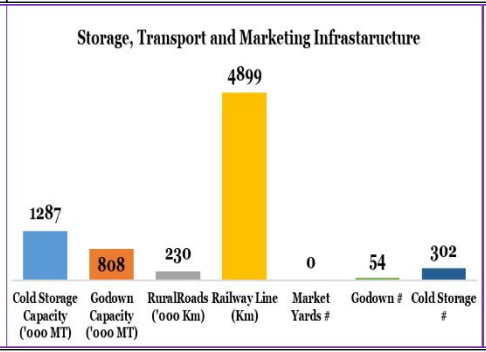
Land Usage (2015-16)

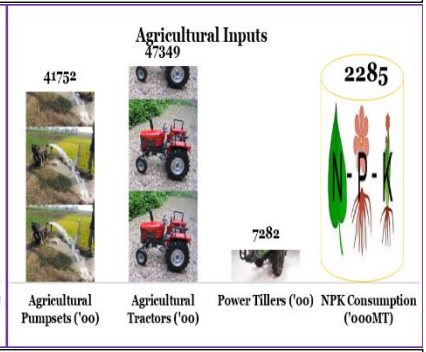


Irrigation

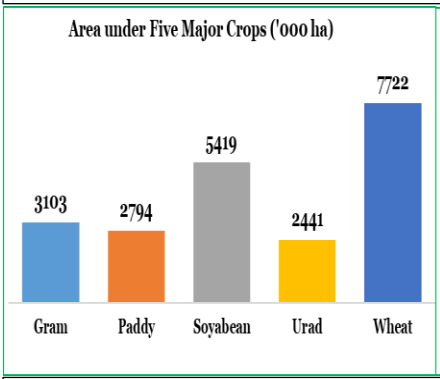


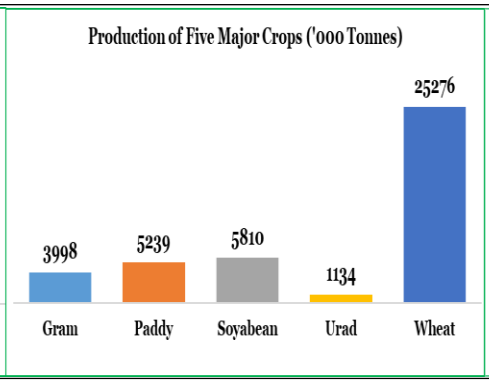
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

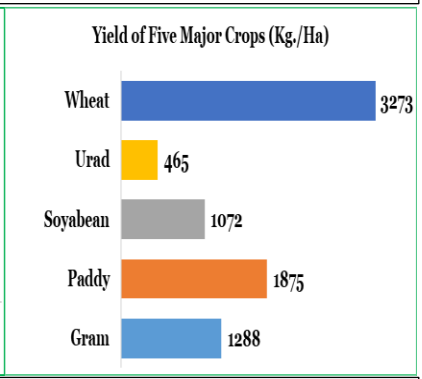




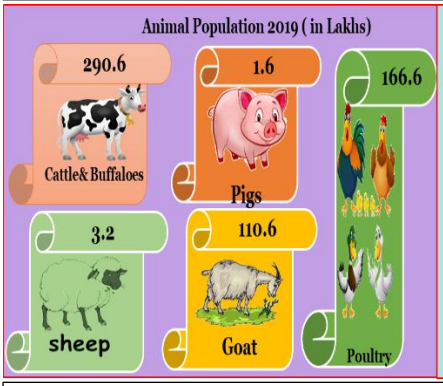
Area, Production and Yield of Five Major Crops 2018-19

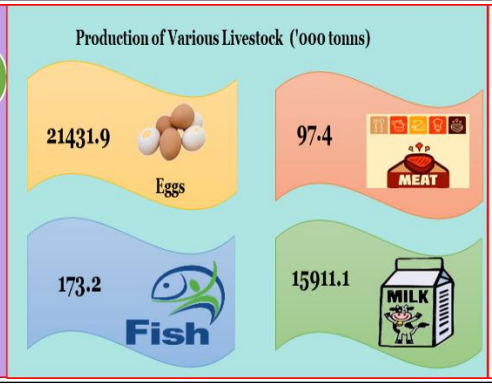


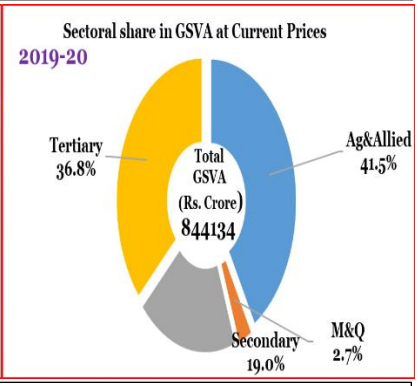




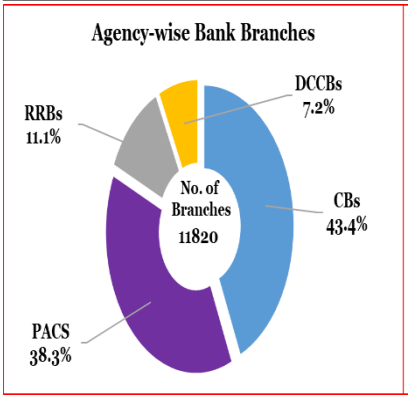
Allied Activities

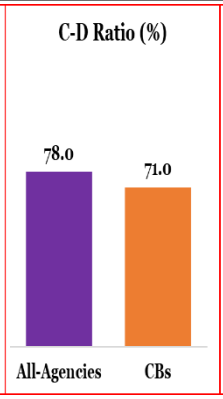


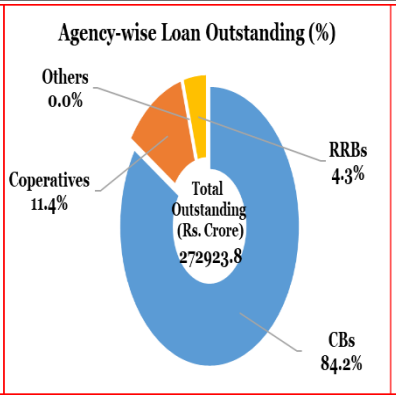


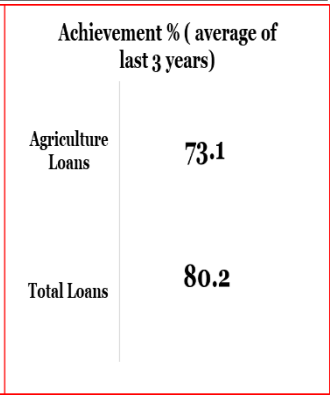


Agricultural Credit Details as on March 2018









Problems and Prospects of Agriculture in Madhya Pradesh

Madhya Pradesh is the 2nd largest State in the country in terms of area with a population of 7.26 crore and a low population density at 236. State has 11 different agro-climatic zones with several geographical advantages when compared to other States of the country with an abundance of resources in the form of land, water, mineral deposits, electricity, irrigation facilities, rural connectivity etc. The contribution of the primary sector in GSVA was 35% in 2019-20 which is almost double that of national average of 17%, indicating comparatively a higher importance of agriculture and allied sector in State's economy. Agriculture is the main source of employment for over 65% of the population and constitutes about 60-75% of the rural income. It is a large producer of soybean and wheat. Agro-climatic diversity and topographical variations enable the state to grow a wide range of cereals, pulses, oilseeds and cash crops, besides being home to myriad varieties of plant species, both in forest areas and outside. Various tropical fruits, vegetables, and spices like coriander, chili and garlic are also widely grown

Problems

i. **Smaller Landholdings**: 76 % farmers in the state possess less than two hectares (ha) of land. Smallholders often suffer from poor access to quality inputs, institutional credit and other resources, organized markets, modern farming technologies, etc. and thus are unable to reap the benefits of economies of scale.

ii. **Climate Change Issues**: With 70 % of the cropped area being rain fed (Madhya Pradesh State Action Plan on Climate Change, 2014) and predominance of small holders with low adaptive capacity, agriculture sector is highly vulnerable to climate change. Climate change adversely impacts forestry, animal husbandry, fisheries and other allied sectors, which provide livelihoods to a large chunk of the population. To maintain the growth rate of these sectors and sustain the productivity, climate change issues need to be addressed urgently.

iii. **Soil Erosion**: Rapid soil erosion is the major problem in its northern part along the Chambal and its tributaries. Large-scale gully erosion can be seen in the belt around the districts of Gwalior, Morena and Bhind. Majority of the farmers burn crop residue in haste to clear fields to sow the next crop. This practice leads to soil erosion, loss in crop yields and air pollution. Instead of burning crops, farmers may use the crop residue as biomass to improve soil fertility. In addition, proper sowing of seeds with latest techniques such as through seed drills also helps in preventing soil erosion.

iv. **Depleting Water Table**: Successive droughts coupled with erratic rainfall pattern are major causes for sharp decline in groundwater tables. A report of Central Ground Water Board (CGWB) revealed that in last 10 years in Madhya Pradesh water table has gone down in larger area but the recharge is happening in smaller parts. Northern parts of the State which include Gwalior and Chambal region, drought prone parts of Bundelkhand region and parts of Mahakoshal regions seem to be the worst affected as far as decline in water table is concerned. The North Central Region of CGWB based in Bhopal, monitored 1204 open dug wells in the State. As per their pre-monsoon report, 7.71% dug wells showed more than 4 m decline in water levels, spread mostly in Bhind, Morena Gwalior, Dewas, Jabalpur, Betul, Chhatarpur, and Chhindwara.

v. **Declining Investment Credit**: Declining trend in the investment credit or long-term credit for agriculture has been a matter of serious concern. Though the overall CD Ratio was 78% in the State, however the CD ratio of the RRBs hovered around 53% which is below the all-India average of 65% for RRBs. The CD ratio in 09 districts was below 40% which is another area of concern. Unless urgent steps are taken to arrest this trend, higher growth rate in agriculture is difficult to sustain in the coming years.

Prospects

i. **Growing Agricultural Sector** - The share of agriculture in GSDP has increased from 22.5 to 30.3 per cent in between 2010-11 to 2014-15 with a spectacular growth of 15.4 per cent a year in six years (2009-10 to 2014-15). During 2019-20, primary sector accounted for 35 % share of total GSVA and Compounded Agriculture Growth Rate (CAGR) of Agriculture from 2011-12 to 2019-20 at Constant Price was 7.70% for Madhya Pradesh whereas at national level it was 3.30%. Moreover, the sector provides employment to around 54.6 per cent of its workforce. Thus, the sector in the state has a huge potential of growth and can provide employment to the growing workforce.

ii. **Aggregation and Collectivisation** - Aggregation is an effective method to mitigate the risk in agriculture and strengthen livelihoods of farmers, particularly the small and marginal farmers. It helps effectively link producers with off-takers to achieve economies of scale along the value chain. So, strengthening of existing FPOs and promotion of new FPOs may be the priority area.

iii. **Increasing Irrigation Potential** - Changing risk profile of agriculture shall have a significant impact on farm incomes. Assured irrigation is one such risk mitigating measure, which may have a drought proofing impact. The State Government's focus on harnessing the potential in its river basins and improving the irrigation outreach with greater efficiency has yielded results in terms of providing impetus to agriculture growth. A significant action point in this sector is, utilizing the irrigation potential created, and improving water productivity by enhancing water use efficiency and using water saving devices.

iv. **Efficient Utilisation of Waste Land** - Reclaimed wastelands and degraded lands can be effectively put to use for cultivation of various horticulture crops, by applying suitable manures. Being labour intensive, cultivation of horticulture crops also provides gainful employment opportunities in the rural areas. Value addition in the form of processing, grading and packaging also boosts the output from this sector.

v. **Sericulture** - The agro climatic conditions of the State are also suitable for sericulture development. Mulberry and Tassar are the two varieties of silk produced in the State. The silk industry is labour intensive and hence serves as an effective tool for poverty alleviation.

vi. **Livestock** - The livestock population shows increasing trend over the years. There is a sufficient improvement of high breed poultry. The Kadaknath breed of cock (Jhabua) is famous for their taste and dark black bones and blood. Government has implemented a Cockerel scheme for uplifting of poor class, under this, day old chicks have been provided to beneficiaries. Further improvement and promotion in the sector will enhance the livelihood of farmers.

Conclusion

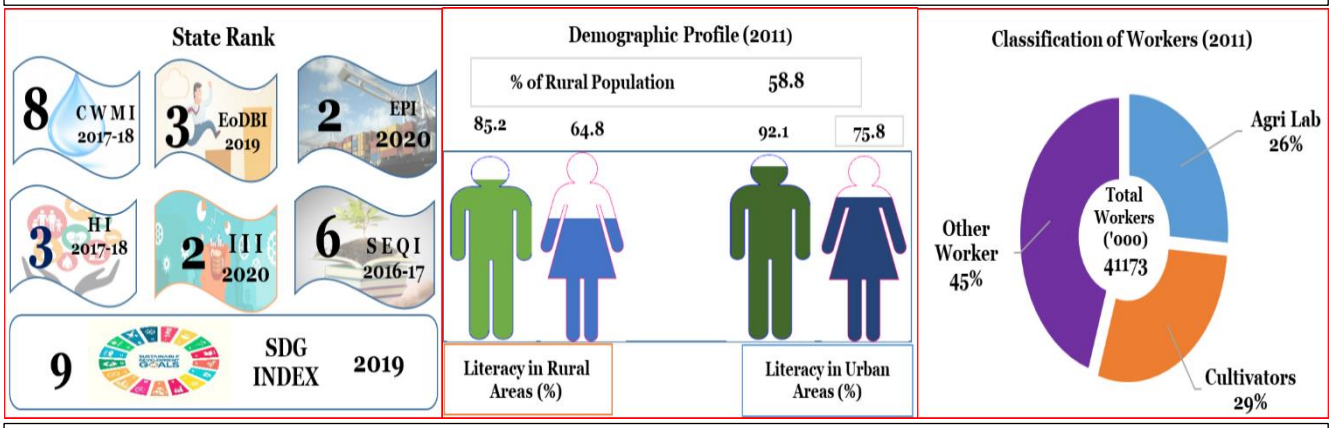
With fragmentation of agricultural landholdings and water availability issues, the focus should be on production, productivity and profitability in order to ensure sustainability in agriculture. Only with a robust agriculture sector, would we be able to achieve the Sustainable Development Goals (SDGs) of no poverty, zero hunger, good health and well-being.

Maharashtra

Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
9	36	28796		355	40959

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
191736	2632792	30771	112374	61556

General Demographic Profile



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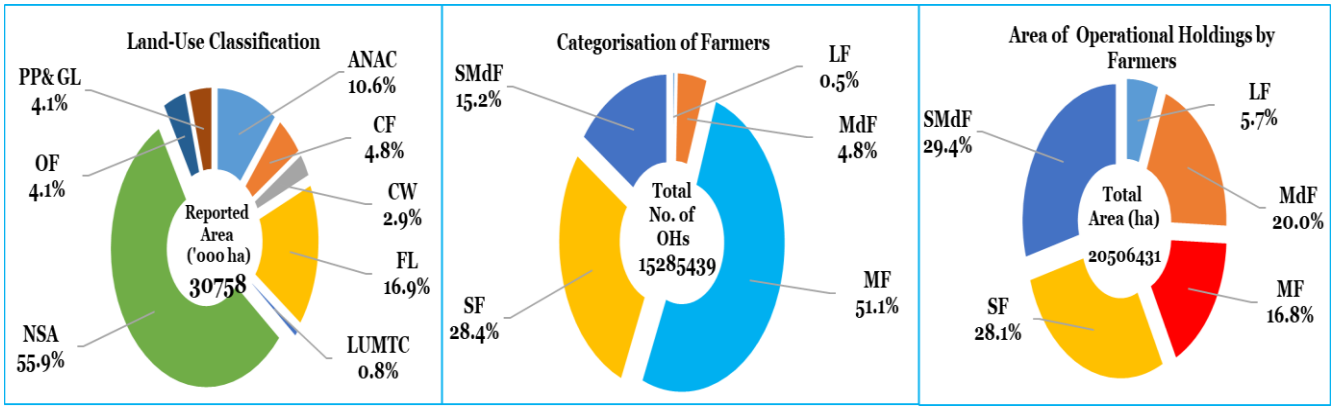
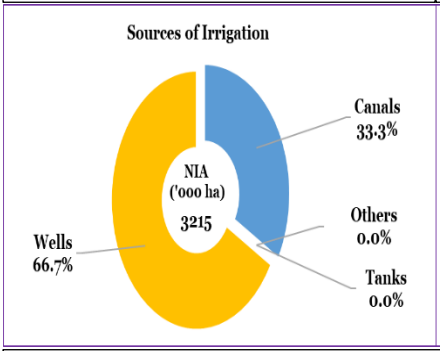
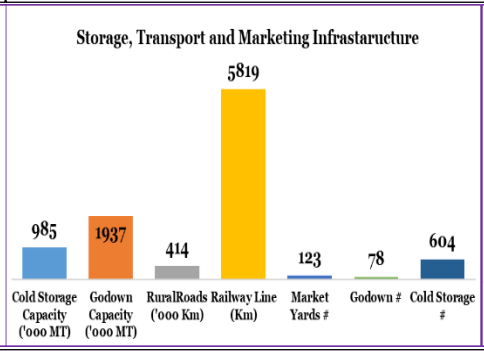
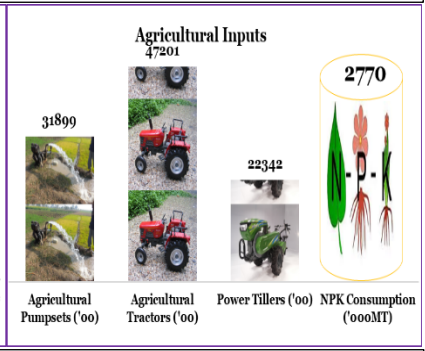


Irrigation

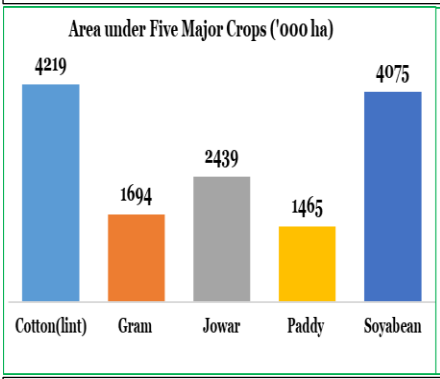


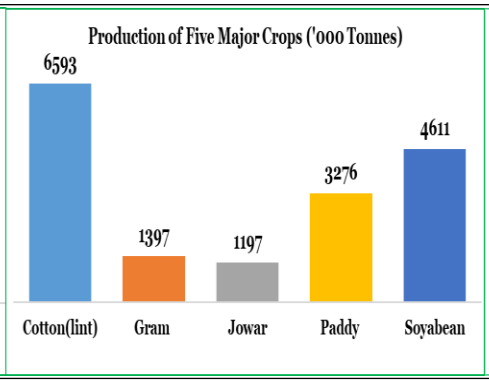
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

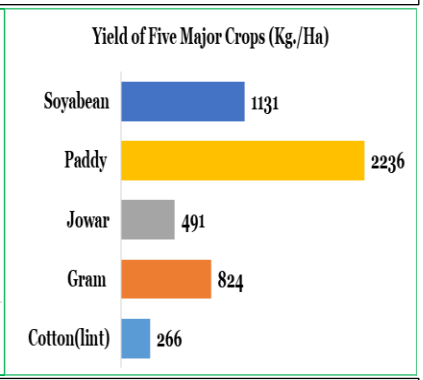




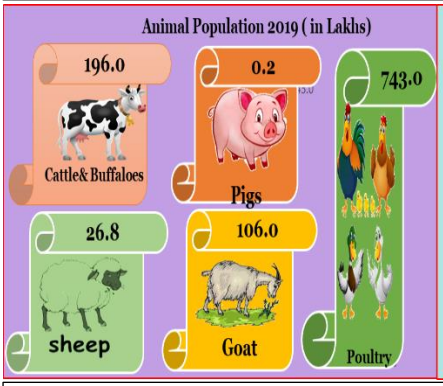
Area, Production and Yield of Five Major Crops 2018-19

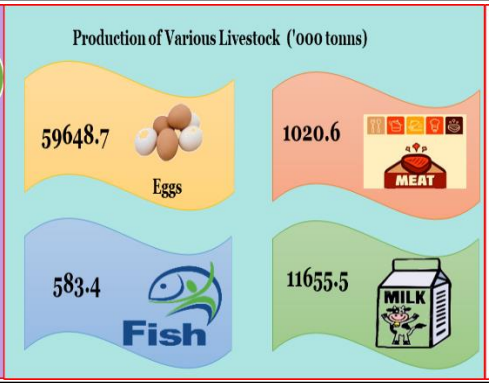


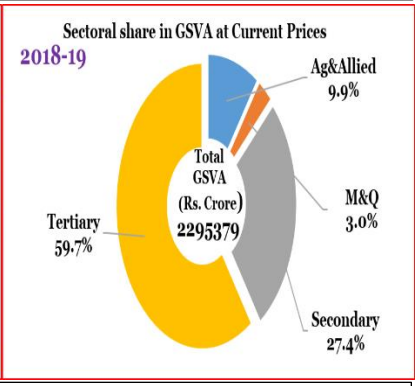




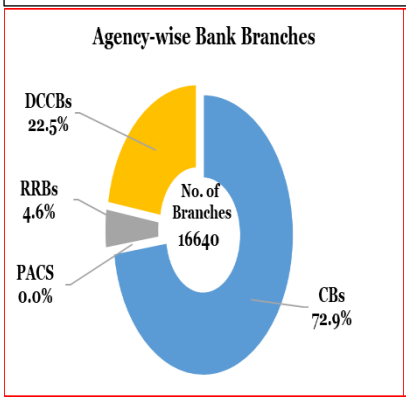
Allied Activities

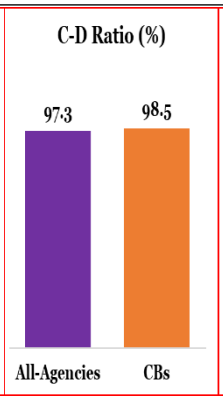


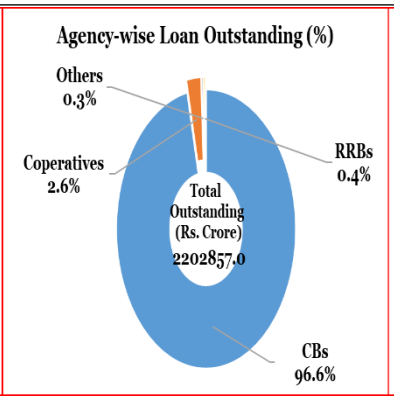


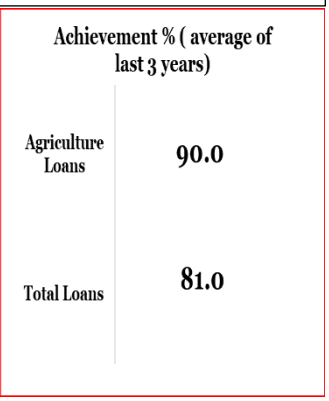


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Maharashtra

Maharashtra is the second and third largest State in India in terms of population and geographical area respectively spread over 3.08 lakh sq. km. With Sahyadri ranges running along the coast of Maharashtra, the state is geographically divided into two regions; the Konkan coastal plains and the great river basins formed by the rivers flowing out from the Western Ghats (Sahyadri). Agriculture is the mainstay of the state of Maharashtra. Almost 82% of the rural population depends on agriculture for livelihood. Both, food and cash crops are grown in the state.

The total number of operational holdings is 15.3 lakh covering 20.5 lakh ha with an average size of operational holdings at 1.34 ha. Out of 1.53 crore total operational holdings, 79.52% belong to small and marginal farm category. The state experiences tropical conditions and rainfall is particularly concentrated to the Konkan and the hilly Sahyadri region. The rain pattern differs from region to region.

Problems

i. **Large area under drought - The** state has 24 per cent of drought-prone area of the country with ninety-nine talukas being chronically drought affected. The problem is prominent in central and eastern Maharashtra due to which agriculture in the state is rain-fed (only 20 per cent of Gross Cropped Area is irrigated) and well-irrigation accounts for 65 per cent of State's gross irrigated area.

ii. **Decrease in the share of agriculture in GVA - The** share of agriculture & allied sector in the nominal Gross State Value Added (GSVA) is about 11 per cent during 2019-20 as against 15.3 per cent during 2001- 02 which shows declining trend over the period, whereas major portion of the population is still dependent on this sector. Reduction in average size of agricultural holdings, increasing number of marginal & small farmers, dependency on monsoon & weather, low productivity are the major concerns of the agriculture sector in the State

iii. **Inadequate Storage and Marketing Infrastructure** –Because of low shelf life, Farmers have to incur high transportation and other charges for TOP. Lack of adequate post-harvest handling infrastructure like grading, pre-cooling, packing and cold storage facilities and marketing infrastructure for fruit and vegetables have been the major impediments in the price realisation of produce. Inconsistent agricultural export policy with respect to TOP and supply chain problems where middlemen get a commission of about 50% of the retail prices further alleviate the miseries of TOP growing farmers.

iv. **Over Exploitation of Groundwater Reserves -** Topography and the geology of the region is such that groundwater resources are limited and in groundwater rich areas, over-extraction has been observed with emphasis on cash crops such as sugarcane, bananas, grapes, and oranges.

v. **High Rate of Farmers Suicide: -** According to data released by NCRB, almost 39% of total farmers' suicide happened in state of Maharashtra. This can be attributed to the fact that Maharashtra is lowest in terms of cultivated area under irrigation and productivity per hectare, The Marathwada and Vidarbha regions lack proper irrigation system and infrastructure which are important for high agriculture productivity. Due to non-availability of alternative livelihood opportunities, drought and hailstorm conditions, inappropriate price discovery, etc. farmers' life become miserable forcing them to take such extreme steps.

Prospects

i. **Use of Modern Technology: -** Maharashtra is the first state to adopt 'Dry Land Farming Technology' with the mission to help its farmers. Farmers are being trained on the new techniques for farming, pond irrigation, micro irrigation, inter-cropping, double cropping, etc., in addition to providing them with improved short duration seed varieties, fertilizers, pesticides etc. This technology transfer from the 'Agricultural Universities' to the farmers is helping in increasing yields. Maharashtra is the leading state in area under micro irrigation with more than 60% of the area under it. Practising efficient management of rain water and soil conservation can help boost sustainable agriculture growth.

ii. **Focus on Horticulture: - Maharashtra** state has been focussing on high-value Horticulture rather than staple crops. Large areas of the state have been brought under fruit and vegetable cultivation. In recent years Maharashtra has become the largest producer of Onions (63%), Banana (75%), Mandarin oranges (75%), Tomatoes (42%), Pomegranates, Alphonso Mangoes (90%) and seedless grapes (78%). The state leads the sugar industry sector with about 150 productive cooperative sugar mills. Diversifying into horticulture will help increase in income of farmers as there is readily available huge urban markets as well as export avenues for this produce.

iii. **Huge export potential and market: -** The state has large population in urban areas (45.2 per cent) that has concentration of financial and industrial activity as industrial sector supports agricultural sector through forward and backward linkages. It provides a ready market for agricultural commodities and manufactured goods. Its close proximity to international sea ports and long cost-line of 720 kms facilitates fishing. Taking advantage of this favorable conditions, investment in agriculture and allied activities can help boost agriculture growth.

iv. **Developed Cooperatives: -** The Cooperatives in Maharashtra have a political, historical and social cultural heritage. It has played a significant role in the socio-economic development of the state particularly in rural areas. Initially the movement was confined to agricultural credit but later spread to other fields like agro-processing, agro marketing, rural industries, consumer stores, social services etc. The existing Cooperative structure need to be strengthened and nurtured so that the issue of credit at ground level can be effectively tackled.

Conclusion

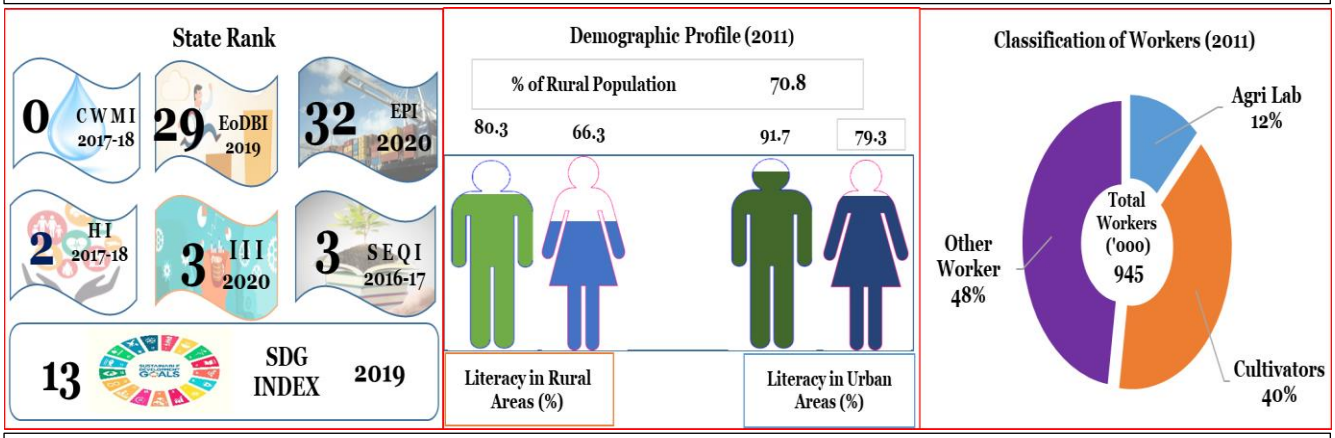
The increasing number of Farmers' suicide from the state is cause of concern and their problems such as inadequate storage and transport facility, market linkages, credit availability, especially in central and eastern Maharashtra need to be addressed. The state has a dense network of Cooperatives which can be strengthened and the problems at grassroot level can be effective tackled. Coordinating with State's Agriculture University can help bring more scientific approach in farming thereby reducing the uncertainty in agriculture. The policy of farm loan waiver though eases the problem in short term is not viable so a policy based on capital investment in the sector is the need of time.

Manipur

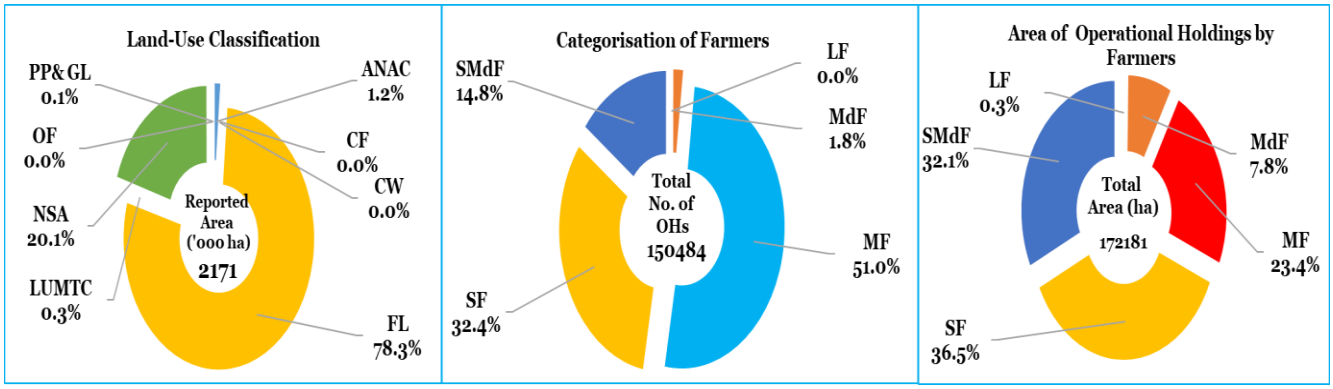
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	16	165	2032.9	33	2515

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
75226	27869	2233	2856	2022

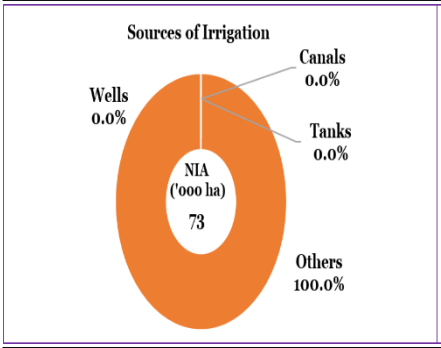
General Demographic Profile



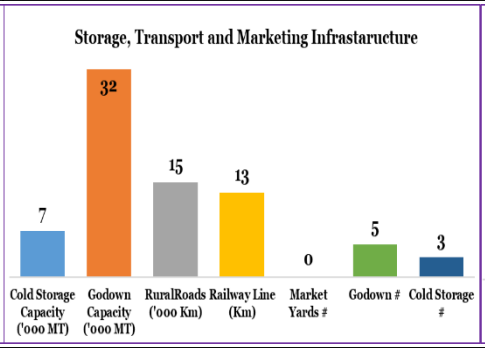
Land Usage (2015-16)

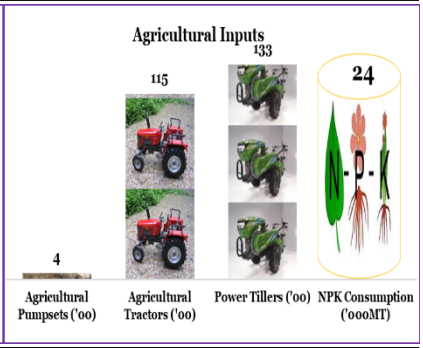


Irrigation

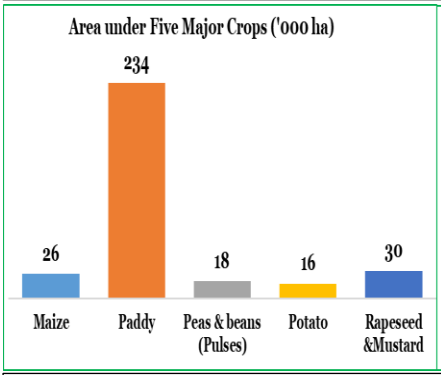


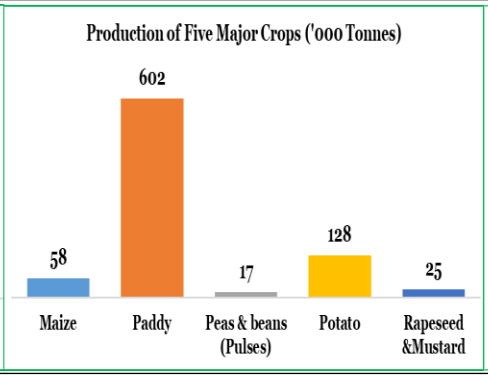
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

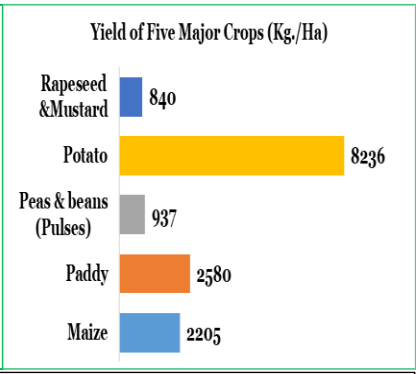




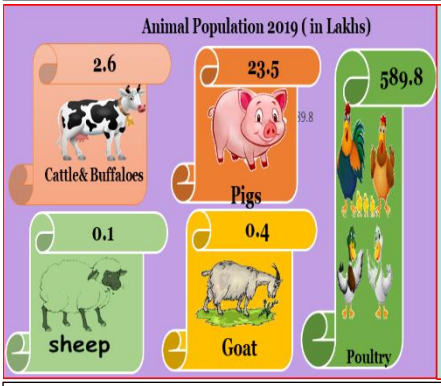
Area, Production and Yield of Five Major Crops 2018-19

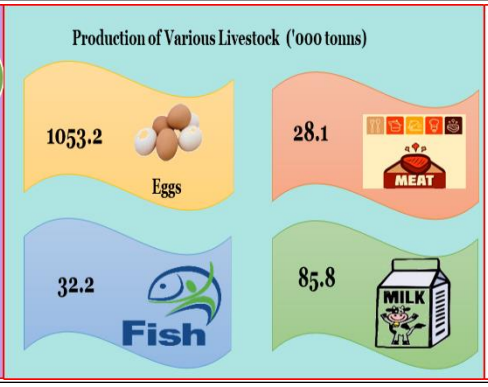


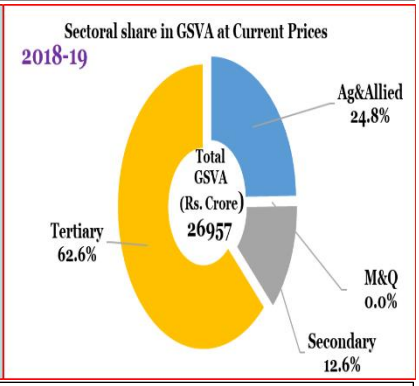




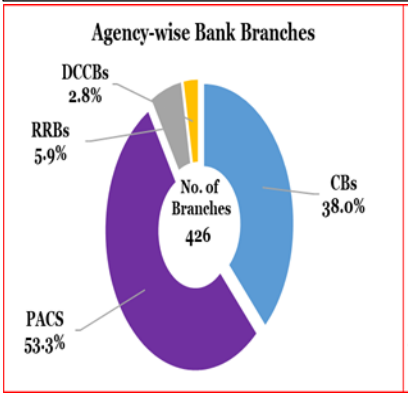
Allied Activities

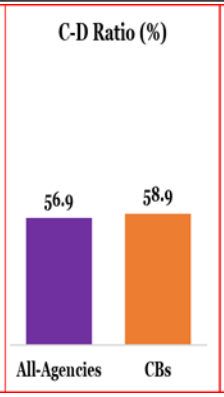


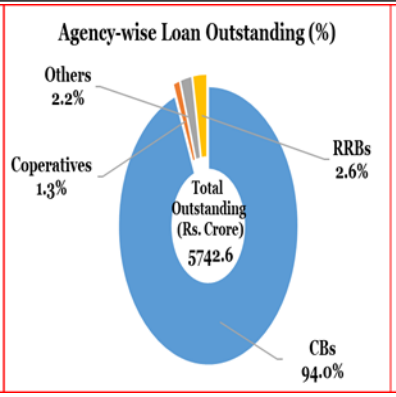


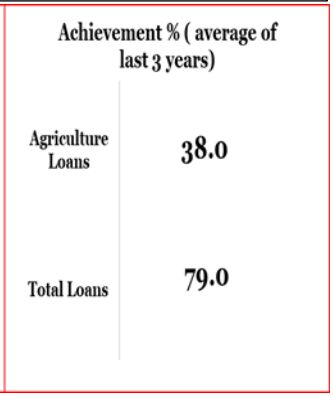


Agricultural Credit Details as on March 2019









Problems and prospects of Agriculture in Manipur

Manipur, one of the North-Eastern states of India, is known as the Jewelled Land. It is land-locked with a total geographical area of 22,327 sq. km, which is 0.7 % percent of the total land surface of India. Agro-climatically, it falls under the Eastern Himalayan agro-climatic zone with two broad topographic divisions, viz., plains and hills in which hills account for 90% (20,089 sq. km) of the total geographical area and the remaining 2238 sq. km area falls under valley region. Its estimated Gross State Domestic Product (GSDP) for 2020-21 at current prices was Rs 37,682 crore (Source: nagalandpost.com) growing at about 10 % annually from Rs. 12,915 crores in 2011-12. The primary, secondary and tertiary sectors contributed 17.31 %, 17.31 and 65.38 respectively to state's GSVA at current prices.

Similar to India's growth pattern, the share of agriculture has declined over time as the GSDP from agriculture has remained stagnant since 2011-12. This does not bid well given that nearly 53% of the main workers in the state are engaged as cultivators and agricultural labourers. It has humid sub-tropical to semi-temperate climate in the valley and semi-temperate to temperate climate in the higher altitudes. The valley is often referred to as the "Rice Bowl" of the state. Hilly areas are conducive for cultivating various horticultural crops and home to a wide variety of rare and exotic medicinal and aromatic plants. Since agriculture supports more than 50 % of the work force, development of the sector is essential to ensure prosperity in the lives of people of the state. Hence, it is important to highlights the problems and prospects of agriculture sector in the State.

Problems

i. **Dominance of Small Holders** - Arable land is limited and majority of the farming community has small and marginal land holdings. The total area operated is about 172 thousand hectares owned by 151 thousand farmers as per the agricultural census 2015-16. The average size of operational holdings has remained the same at 1.14 hectares in 2010-11 and 2015-16. Small and marginal land holdings account for 83 % of the total holdings which is 59.88 % of the total area as per census 2015-16.

ii. **Prevalence of Primitive Agricultur**e - The low utilization of modern inputs in agriculture has further reduced the ability of the farm households to cope with high risks in production and income. Natural calamities like floods, submergence, landslides, soil erosion, etc have further aggravated the problem resulting in low and uncertain agricultural productivity. There is also over-dependence on monsoon rains with poor irrigation infrastructure.

iii. **Inadequate Irrigation** - The major sources of water are Loktak Lake, rivers in the valley and springs in the hills. A working group constituted by NITI Aayog assessed that 54.4 % of 2581 villages of the state have reported springs. According to another assessment, about 47 % of the springs have dried up over time. The gross irrigated area is 186.14 thousand hectares out of the total cropped area of 362.96 thousand ha. Irrigated area under paddy accounts for 31.9 % of the total area of 180.21 thousand hectares.

iv. **Declining Livestock Population**- It has a high demand for animal products due to dietary habits. However, livestock population in the state has declined severely over the years as revealed by successive quinquennial Livestock Census. Also, expectantly, production of meat, milk and eggs have declined over time. Fish production, however, has increased at an annual compound growth rate of 5.83%. The growth, however, is inadequate since fish production of 32 thousand tonnes is well below the demand of over 50 thousand tonnes.

v. **Horticulture needs support** - Among fruits, banana, pineapple and citrus take a major share in area and production. Banana is a native to this region. Pineapple is grown on hill slopes and Giant Kew and Queen are the two leading varieties grown in the state. The average annual production of fruits and vegetables during the year 2017-18 was 4.69 and 3.32 lakh tonnes, respectively. Area under horticulture crops is

declining for some of the crops. Further, many plantations are old and hence, need replacement with high yielding varieties.

Prospects

i. **Horticulture and Floriculture** - Horticulture can be a game changer owing to its ideal conditions for growing a variety of fruits, vegetables and flowers. Hill districts are suitable for good quality fruits, vegetables and spices like orange, kiwi, pineapple, ginger, turmeric, passion fruit, and litchi. It is a home to a variety of orchids. Mushroom cultivation is another potential activity. Value chain development in these segments while encouraging agro processing is the need of the hour to ensure higher share for producers in consumer's rupee. The Mega Food Parks can transform the processing landscape in the state.

ii. **Cane and Bamboo Industry** - With about 3,268 square km of area covered by bamboo forests, Manipur is one of India's largest bamboo producing states and a major contributor to the country's bamboo industry. Since cane and bamboo are abundantly available. An effective intervention for skill up-gradation, appropriate product designing, quality control, credit supply through PPP, organized marketing and raw material supply arrangements will transform this traditional sector into a highly remunerative market-oriented activity, generating more employment and income.

iii. **Agro-Processing** - Gifted with suitable agro-climatic conditions, it is home to various food and cash crops, fruits and vegetables. The soil is fertile and suited more particularly in the hills for growing of different fruits and vegetables. Organic farming is the most sought-after practice in the hill areas. Pineapple, passion fruit and mushroom naturally grow are also commercially cultivated. Bamboo shoot, ginger and turmeric are available in plenty. The State Government has given special impetus to farming for pineapple, passion fruit, mushroom, etc. on a massive scale. Many agri-horticultural crops when processed, have promise of export. On this count, various preparations of pineapple, passion fruit, bamboo shoot, mushroom and ginger have attracted wide markets outside the State. Processing for extracts of spices, medicinal and herbal plants is another area of focus for agro-based industry.

iv. **Handloom Industry -** From time immemorial handloom industry has been playing a vital role in the state economy. The traditional skills of handloom weaving is not only a status symbol for the women-folk but also an indispensable aspect of the socio-economic life. Handloom weaving is by far the largest and the most important cottage industry with e most-superb quality products.

v. **Need for Institutional Credit Enhancement** - A designated officer may be authorised to issue "Land Utilisation Certificate" to Share Croppers, Tenant Farmers & Oral Lessees on the basis of which these farmers can access institutional credit. On-line access to land records (where Manipur Land Reforms & Revenue Act is applicable) should be made available to banks for assessing the credit requirements of the farmers and DC Office may issue printed copies of land ownership certificate to the farmers for the purpose of applying for bank loans. This will decrease the loan uptake from non-Institutional sources made available at exorbitant rate of interest.

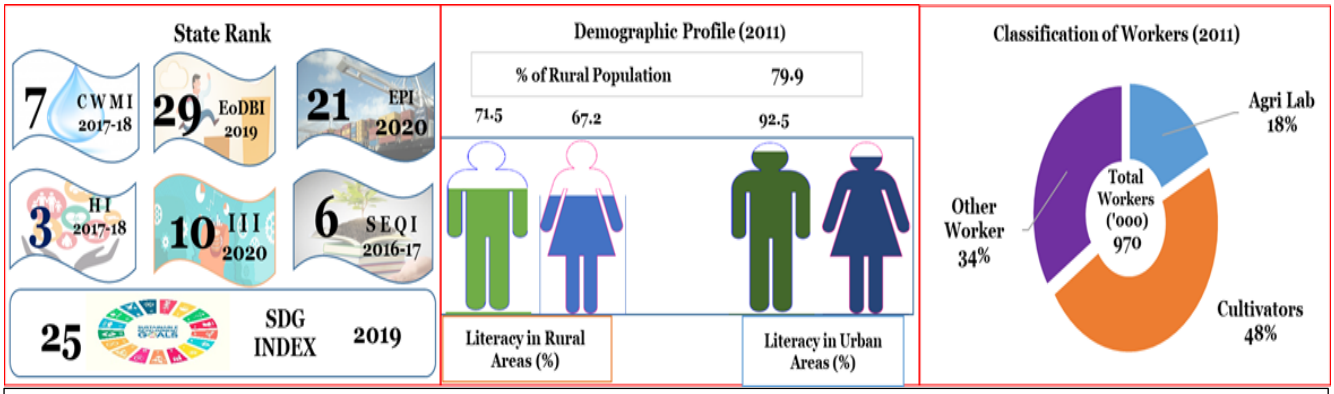
Conclusion: Manipur offers lot of scope for agriculture-industry linkages. Agriculture is capable of providing a wide range of raw materials for the industry, educated and technical work force to operate the industrial jobs, industry and service sectors providing additional sources of incomes and a never-seen-before variety of items for consumption for its people. Farmers to be given exposure for high-tech agriculture projects / techniques. Urban and peri-urban are potential areas for Hi-Tech Agriculture to meet requirements of fresh produce like vegetables, fruits and flowers round the year; areas with limited land, water resources, natural hardships, and small and marginal land holdings for adopting intensive production technologies.

Meghalaya

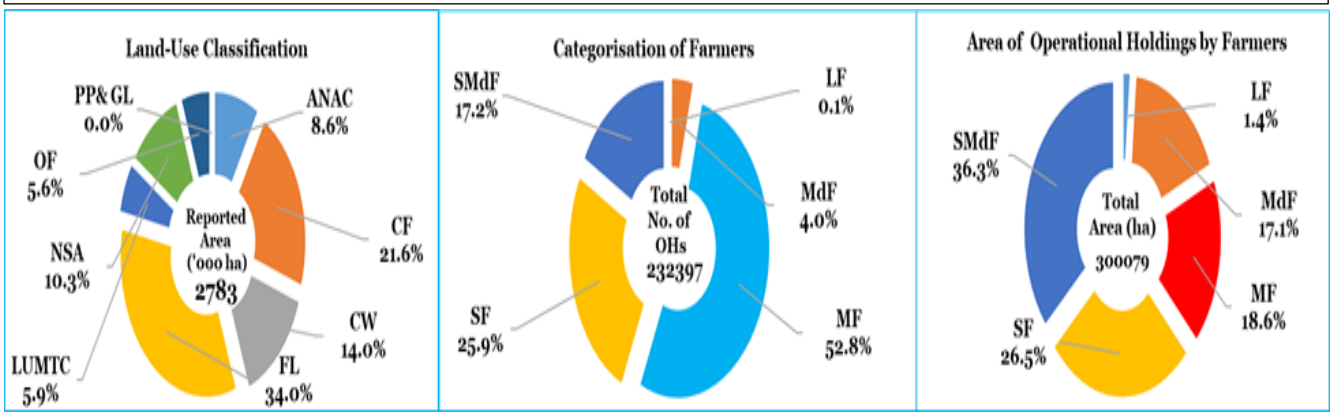
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
5	11	0	3979.3	46	6459

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
92174	36572	2243	2967	2371

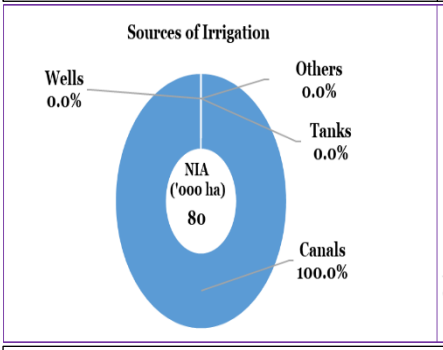
General Demographic Profile



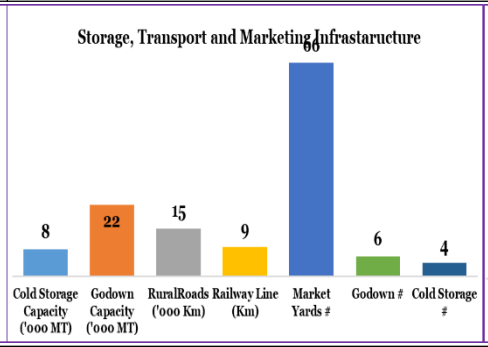
Land Usage (2015-16)

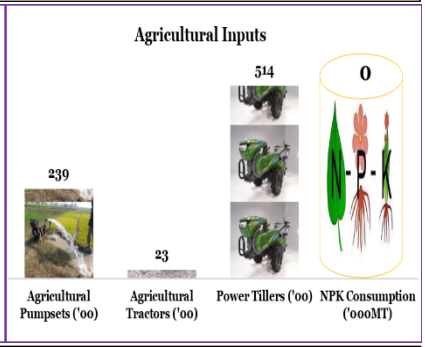


Irrigation

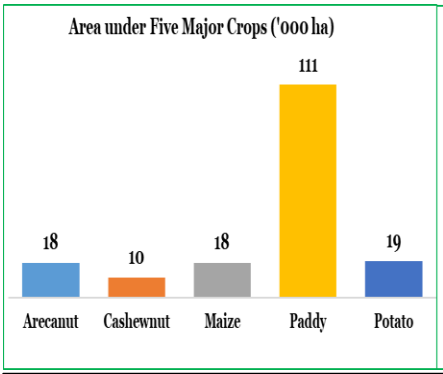


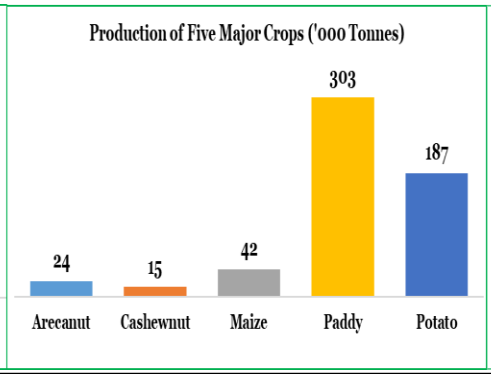
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

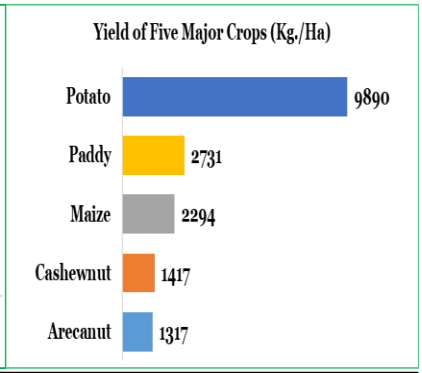




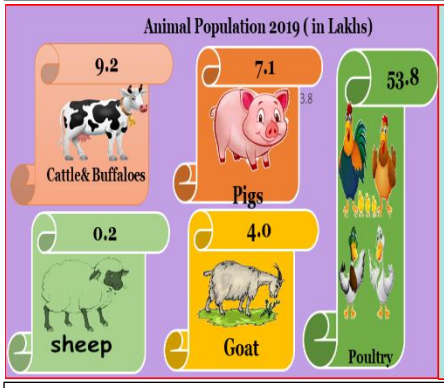
Area, Production and Yield of Five Major Crops 2018-19

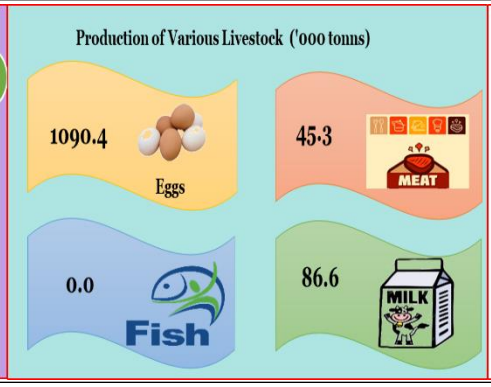


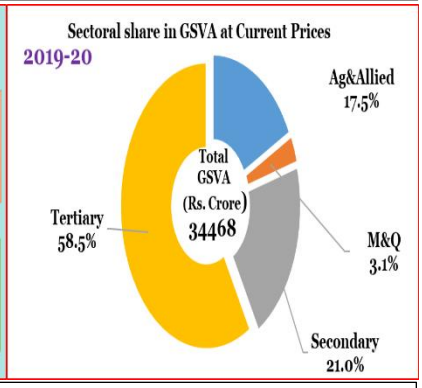




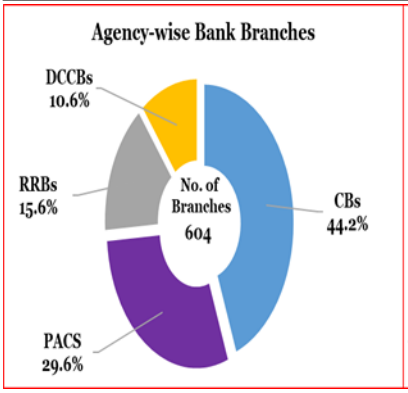
Allied Activities

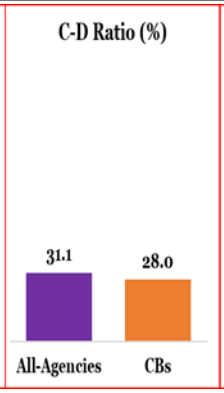


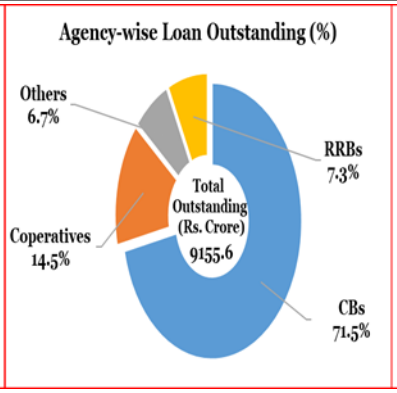


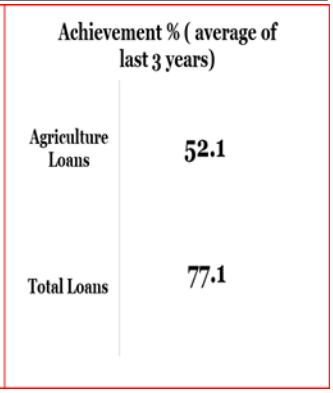


Agricultural Credit Details as on March 2019









Problems and prospects of Agriculture in Meghalaya

Meghalaya has five agro-climatic zones and produces a wide variety of horticulture crops which is an important source of supplementary income to the rural populace. With a vascular plant diversity of 3,331 and more than 300 varieties of orchids, it has a strong floriculture sector and is one of the leading states in the Northeast in terms of production and supply of cut flowers to mainland consumer markets. It is one of the leading north-eastern states in terms of production and supply of cut flowers to mainland consumer markets. Its climate, particularly, in the areas near Shillong in East Khasi hills district, is well suited for cut flower production. The existing industry is at a nascent stage and has the potential to be developed and promoted for export-oriented businesses.

Problems:

i. **Dominance of Small Holders** - Small and marginal holdings account for 81% of the total number of holdings while occupying only 62% of the total area. This results in low production and no surplus for investment in capital formation in agriculture.

ii. **Cropping pattern** - According to its land use pattern, the net sown area (NSA) constitutes 12% of the total geographical area with cropping intensity of 120% which is far less than the national average of 136%. Lack of resources for effective rain water harvesting and deterioration of the quality of water due to large scale mining of coals, limestone, including deforestation are some of the major reasons for such a low cropping intensity.

iii. **Banking Network and Poor CD Ratio** - Banking services are provided through a network of 417 branches, of which 298 branches (73%) comprised of rural/semi urban branches. The overall CD ratio dropped to 37% in June 2019 from the level of 38.46% in September 2017. against the national average of 75.6% for all commercial banks and the minimum stipulated requirement of 60%. Its continuous low CD ratio is indeed a matter of serious concern. There were as many as 12 commercial banks with CD ratio of less than 20%.

iv. **Regional Imbalances in Agriculture Credit Disbursement -** The regional bias in lending was visible with almost the whole credit limited to Ri Bhoi and Khasi hills districts. These two districts accounted for nearly 63% of the total advances in the state. East Jaintia with CD ratio of 15.38% and West Jaintia with 24.11% were at the bottom of the 11 states in the CD ratio ranking. It is one of the lowest credit absorbers in the country.

v. **Inadequate Storage Facilities**: The most common problem faced by farmers is the absence of adequate scientific storage facilities at the farm level. The indigenous methods of storage developed by the farmer do not adequately protect the produce from dampness, insect pest secondary infestation resulting in very high level of post-harvest losses. Farmers usually store potato in heaps on the ground usually adjacent to his house. As a result, considerable heat is generated inside the heap which aids in rapid degradation of produce quality.

Prospects:

i. **Conducive agro-climatic conditions**: Meghalaya has favorable agro-climatic conditions that support agriculture, horticulture and forestry so there is potential for development of these sub sectors. Priorities to Horticulture and Plantation crops like tea, cashewnut, coconut, banana, ginger, turmeric, arecanut, etc. should be given as these give higher revenue returns and encourage permanent cultivation having positive impact on the areas which hitherto had been under traditional *jhum* practices besides supporting food security.

ii. **Potentials for Productivity Enhancement**: Practicing of improved and modern methods of agriculture by the farmers, using of chemical fertilizers, plant protection measures and introduction of High Yielding Variety (HYV) seeds of paddy, wheat, maize etc., has huge potentials to enhance agriculture productivity in the state. As per RBI data of 2020, only around 47 kg/Ha of fertilizers (N+P+K) is consumed as compared to around 123 kg/Ha. At the national level.

iii. **Agriculture area Expansion**: It has only about 15% of geographical area as Gross Cropped Area (GCA) while national average is around 38% (RBI,2020). Moreover, around 28% is the irrigation coverage as compared to around 48% in the country. Thus, cultivable area can be expanded by proper land management and location specific technologies in rainfed, flood-prone irrigated areas, and increasing the utilisation of its irrigation potential.

iv. **Tea Cultivation**: Its climatic and soil conditions are very conducive for tea cultivation and against this backdrop the Government of Meghalaya had established two tea development centres one in Umsning in Ri Bhoi district and the other in Rongram in West Garo Hills district to demonstrate and promote tea cultivation.

v. **Bamboo Cultivation**: Bamboo is being used in all spheres of life such as housing, crafts, fence, etc. by tribal societies in Northeast India. In view of the economic importance of the crop and its capability to sustain the ecological balance, a Scheme on Organic plantation of Bamboo and Agar has been launched to generate livelihood opportunities for the rural communities while maintaining a healthy ecosystem in the upper catchment area.

Conclusion:

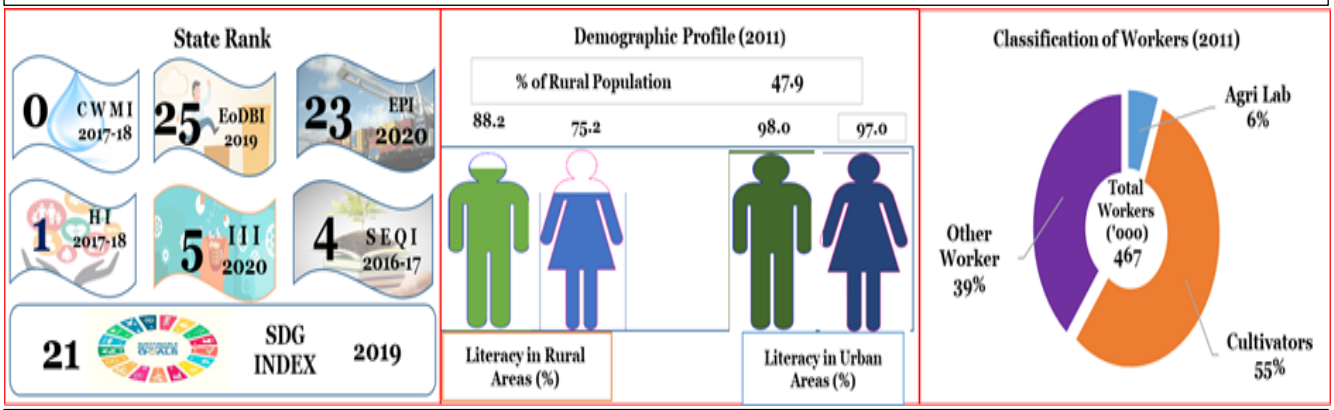
Agriculture / horticulture products like ginger, turmeric, potato, pineapple, orange, jackfruit and cashew offer potential for value addition and increased income to farmers for which the lack of common facilities and low level of production technology need to be addressed. There is a scope for promotion of Food Parks by both, private sector individuals/corporate or the State Govt. It requires focus on economic transformation in production of horticulture crops for growing marketable crops adopting appropriate technology to ensure adequate production and economic returns. Moreover, popularisation and commercialisation of indigenous fruits, plants, herbs and medicinal plants can be enhanced to increase farmers' incomes. Schemes for tea cultivation limited to the three districts should be extended to other districts. Emphasis on floriculture with special focus on cultivation of orchid which have export potential must be encouraged.

Mizoram

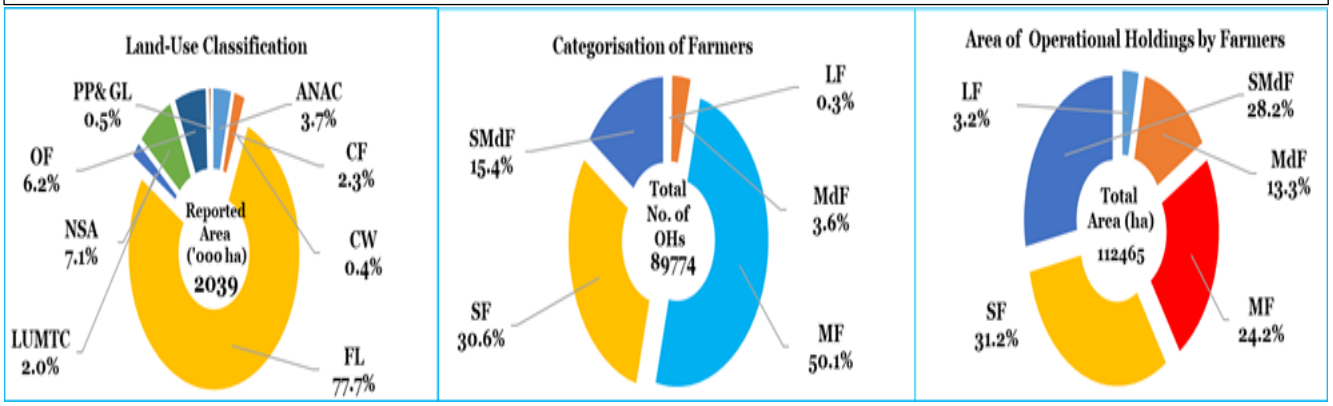
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	11	757	2530	26	704

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
147602	19520	2108	1097	525

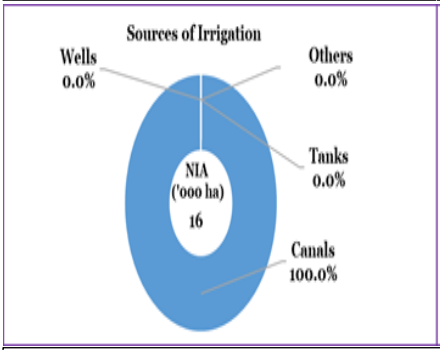
General Demographic Profile



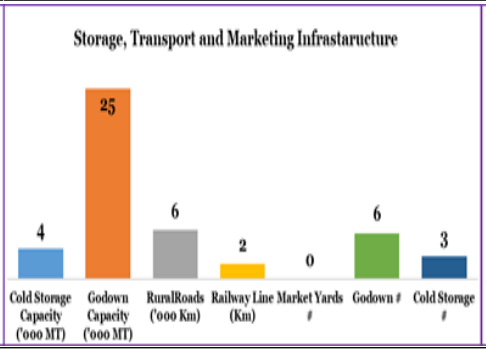
Land Usage (2015-16)

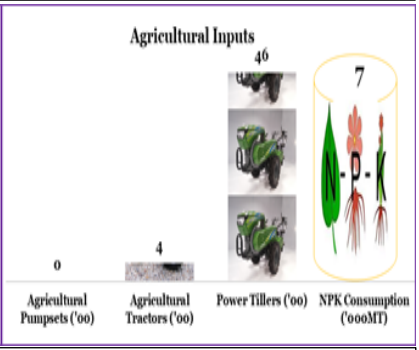


Irrigation

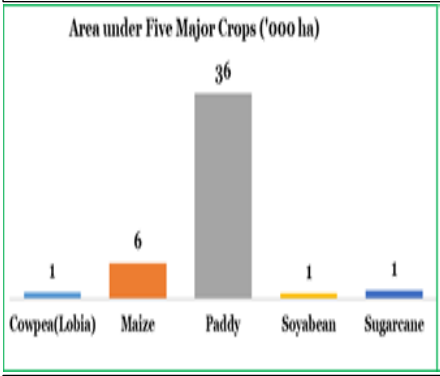


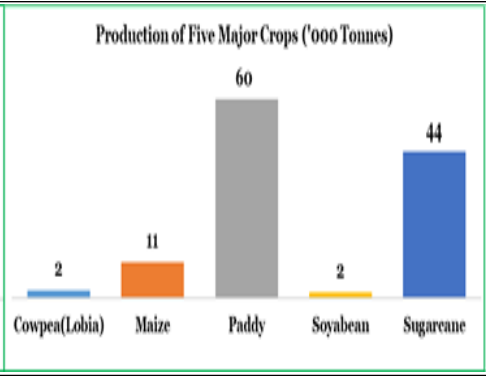
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

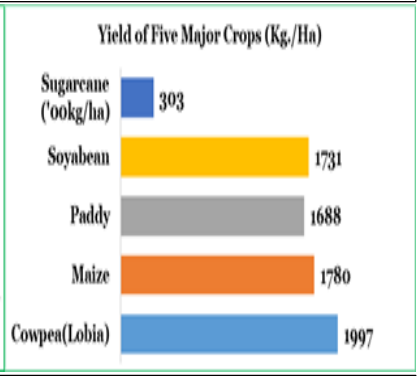




Area, Production and Yield of Five Major Crops 2018-19







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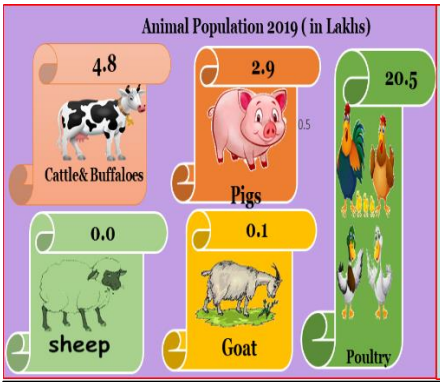

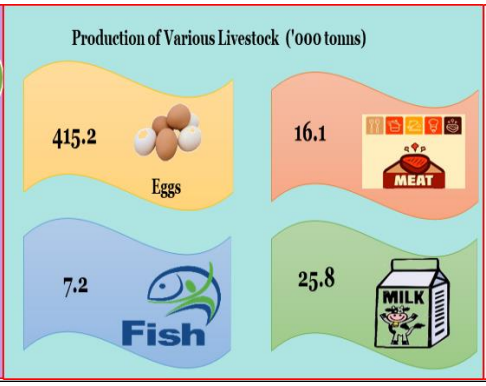

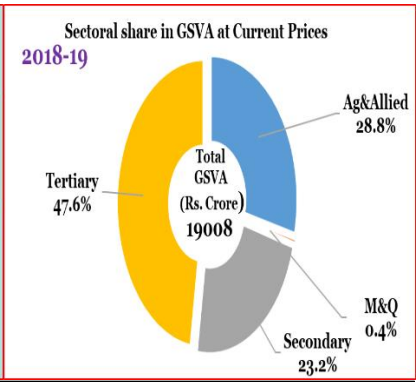

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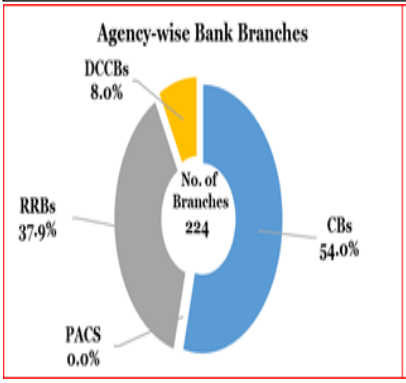
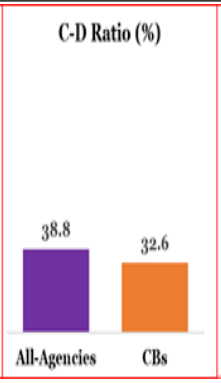
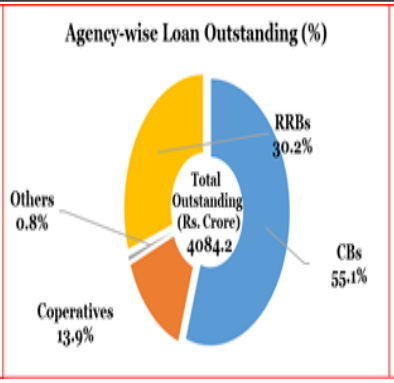
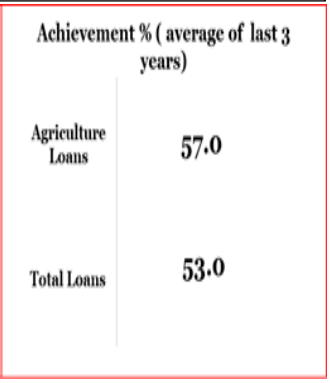








Problems and Prospects of Agriculture in Mizoram

Mizoram is one of the seven sister states of North East Region of India. It is a mountainous region with land of rolling hills, rivers and lakes. The hills are extremely rugged and steep with some plains scattered occasionally here and there. Though the tertiary or service sector drives the economy of Mizoram with 43.49% of the total GDP and industry sector with 24.84% of GDP, the economy is predominantly agrarian, with more than 60% of the population dependent on agriculture with 31.67% share in total GSDP. Paddy, maize, pulses are the major food crops. Mizoram offers a highly literate workforce with a literacy rate of 91.33%. Knowledge of English is an added advantage for the Mizo workforce. With improving road, rail and air connectivity and the establishment of trade routes with neighboring countries, trade facilitation has improved over the last decade.

Problems:

i. **Prevalence of Primitive Agriculture -** Primitive method of jhum cultivation predominates the state thus forcing agriculture to remain underdeveloped. In pre independence days Jhum cultivation (also known as Shifting Cultivation) was having a Jhum cycle of 5 to 10 years which now has been reduced to 3 to 5 years bringing more land under de-gradation and soil erosion. In spite of the efforts by the State government to bring more areas under settled cultivation the practice of Jhuming is still prevalent among many farmers in the State with 39% of rice production in the state contributed from Jhum areas. The long practice of Jhums also has prolonged effect on fish culture adaptation in rural areas of the state.

ii. **Small Landholding Size -** Mizoram mainly consists of hilly terrain (96.9%), with small areas of flood plains and river valleys (3.1%). 85 per cent of the land holdings in the state is in the category of small and marginal with average landholding size of 0.5 ha. Small landholding size and hilly terrain directly impacts the productivity of major crops in the state which is among the lowest in the world. It also reduces the scope of mechanization and capital investment in the sector.

iii. **Credit Issue –** Though the overall CD ratio in the State increased to 46.25% as on 31 March 2018 from 39.88% on 31st March 2017 it is relatively less than national average of 70%. Except Lawngtlai (105%) and Siaha (99%) districts, all the remaining districts - Aizawl (32.65%), Serchhip (50.80%), Mamit (44.39%), Kolasib (43.04%) and Lunglei (55.23%) districts, has CD ratio less than 60%. NPA has been a major issue for the banks in the state and as on 31st March 2018, agriculture sector had the maximum NPA of 8%.

iv. **Inadequate irrigation facility-** The State has total geographical area of 21,08,700 Ha of which net sown area is 2,18,608 ha and Gross cropped area is 2,21,430 ha leading to cropping intensity of 101% which is very low. The state has gross irrigated area of 19,775 ha which is just 9% of total gross cropped area. Such low figures can be attributed to the fact that high hills and extreme terrain make construction of major and minor irrigation project difficult and extraction of ground water for irrigation least feasible.

Prospects:

i. **Forestry and Bamboo Cultivation -** As per State of Forest Report 2017, the State has a vast area under forest which is 88.48% of total geographical area. The major forest produce are Bamboo, timber and fuel wood, etc. Mizoram has abundant natural

bamboo resources which covers around 31% of its geographical area and as many as 35 species of bamboo have been identified in the State. Low productivity of bamboo cultivation and connectivity to the bamboo cultivation are the major issues facing the sector. Recent policy of omitting Bamboo grass from the definition of tree, industrial park and Bamboo Technology Park can help vast bamboo resources to become an income earner for the State. Also, forest areas offer potential for development of eco-tourism, development of Sanctuaries in protected area in the State.

ii. **Animal Husbandry with focus on Piggery-** Livestock plays an important role in hilly State like Mizoram as crop production is still traditional. Amongst the livestock, pig farming is the most important activity and every family rears pig as backyard venture. Pig farming is one of the sources of cash income and also determines family's purchasing power, because of unprofitable "Jhum" cultivation practices. Promoting commercially organized farms and expanding the network of Artificial Insemination (AI) facilities for pigs especially in remote places can help reduce constant shortage of piglets which are currently brought in large scale from Myanmar, Tripura, Assam and Manipur. Piggery should be given due attention as it is reared by the poorest of the rural population. Network of rural animal health centers and veterinary hospitals in the state should be strengthened so that dairy and meat production can meet the growing demand, as majority of the people in the state is non-vegetarian and prefer cork and meat.

iii. **Horticulture-** Horticulture leads among few sustainable land-based activities for development of the State and its farmers because of its hilly terrain. Major fruit crops grown are pineapple, banana, lemon, orange, passion fruit, papaya, grapes etc. Ginger and turmeric are the major spices grown in the State. Approximately, 1.50 lakh ha. is covered under horticulture plantation, a large of horticulture potential area is still lying untapped indicating vast scope for settlement of jhumia families into permanent settlement as well as development of horticulture in the State. Horticulture crops produce in the state is mostly organic which the state should capitalize upon. Within horticulture, diversification into fruits like dragon fruit, passion fruit and strawberry, should be encouraged which can get more value for the farmers.

iv. **Handloom Industry-** Handloom is the most flourishing sector in the development activities. This sector is estimated to create thousands of employments. Availability of raw material, designs and marketing are the major issues affecting the growth of the sector. Appropriate state policy such as skill development in handloom can help overcome the problems as the state can capitalize on human resource 92% of which is literate. Mizoram has common international border with Myanmar & Bangladesh and traditionally, the trade has been taking place with these countries. Handloom sector in the state can capitalize on Look East policy for exports as the inhabitants of the South East Asian Countries also wear the same type of fabrics produced by local weavers. For protecting local handloom industries state support should be given for Geographical Indication registration.

Conclusions:

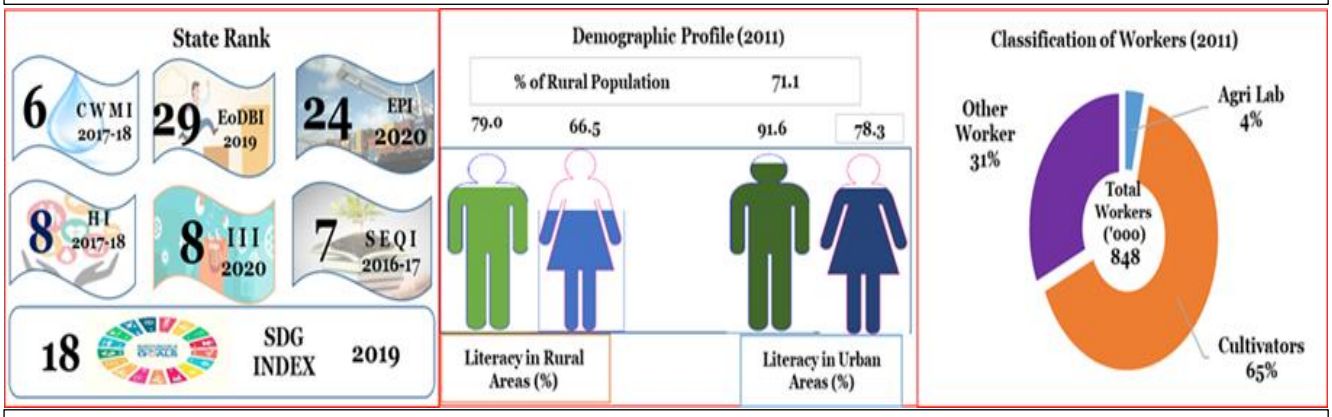
Because of its topography, the state has to face various problems in the path of economic growth. In spite of these hurdles, the state being endowed with natural resources creates ample opportunities for the population. With proper policy support, the rich human resource can be channelized for diversified activities which has a potential to generate income at the same time promote environmental sustainability.

Nagaland

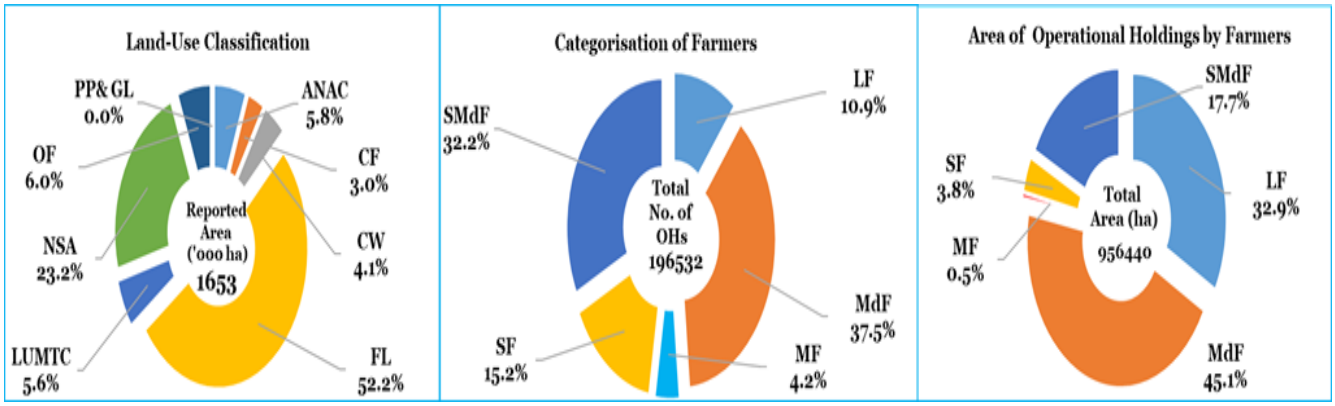
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
1	11	1238	1720.7	74	1428

Percapita Incoem (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
116882	27283	16579	1979	1408

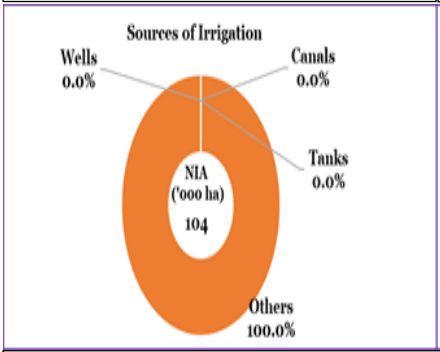
General Demographic Profile



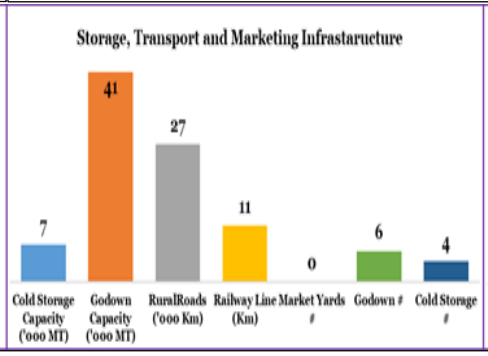
Land Usage (2015-16)

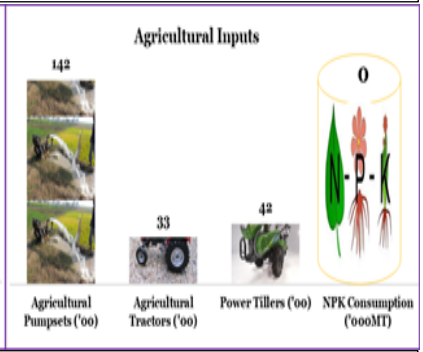


Irrigation

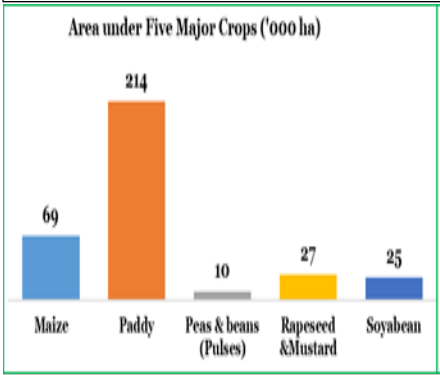


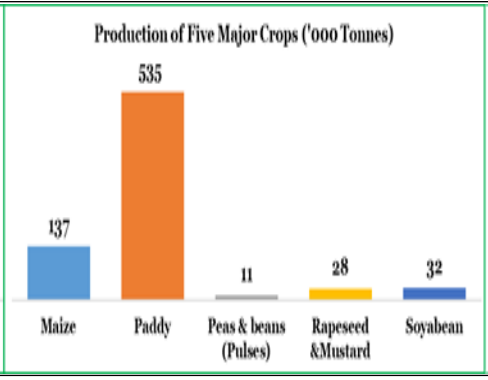
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

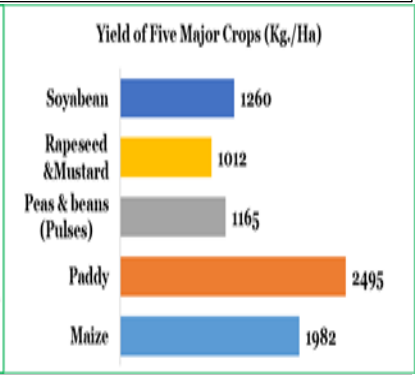




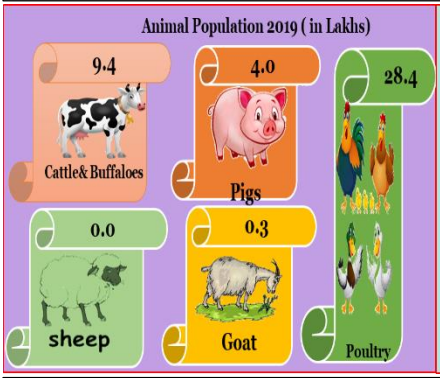
Area, Production and Yield of Five Major Crops 2018-19

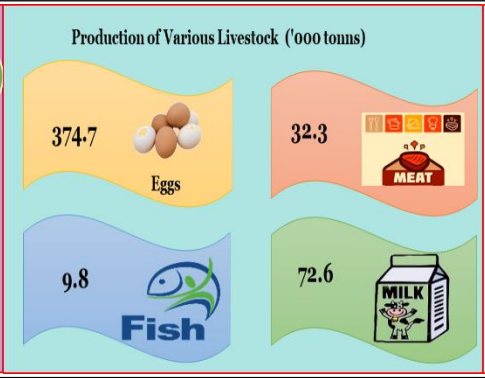


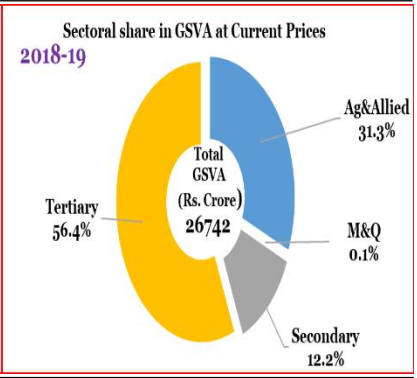




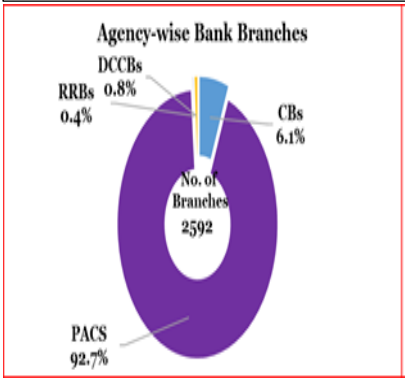
Allied Activities

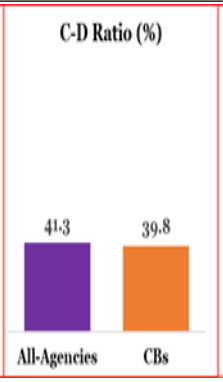


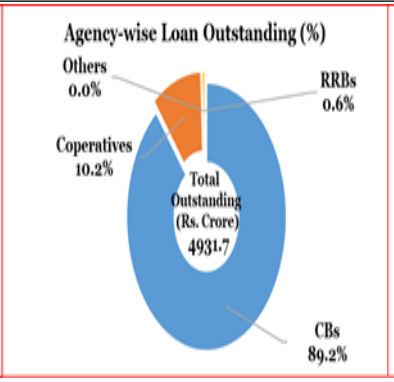


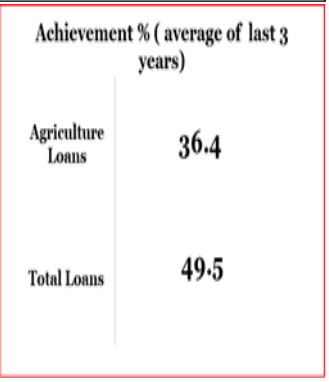


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Nagaland

Nagaland is a mountainous state characterized by humid to perhumid climate and shares boundaries with Indian states of Assam and Manipur. It is an agrarian State with over 71% of its population dependent on agriculture and its allied sectors. The primary sector at constant prices registered a share of 29.39% and the share of secondary sector marginally increased from 12.23% in 2017-18 to 12.25% in 2018-19 while the tertiary sector continues to be the most prominent sector with a share of 58.37% of the SGDP.

Gross Cropped Area (GCA) during 2017-18 was 5.30 lakh ha. An area of 1.45 lakh ha. was sown more than once during 2017-18. The cropping intensity registered an increasing trend during the last 5 years from 130 in 2014-15 to 138% (anticipated) during 2018-19. Net Sown Area (NSA) constituted 23.22% of the total geographical area of 16.58 lakh ha. Rice is the dominant crop and staple food of the people occupying about 61% of the total area under food grains cultivation and 71% of its total food grain production. Kharif is the main season with the production of 90% of cereals and commercial crops

Problems

i. **No formal ownership**: Absence of land records/cadastral mappings has resulted in lack of clarity about land ownership, which has hindered the flow of investment especially in the form of bank credit. Land reforms, cadastral survey and land settlement are imperative for not only addressing the issue of collateral for banks but also to facilitate speedy and equitable transition of shifting cultivation based tribal economies to modernized market-based ones.

ii. **Low agriculture productivity**: Due to subsistence farming and low farm mechanization, it has one of the lowest agriculture productivities. The concept of seed villages may be popularised to increase seed production replacing existing low yielding local varieties with improved high yielding varieties, meet the local demand with timely supply at reasonable costs.

iii. **High soil erosion**: The state govt. has estimated that out of its total geographical area, about 5.65% is prone to soil erosion hazards as 61% of the total households practice shifting cultivation in about 1.00 lakh ha of land. It is observed that 70% of soil depletion, degradation of land and deterioration of water resources are due to extensive practice of shifting cultivation without proper conservation measures.

iv. **Primitive Poultry Sector** - The status of organized poultry sector is too meagre, consisting of only 1.64% broiler and 0.80% layer to meet the demand of egg and meat of almost 100% of its non-vegetarian population. Urbanization and increase in purchasing power of the population lead to a greater demand for eggs and poultry meat. However, there are major constraints like non-availability of good poultry germplasm, lack of scientific knowledge of improved production practices and high feed cost, which deter poultry farmers from going for large-scale commercial poultry farming.

v. **Low Livestock Productivity** - Livestock farming in rural households is an age-old supplementary income activity as animal husbandry is mostly undertaken as a subsidiary occupation. Due to lack of large-scale development programmes and unscientific animal husbandry practices coupled with low quality livestock reared by the people; the production potential of livestock has not been exploited to the desired level.

Prospects

i. **Sericulture**: Sericulture is an Agro-based Industry and has great potential to create more employment opportunities and upliftment of rural economy. Favourable climatic and topographic conditions has provided an opportunity to practice all the four varieties of silkworm races namely Mulberry, Eri, Muga and Tasar. Sericulture is thus regarded as one of the important sectors that offer good opportunity for solving the socio-economic problems as well as creating regular employment in the society.

ii. **Organic certification**: The farming system is largely 'Organic by default' which means that the farmers do not use fertilizers or other soil amendments and therefore, with time the soil loses its fertility leading to low productivity. Thus, "Organic by Default" may be converted into "Organic by Design", in which potential crops may be identified based on the market potential and brought under organic farming with certification, so that farmers may get better income through the sale of their produce.

iii. **Horticulture:** Given proper pre-&post-harvest infrastructure, food-processing industries based on organic horticulture produce have tremendous potential. It has a comparative advantage in the availability of fruits such as pineapple, plum, bananas, passion fruit and citrus fruits, bamboo shoot and exotic spices.

iv. **Medicinal & Aromatic Plants**: Due to the favourable agro climatic conditions, medicinal herbs and plants are abundantly available in the hilly regions. Scientific harnessing of this potential in the private sector could yield good results.

v. **Agro Forest Products**: It has been the major exporter of round logs, veneers, plywood and sawn timber to the rest of the country until the ban imposed by the Supreme Court. 'Tree farming' has been taken up on a massive scale and can be a major resource for industrial activity in the near future.

vi. **Bamboo**: It has 5% of the total stock of bamboo of the country and this resource holds immense potential for growth of commercial units for various products like bamboo mats, agarbatti sticks, handicrafts, blinds, etc. Under the Bamboo Mission, 34 bamboo clusters have been set up and are functioning under the guidance of the Bamboo Resource Development Agency of Nagaland.

vii. **Food Processing**: It is endowed with abundance of fruits, vegetables, maize and other agro-products, and has the potential to be a sunrise zone for food processing and other agri-businesses. It offers significant business opportunities in processing of fresh fruits, vegetables, medicinal and aromatic plants, spices and herbs in the agri sector and meat, dairy and apiary-based products in the food sector.

Conclusion

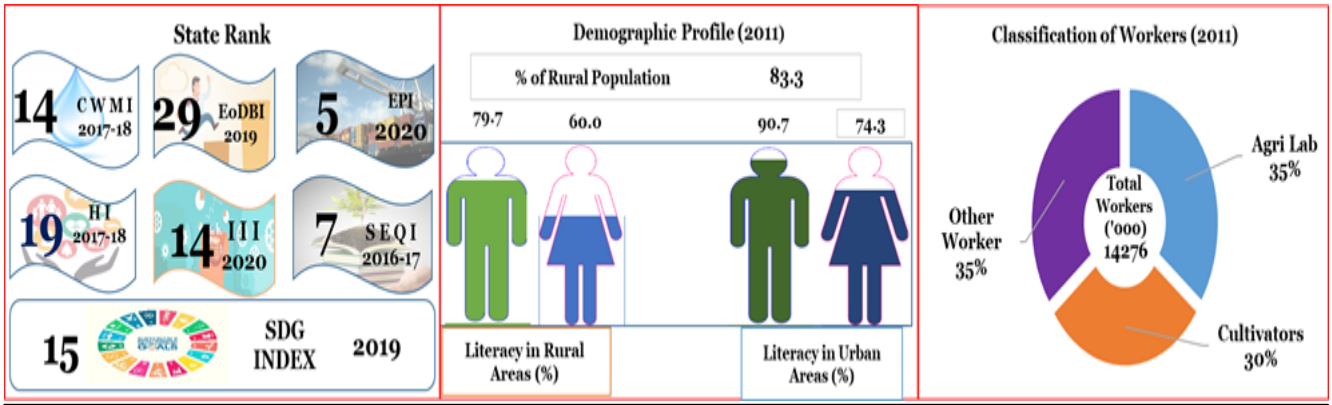
As the agriculture sector provides sustenance to over 70% of its population, it is imperative that the focus of development should be on increasing capital formation in the agriculture and allied sector through public and private sector investment. In the private sector, investment credit or long-term agriculture loans has been identified, as the major driver of private sector capital formation, and therefore an immediate thrust is required by banks to raise its share in the total agriculture credit in the state.

Odisha

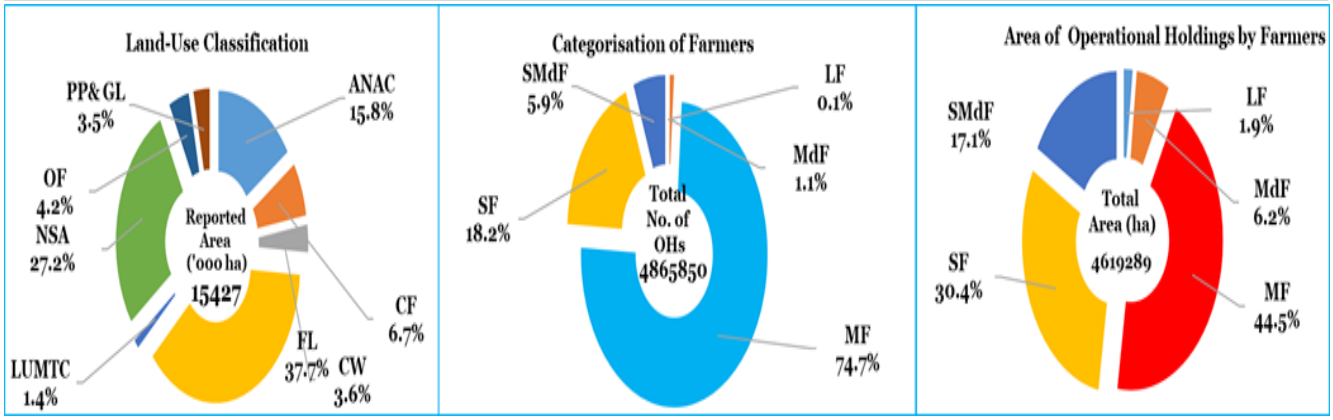
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
10	30	6802	1444.2	314	47677

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
106804	531374	15571	41974	34951

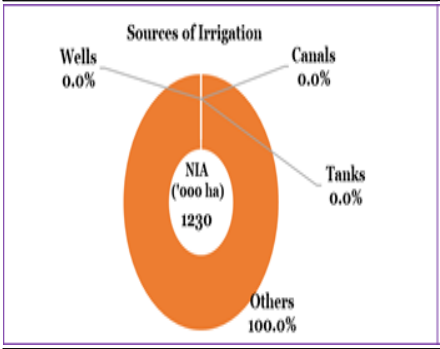
General Demographic Profile



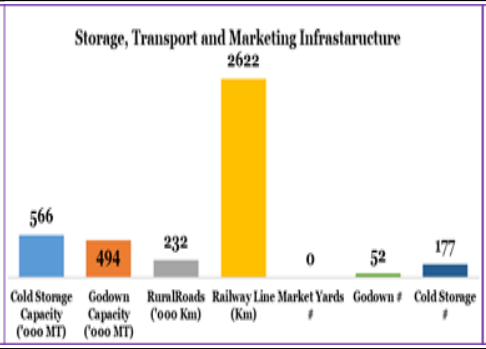
Land Usage (2015-16)

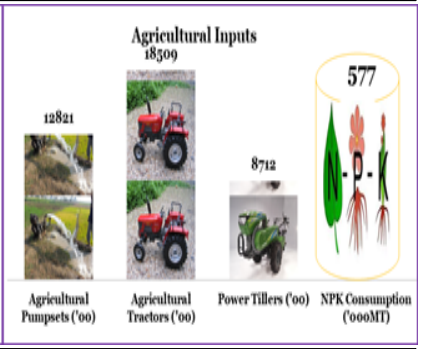


Irrigation

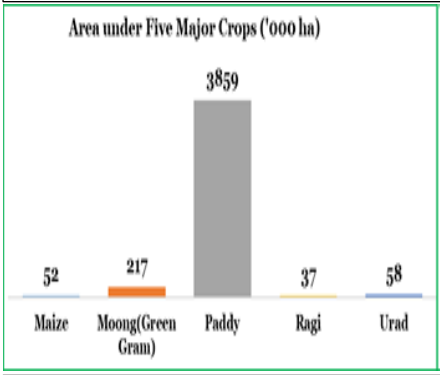


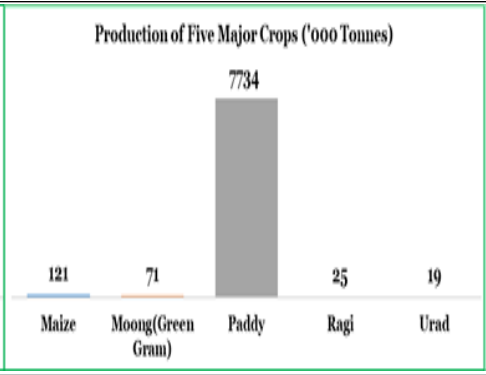
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

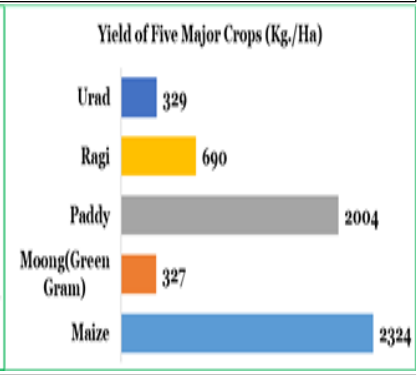




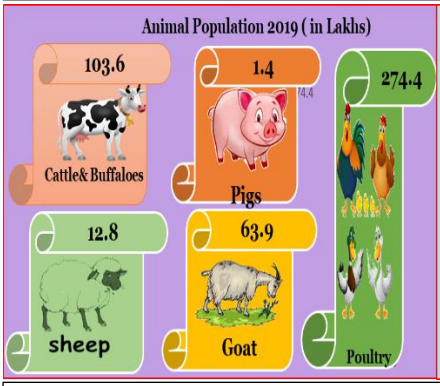
Area, Production and Yield of Five Major Crops 2017-18

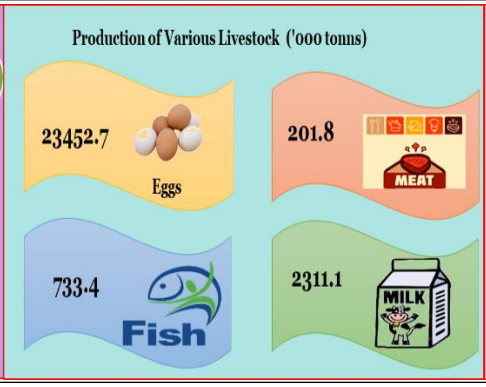


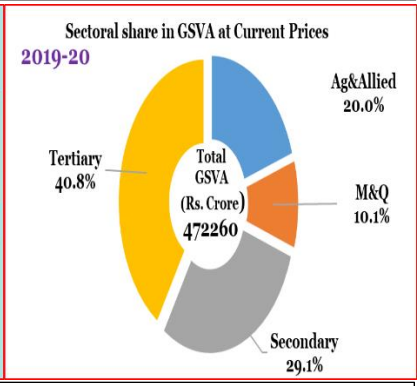




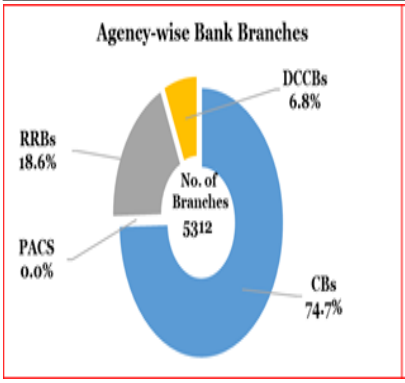
Allied Activities

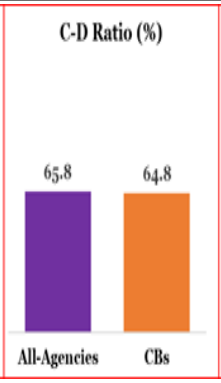


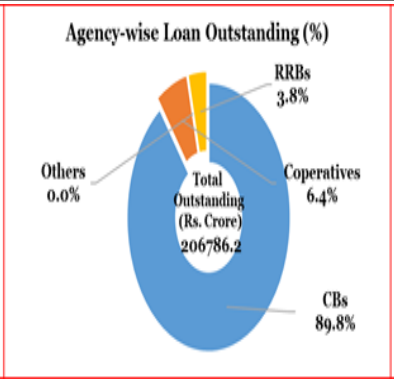


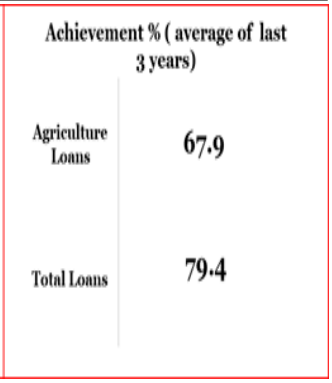


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Odisha

Odisha has a total geographical area of 155.71 lakh hectares of which total cultivated land is about 61.80 lakh hectares which constitutes about 39.69% of its geographical area. It is divided into 10 agro climatic zones. With a coverage of 35% of geographical area as the net sown area and with more than 60% of its workforce depending on it for their sustenance. During 2019-20, the share of agriculture, industry and services in the Gross Value Added (GVA) were 19.9%, 39.6% and 40.5% respectively. Odisha is among the few states that present a separate agriculture budget which shows the importance of the sector.

The cropping pattern is highly cereal dominated (67% of area) and rice is the principal crop of the State, accounting for over 60% of the total area under cultivation in 2017-18. As per Agricultural Census 2015-16, 92.97% of the farmers are in small and marginal category. The number of operational holdings is 48.66 lakh with operational area of 46.19 lakh ha.

Problems:

i. **Vulnerability to Natural Disasters:** Odisha is very vulnerable to natural disasters like cyclones. It has witnessed three major cyclones in the past 5 years. During the current year, coastal districts of Odisha were devastated by Extremely Severe Cyclonic Storm "FANI". It badly affected 159 blocks and 52 ULBs in 14 districts.

ii. **Prevalence of Marginal and Small Farmers**: Agriculture is dominated with marginal and small farmers. 92.97% of the farmers are in small and marginal category. The average size of land holding is 0.95 ha.

iii. **Low Productivity:** The yield of most of the crops were lower than the All-India average. Though the gap in productivity from All India level has been bridged, there is a need for directed policy intervention to increase the yield of all major crops.

iv. **Lack of Marketing Infrastructure**: Odisha is a low-cost producer of most crops but due to marketing problems (aggregation, accessibility and adequacy), the value realised by farmers is low. Due to a sharp rise in costs of production, driven mainly by rising labour costs, and a slower growth in the market value of produce, Odisha farmer's profitability in most crops has been shrinking

v. **Low Seed Replacement Ratio:** The SRR for most crops grown in the state, barring paddy, are lower than the national average as well as below the desired level of 33 per cent, especially in case of self-pollinated crops.

vi. **Low Fertiliser Consumption:** Odisha's per hectare fertiliser consumption is amongst the lowest in the country at 56.8 kg as compared to an all-India average of 123 kg and the ratio of NPK is 5:2.1:1 compared to the all-India average of 6.7:2.7:1.

Prospects:

i. **Horticulture:** The State Government is keen to increase agricultural production and raise productivity through improved land and water management, well-functioning agricultural markets, application of better technology, higher public and private investment and effective implementation of ongoing programmes in agriculture and allied sectors. Although the State economy has been diversifying and service sector grew substantially over the years, agriculture and allied sector continues to be the high priority sector with huge growth potential. Government is giving more importance to horticulture as it is less affected by natural calamities.

ii. **Doubling of Farmers' Income:** The Government has set a target to double the income of the farmers by 2022 by reorienting its interventions in the farm and non-farm sectors towards income-centric measures. Govt may formulate specific strategies from production to post production stage to enhance the income of farmers through various important interventions like rain-water harvesting, crop diversification, Integrated Nutrient Management (INM), varietal replacement, development of fisheries and livestock sector and emphasis on agro processing sector.

iii. **Krishak Samridhi:** It is the Pilot Project launched by NABARD in Nischintakoili block of Cuttack district for doubling of farmers‟ income and to improve economic status of farmers through convergence with various government programmes and bank loan. The major objective of the project is to increase the average income of the beneficiaries by 60% over a period of 3 years. The major interventions include line sowing, line transplanting, soil testing, green manuring, self-sufficiency and varietal replacement through Seed Village Programmes, farm mechanisation, crop diversification, pest and disease management programmes, integrated farming and promotion of non-farm activities, etc.

iv. **Capital Formation in Agriculture Sector:** The most important pre-requisite in the agricultural sector is the need to encourage farmers to make long-term investment. Investment in agricultural infrastructure like cold storage, warehouse and irrigation facilities, and other infrastructure are required to ensure sustainable growth in productivity and output in agriculture and allied sector. Public Sector is the most important source of capital formation in agriculture in Odisha, however private investment needs to be substantially enhanced through bank credit.

Conclusion:

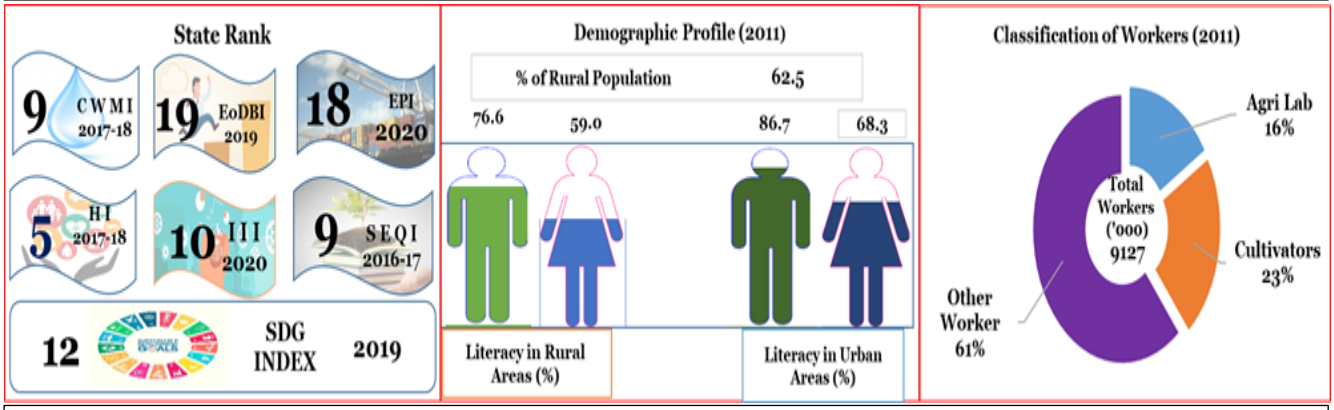
The new strategy of agriculture growth and diversification of agriculture from traditional crop cultivation to horticulture, etc. would require more investments on cold storage, rural roads, communication, marketing facilities, warehouses etc.

Punjab

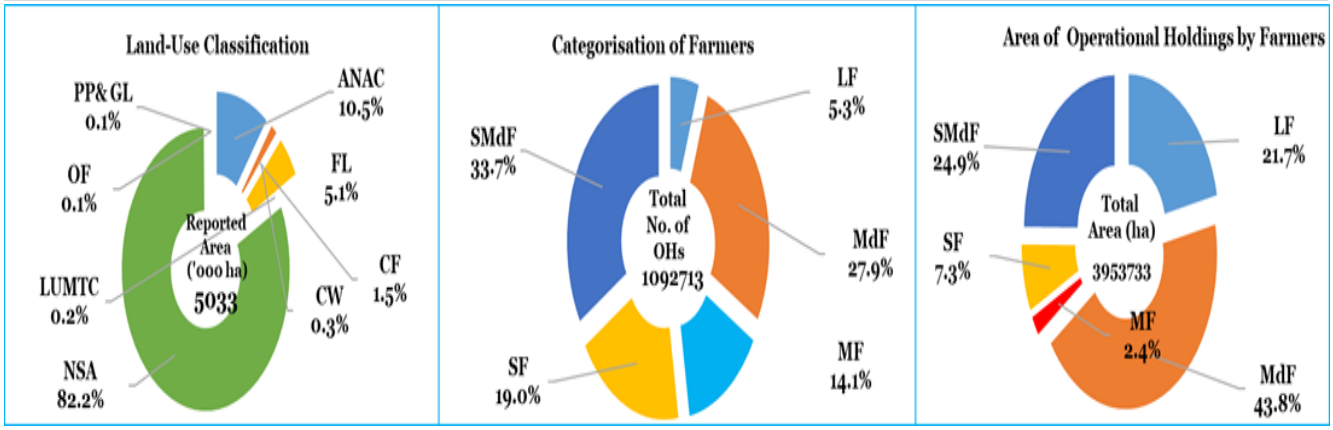
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
6	22	13028	597.4	150	12581

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
166830	574760	5036	27743	17344

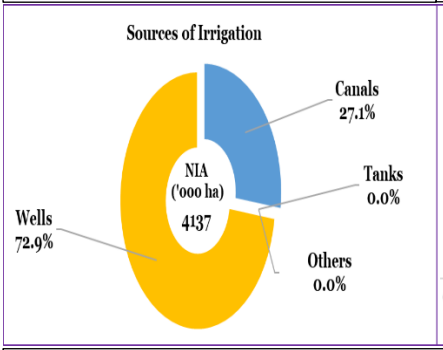
General Demographic Profile



Land Usage (2015-16)



Irrigation



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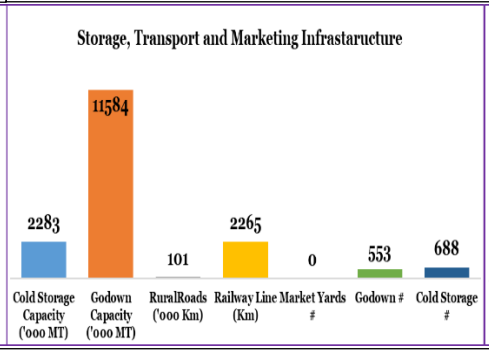
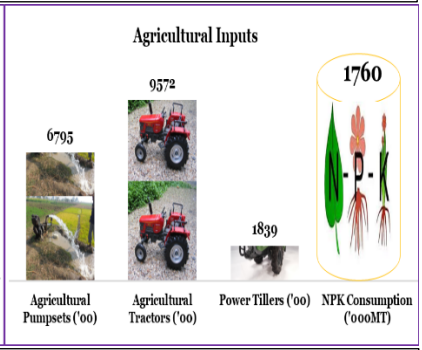
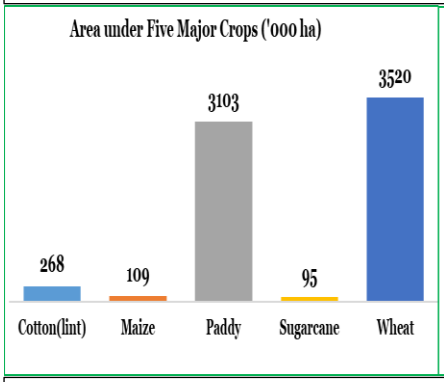
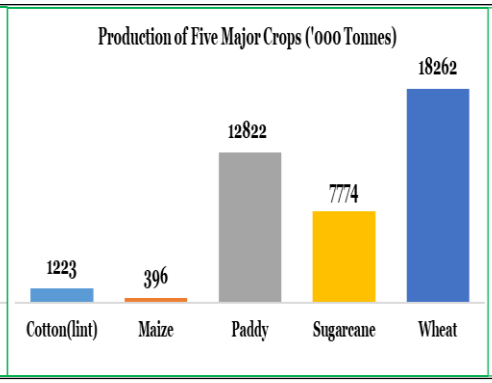
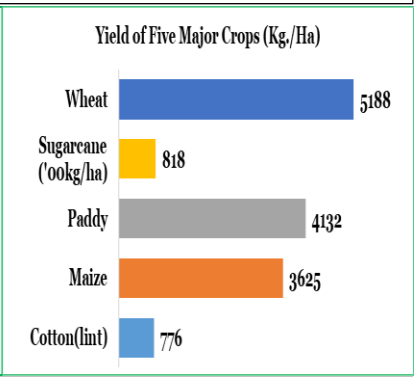




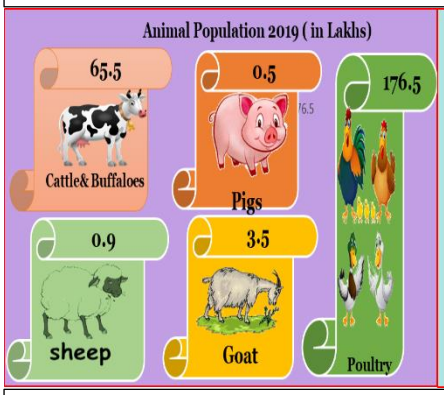
Area, Production and Yield of Five Major Crops 2018-19

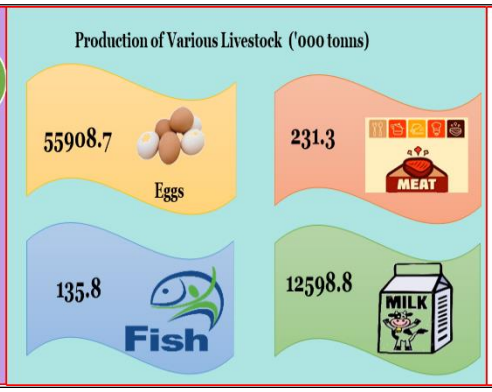


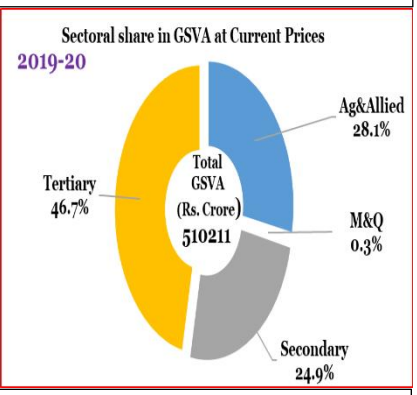




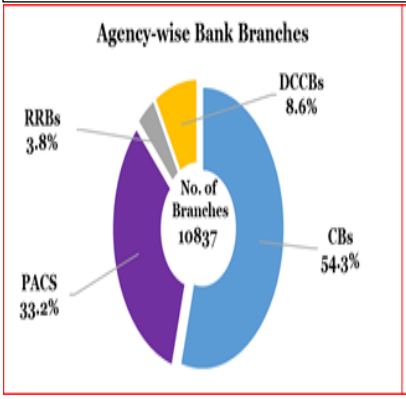
Allied Activities

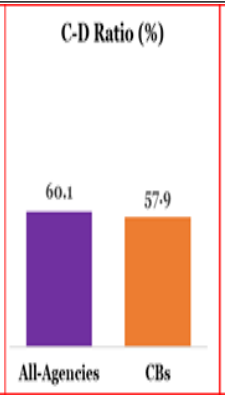


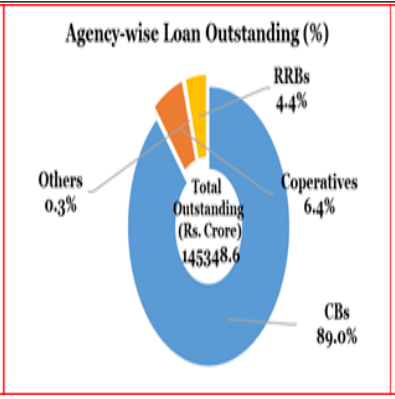


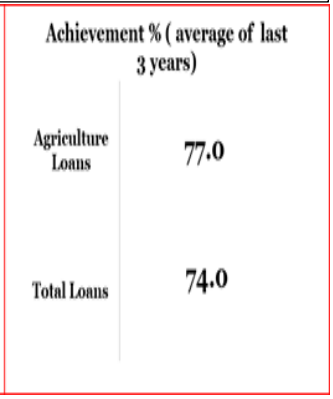


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Punjab

Punjab, the land of five rivers is situated in the North-West part of the country. It is considered to be the bread basket of India. While its share in total geographical area of India is 1.53%, its share in the central pool of rice and wheat was 25.53% and 35.45 % respectively in 2018-19. The per capita income at current prices was estimated at ₹ 1,53,061 for Punjab in 2018-19, registering an increase of 8.13% over the previous year. According to NAFIS survey in 2016-17, among the states of India, agricultural households in Punjab has the highest monthly average income.

The agriculture and allied sector of Punjab is highly mechanized, contributing 28.1% of the total GSVA (2019-20) and providing employment to 26% of its workforce (2017-18). Agricultural yield in Punjab was the highest across India for rice and wheat in 2017-18. It made remarkable progress in terms of irrigation, mechanisation, use of chemical fertilizers, etc., with nearly 100 % of net sown area under irrigation, 189% cropping intensity and highest farm power availability (2.6 KW/ha) (India 1.84 KW/Ha). The state ranks 7th as a gross producer of wheat in the world and in case of rice, its market surplus is 2nd only to Thailand.

Problems

i. **Wheat Paddy Cycle -** The critical issue weighing down agriculture diversity and growth in Punjab today is the dominance of paddy and wheat crop rotation cycle leading to water table depletion, loss of soil fertility, strain on marketing infrastructure, piling up of huge food grain stocks, stagnating production, burning of paddy straw and decline in profitability of the farmers over the long run.

ii. **Stagnating yield-** As per the Punjab's Economic Survey 2020-21, area under paddy in 2019-20 increased while the production decreased.

iii. **Lower area under high value Horticulture Crops -** The area under fruits and vegetables has remained constant over the years. It constitutes 0.99 % (77.75 thousand ha) and 2.6 % (2.08 thousand ha) of the total gross cropped area in 2014-15 respectively, lower than the national average.

iv. **Higher NPK usage -** The State uses an alarming 39:9:1 NPK ratio against the national average of 7:3:1 and the ideal ratio of 4:2:1. National average of phosphate consumption is 15-20 kg/acre while it is 200kg/acre in Punjab.

v. **Degraded Soil Health -** 39% of the state's soil is completely degraded while 50% of the soil is acutely low in nitrogen and 25% low in phosphorus content. Further, the organic carbon content which was about 4% in the 1970s, before the 'green revolution' – has fallen to approximately 0.4%. As per BARC study, uranium concentration in soil was 91.77ppm.

vi. **Depleting Water Tables** The annual extractable groundwater resource of Punjab is 21.58 billion cubic metres (BCM) whereas the current annual extraction is 35.78 BCM (Ministry of Jal Shakti). Groundwater resources in 110 blocks are overexploited. In Malwa region water is contaminated with nitrate, thus increasing the risk of health hazard such as Blue Baby Syndrome.

vii. **Higher level of indebtedness -** For every agriculture landholding, there is 2.22 active KCC accounts which points towards use of ST loans for unproductive purposes. As on 31 March 2019, the total nos. of outstanding KCC accounts are 25.42% more than the total nos. of 19.35 lakh cultivators in the state.

viii. **Stubble burning- environmental hazard and impact on soil fertility -** The burning of stubble in the harvesting season causes loss of soil fertility and overall environment pollution. The heat generated from burning penetrates 1 cm into the soil,

elevating the temperature to 33.8 to 42.2 degree Celsius. This kills the bacterial and fungal populations critical for a fertile soil.

ix. **Commission agents -** Commission agents also double up as informal source of credit to farmers and charge exorbitant rate of interest from farmers, besides getting flat rate of 2.5% as commission on food grains procurement.

Prospects:

i. **Crop Diversification:** The state should focus on crop diversification and the state should buys crops other than wheat or paddy at MSP, deploy its own state bodies or aligns with private agencies to procure such products.

ii. **Farm Mechanisation**-Water harvesting, conservation machinery such as Laser Land Leveller, ridge and bed planter, Inter-crop planter, pneumatic precision planter, sugarcane harvester, cotton picker, tractor operated pond excavation machinery, drip and sprinkler irrigation system also need to be promoted.

iii. **Digitisation of land records** -Digitization of land records will help in curbing the menace of higher percentage of informal credit sources.

iv. **Stubble burning**-An approach to overcome the problem of stubble burning in the State is to procure the straw from the farmers by a common agency, densify the straw, and improve its nutritive value by various treatments like urea and molasses treatment or to constitute it into complete feed blocks by various methods of treatment and fortification.

v. **Dairy:** The state followed the crossbreeding programme very extensively to improve the productivity of cows as a result of which more than 80% indigenous cows have been replaced by crossbreds. The daily milk production of lactating cows increased from 7.09 kg in 1990 to 10.36 kg in 2009. It has the potential to be the major source of germplasm of Holstein Friesian, Jersey crossbred, Sahiwal cattle and Murrah/Nili Ravi buffaloes in the form of semen and bulls to other states.

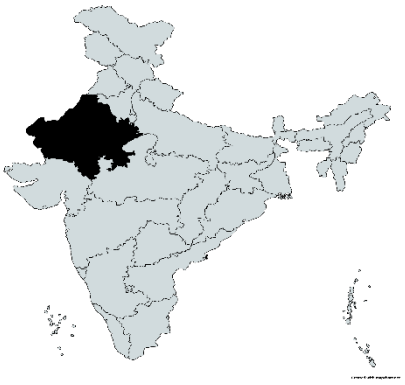
vi. **Investment in Cold Storage:** Construction of Cold Storage and investment in Cold Chains to improve remuneration from vegetable and fruit farming is needed.

vii. **Commission Agents**- Controlling of Commission Agents through regularising their fees and operations to provide legitimate dues to the farmers is needed. As substantial number of farmers are still dependent on Arthtiyas for their credit requirements, there is a need to regulate their transactions. As of now only 7 commodities, including potato, *kinnow* and peas, amongst horticulture crops are listed in e-NAM. It may include other potential horticulture crops under the same to give a flip to the sector.

viii. **Fisheries -** During the year 2018-19, fish production was 85,513 tonnes. Requisite thrust on quality fish seed of culturable varieties, adopting suitable village ponds under fish farming, and developing saline/brackish water fish farming is required. Shri Muktsar Sahib, Ferozepur, Mansa, Fazilka and Faridkot district experiences logging and salinity of soil and are appropriate areas for introduction of saline fish farming.

Conclusion: - Punjab has experienced high growth rate in agriculture and it has become a hallmark of success of green revolution in India. However, overtime growth rate and yields growth have hit a plateau and agriculture does not seem sustainable in its current form. In this scenario, radical change is required in terms of crop basket, technique of production and diversification in income source from dairy, etc.

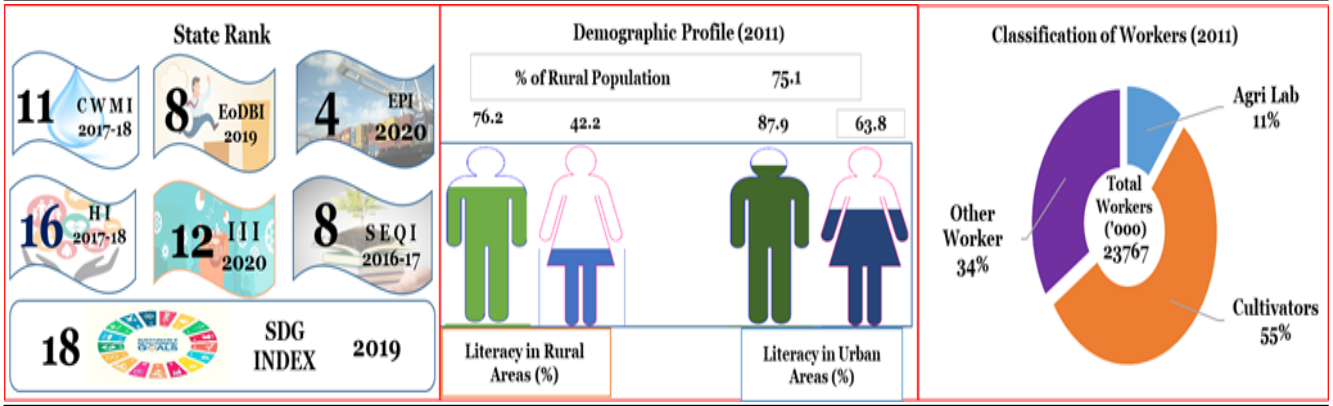
Rajasthan



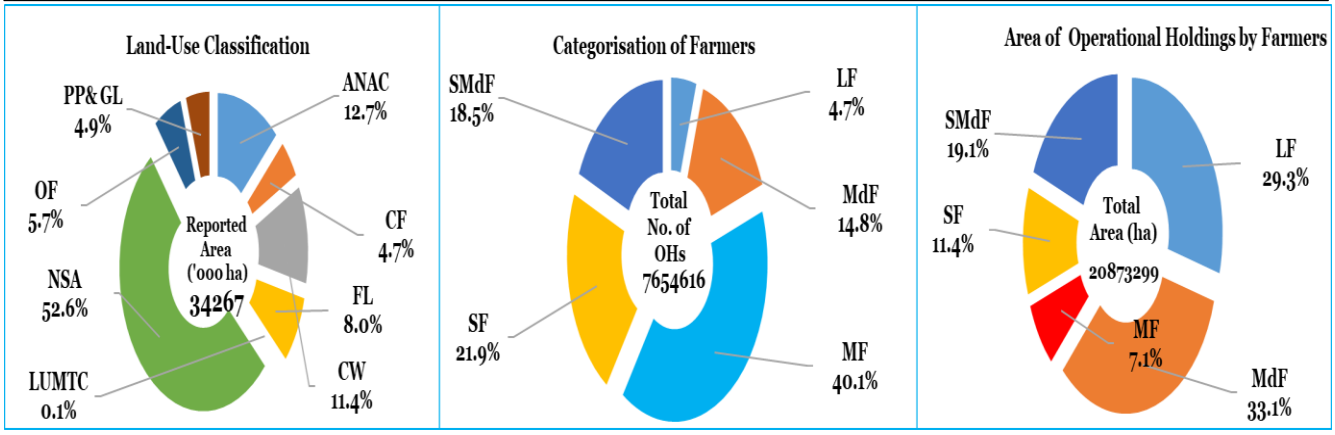
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
10	33	9891	463.2	295	44672

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
118159	1020989	34224	68548	51500

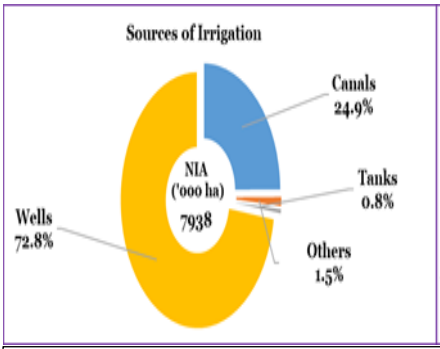
General Demographic Profile

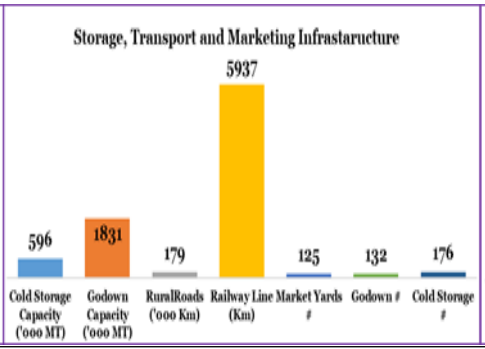


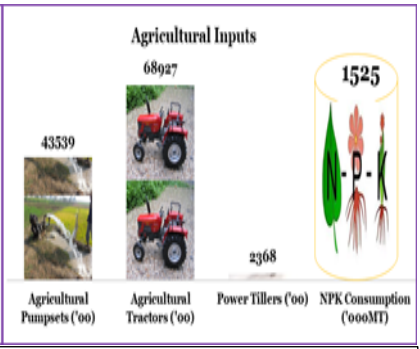
Land Usage (2015-16)



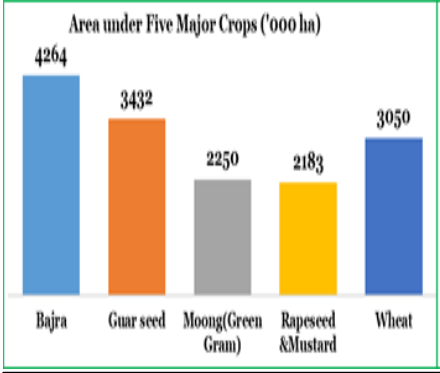
Irrigation	Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

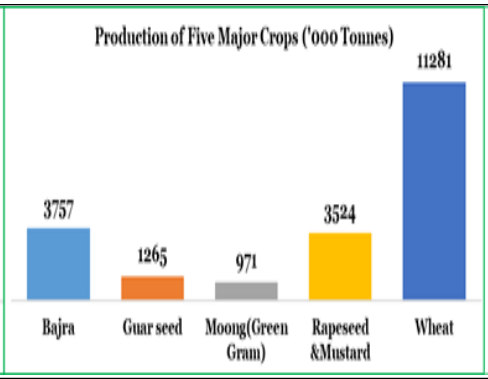


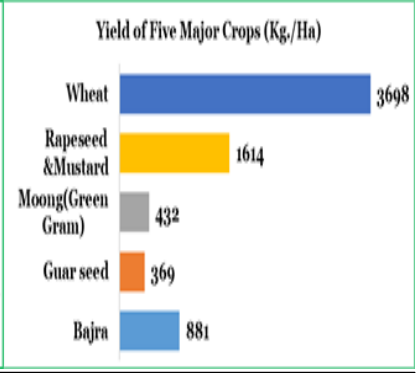




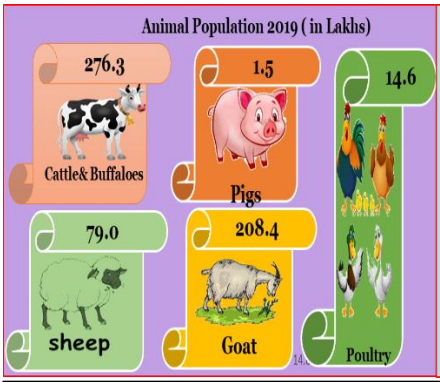
Area, Production and Yield of Five Major Crops 2017-18

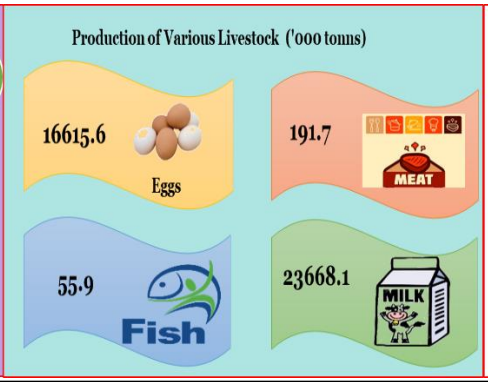


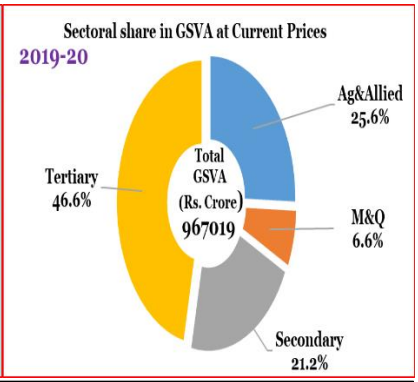




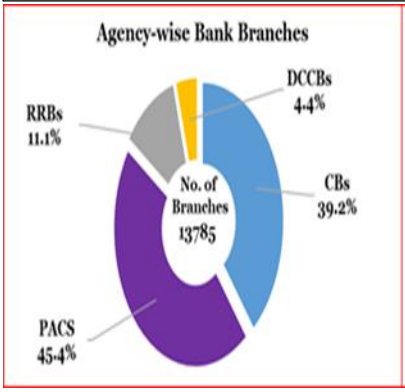
Allied Activities

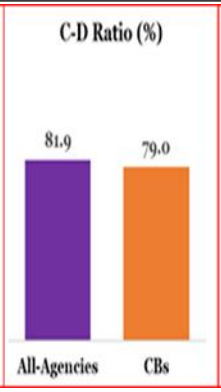


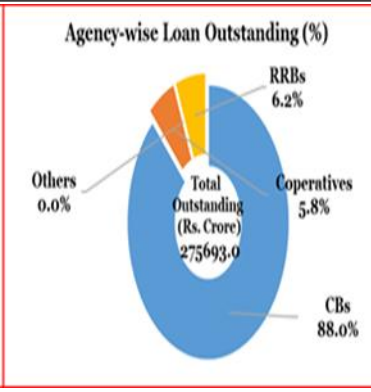




Agricultural Credit Details as on March 2018







Problems and prospects of Agriculture in Rajasthan

Rajasthan is the largest State of India in terms of geographical area. It is situated in landlocked north-western part of the Indian Union covering arid Great Desert and parts of semi-arid climatic zone. In the west, it is relatively dry and infertile due to Thar Desert. In the south-western part, the land is wetter, hilly, and more fertile.

Agriculture and allied sector are the backbone of the State's economy. Its seventy-five per cent population resides in the rural areas and about 62 per cent depend on agriculture and allied activities for their livelihood. Its total GSDP is Rs. 929124 crores at current price in which contribution of agriculture sector is 24.82 percent. Capital formation in agriculture sector was just 4.51 percent of gross fixed capital formation in 2018-19. It is evident that capital formation in agriculture is low as compared to other sectors like Manufacturing, Construction and Electricity, Gas, Water Supply. Rajasthan produces 5.49% of the nation's total food grains and 21.31% of its oilseeds. It is also the largest producer of Mustard and Bajra and second largest producer of Groundnut in the country. It contributes 42.41% and 46.46% of total production of Bajra and Mustard respectively at all India level. Since agriculture sector plays a major role in the State's economy, it is important to highlight problems and prospects of its agriculture.

Problems:

i. **Dominance of Small holders: -** Marginal and small farmers hold 18.55% of the total area and their land holdings account for 62% of the total land holdings. The major reason behind this fragmented landholding is the topography of the region. Around 60 percent of total area is fall under Thar Desert, which is not very suitable for agriculture.

ii. **Rainfed Agriculture: -** Agriculture in the state is largely dependent on rainfall. Only 43.94% of the net sown area is irrigated. Uncertainty of monsoon is critical condition for farmers and losses the seasonal crop production. So, the dependency on monsoon is major crisis facing by agriculture sector. Fertilizer use is very low due to uncertainty of monsoon, impeded drainage, desert soil and lack of awareness about the fertilizer in time, non-availability of fertilizer in time. As majority of farmers cultivate in rainfed situation and face the challenges of frequent crop failures this directly impedes investment in capital formation.

iii. **Low Productivity: -** At present, agriculture has become a relatively unrewarding profession mainly due to low productivity, unfavorable prices and practically very little addition. Besides increasing the overall system productivity, the challenge is also to appropriately reduce the cost of cultivation. In several regions, cultivation of crops alone cannot provide livelihood.

iv. **Inadequate Infrastructure: -** The most important cause of decline in agricultural production is the unfavorable environment for agricultural growth. Most parts are suffering from inadequate infrastructural facilities such as electrification, post-harvest infrastructure like warehouses / godowns, cold storages, grain silos, road map, and inadequate credit facilities in rural areas.

v. **Land and Soil issue:-** Though Rajasthan is the largest state in India, huge area is affected by salinity and alkalinity problem, nearly 10 lakh ha and nearly 50 lakh ha comes under waste land category. Lack of Awareness and availability of organic manure and bio fertilizers and irrational use of fertilizers has led to deterioration of soil health.

Prospects

i. **Large Farm Size:** - Average size of land holding is 2.72 ha as against all India average of 1.08 ha. Rajasthan State is having largest no of medium (20.35%) and large (42.8%) holdings in the country which offers huge investment opportunities at farmer level through bank credit. These holdings offer opportunities for enhancing area under fruit & vegetable cultivation by promoting suitable schemes and integrated farming system.

ii. **Reclaimation of Waste Land:** - Large Area can be reclaimed as there is a sizeable percentage of area which is waste land and is affected by Salinity and Alkaline issue. This also increases the scope of Farm Mechanisation.

iii. **Livestock Sector:** - It has a sizeable livestock population and the production is growing steadily. Livestock density is higher and is tilted in favour of dairy animals. It is notable that the milk yield of most breeds has improved and is now estimated to be above the national average. The state has largest population of cattle, sheep and camels with 12% of milk, 31% of goat meat & 34% of wool to the country's production. About 35% of the income of farmers comes from dairy and animal husbandry. In arid areas the contribution is as high as 50%. The animal products like meat, wool and leather are the main source of income. Rajasthan is the largest producer of wool in the country. In arid western region, livestock farming essentially works as an insulating factor against vagaries of drought and famines, and provides a kind of stability and sustainable livelihood to the rural poor. The sector has potential to create employment in rural areas with least investments as compared to other sectors.

iv. **Agro-Forestry: -** Agro-forestry has great potential to contribute significantly to achieve sustainability in agriculture while optimising its productivity & mitigating climate change impact. The State has forest cover only on 8 percent of land which needs to be increased by promoting farm forestry, social forestry and forest cover on culturable wasteland thereby offering huge employment generation opportunities for SHGs/JLGs/FIGs through convergence with MNREGA

v. **Production of Crops suited to Climatic Conditions: -** It has a huge prospect in new crops like dragon fruits, date palm, custard apple and olive cultivation. These crops are suitable to its climatic conditions and have greater market value than traditional crops.

vi. **Horticulture: -** It is the largest producer of seed spices like fenugreek, coriander, cumin, fennel etc., with third position in total production of spices and fourth in kinnow production in India. It also leads in Mehandi and Isabgol production. Mango, Aonla, Pomegranate, Guava, Orange, Kinnow, Ber and Malta are the other horticulture crops. There are 29 Nurseries in the state. The production of fruits, vegetables and spices was 736350 MT, 1699584 MT and 1392301 MT respectively during 2017-18. Horticulture has potential of increasing employment generation, agro processing and other ancillary activities.

Conclusion

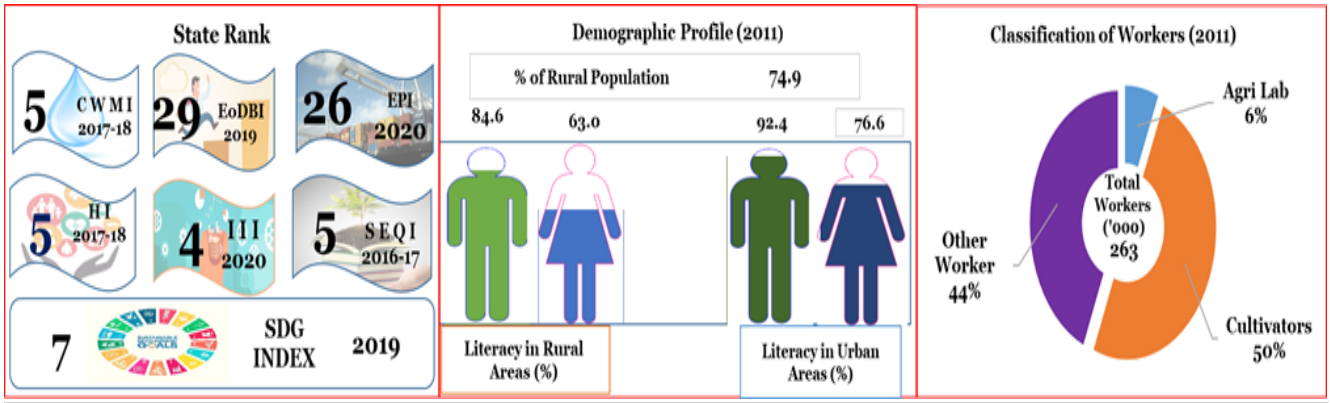
Rajasthan has a huge potential in horticulture crops like olive, dates, Aonla, Pomegranate, etc. which needs to be promoted. In agriculture sector, the present-day challenge is to ensure overall farm prosperity. The challenges are also to provide proper institutional mechanisms and undertake organizational and management reforms for overcoming the felt constraints coming in way of the farm prosperity. Crop diversification and better irrigation infrastructure can improve the situation of its farmers.

Sikkim

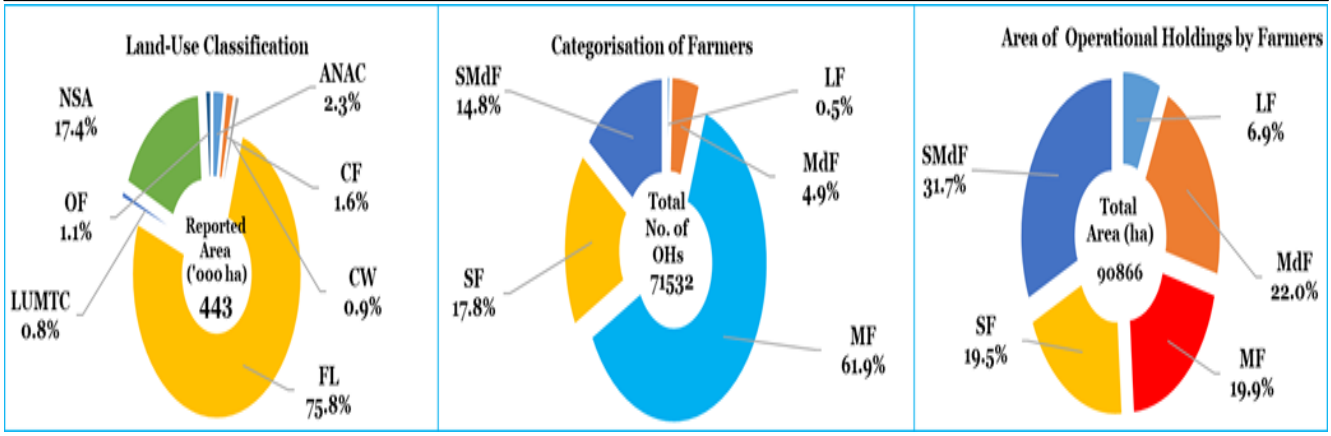
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	4	176	2540.3	31	989

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
425656	32496	710	611	457

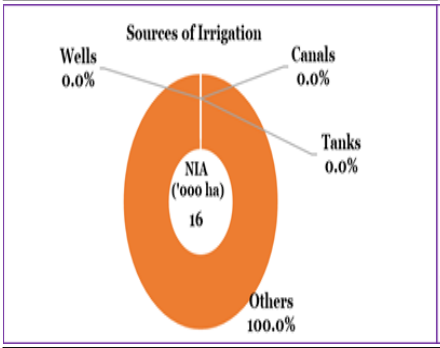
General Demographic Profile



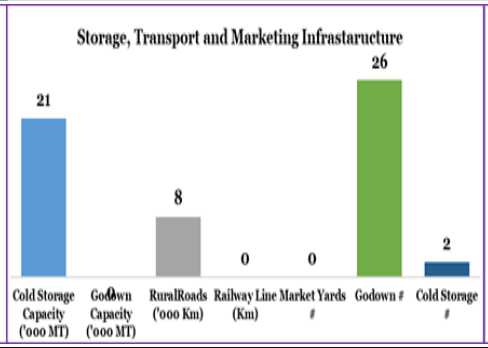
Land Usage (2015-16)

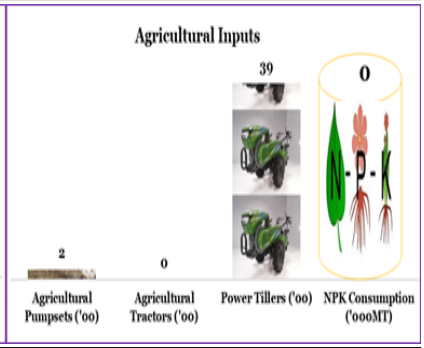


Irrigation

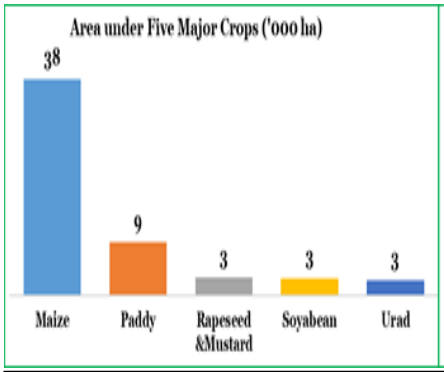


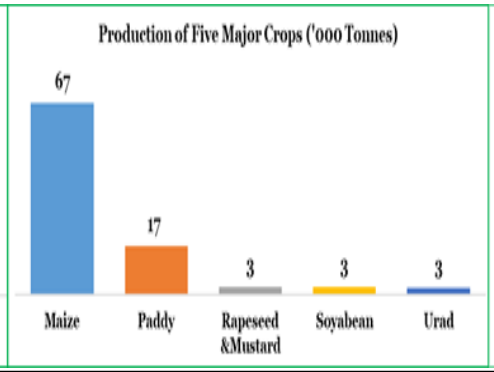
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

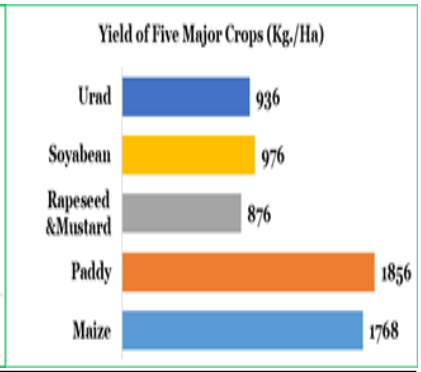




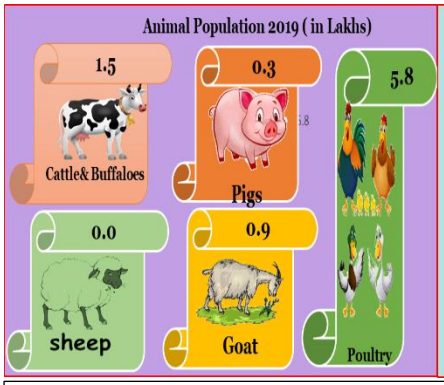
Area, Production and Yield of Five Major Crops 2018-19

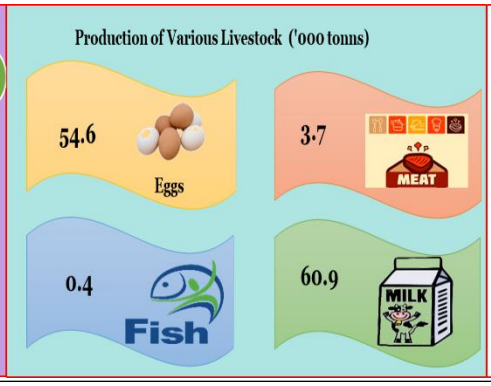


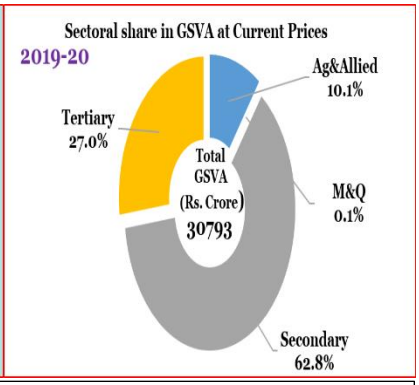




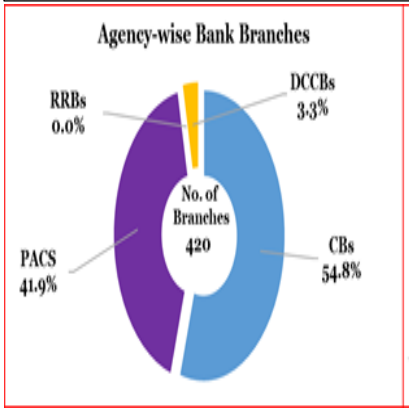
Allied Activities

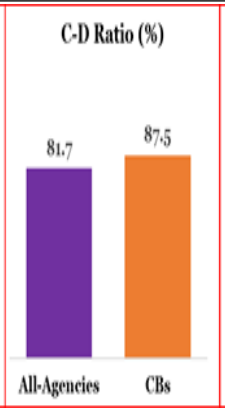


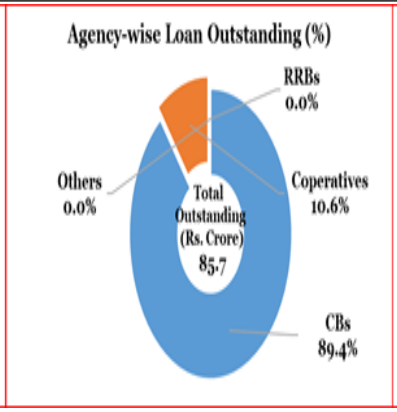


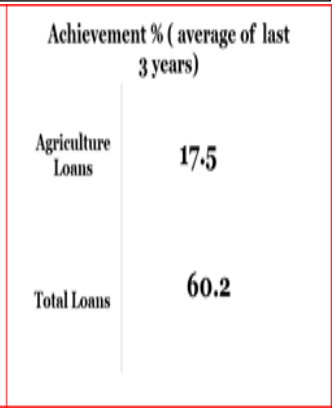


Agricultural Credit Details as on March 2019









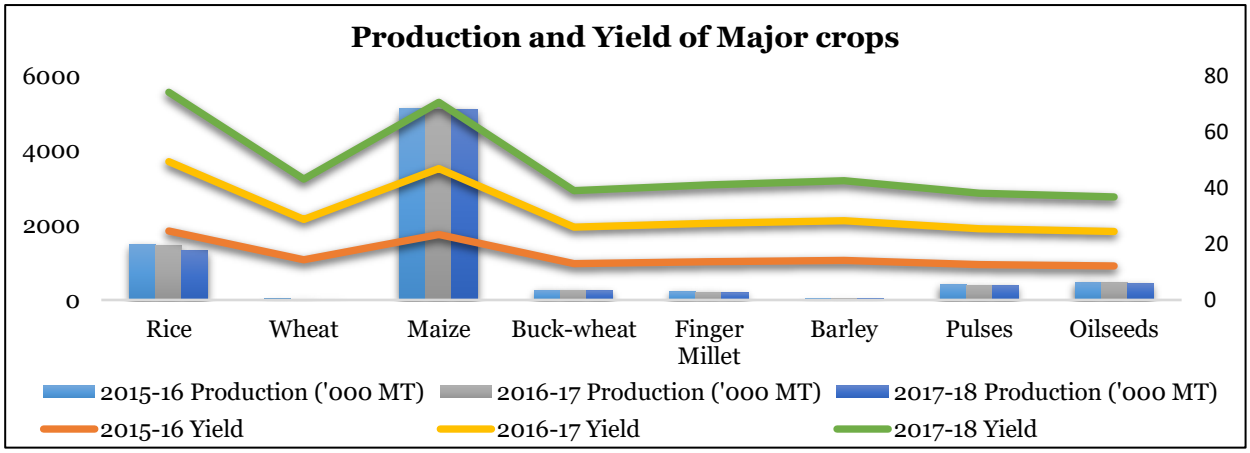
Problems and Prospects of Agriculture in Sikkim

Sikkim is the second smallest state in the country located at the foothills of eastern Himalayas characterised by mountainous terrain with favorable agro-climatic conditions, which support agriculture, horticulture and forestry. Out of the total geographical area of 7096 sq.km, only 10.5% (around 745 sq.km) is available for cultivation. The cropping intensity is 120%. The GVA at basic prices for the year 2018-19 from agriculture and allied sectors stood at Rs.18.55 lakh crore and was estimated to grow by 2.9%. Agricultural sector mainly comprises of small and marginal farmers accounting for more than 76% of the holdings but possess only 33% of the area. The soil is mainly loamy sand to silty clay loam. The main crops cultivated are rice, wheat, maize, buck wheat, finger millet, barley, pulses and oilseeds. The irrigation potential created in the state is 28,689 ha. but net irrigated area is 11,060 ha. Out of the total cultivable area of 77,373 ha, 50% area is under maize, followed by 14% under rice. It has been observed that the average yield (kg/ha) for the major crops from 2015 onwards has remained static.

Problems

i. **Irrigation -** The major constraint in the state is the absence of adequate irrigation systems. Sikkim being a hilly state with varying degree of slopes, constructing big irrigation canals is not feasible and entails a very high capital investment and maintenance cost thus limiting the scope of irrigation. Almost all the crops are grown on rainfed condition. Availability of stream water during the summer allows for cultivation of paddy through temporary channels.

ii. **Traditional Practice of cultivation -** Agriculture is largely carried out with traditional practices. Small size and scattered holding (the average land holding size is 0.61 ha in 2015-16) of farmers restricts the scope of major mechanization of farm activities. Due to the fragile ecology, the production and productivity of the state is lower than both the regional and national averages. The productivity of all major crops have shown an increasing trend but at a slower rate.



Strategy has to be developed to increase productivity and thereby increase the share of marketable surplus to ensure sustainable inclusive growth.

iii. **Impact of Climate change -** It is foreseen that climate change will have a negative impact with a trend of warmer nights and cooler days with increased rainfall which will affect the yields. With adoption of climate smart technology like diversification and adoption of new agricultural practices these problems can be minimized.

iv. **Availability of labour -** Paucity of labor during peak season is a serious bottleneck. This results in high labour wages per day. Therefore, increase in production and

productivity must come from intensive cultivation which warrants adoption of farm mechanization.

Prospects

i. **Organic Farming** - Sikkim is the first state in the country that has been declared as 100% organic. Due to the organic certification envisaged under 'Sikkim Organic Mission', the agriculture produce is expected to get a higher price. The 'Mission Organic Value Chain Development for NERs' has planned to focus on 4 main crops buckwheat, turmeric, large cardamom and ginger. The mission envisages the following: (a) Developing processed products for new markets (b) Replacement of traditional channels by organized market channels for both domestic and export market (c) Developing a range of market places and outlets for sale of organic produce. A series of "Buyer-Seller" meets for sale of organic produce (d) Establishment of infrastructure in the production clusters and modern/integrated processing units.

ii. **Horticulture:** Sikkim is blessed with abundant resources, manifested in rich bio-diversity, perennial water sources, diverse soil profile, extremely varied climatic and wide-ranging topographical variations. Horticulture is one of the major economic activities of the people in the state. Large cardamom, ginger and turmeric are the principal spices crops while mandarin orange, guava, banana are the principal fruits grown in the state. Vegetables such as bean, garden pea, exotic vegetables like tomato, radish, and tuber crops are extensively cultivated. There is immense potential for developing floriculture on commercial scale. It is a home to more than 500 species of exotic orchids alone.

iii. **Micro Irrigation** - To overcome the problems of irrigation, a more pragmatic approach is to go for micro irrigation and better methods of water application like small water harvesting structures, roof water harvesting, etc.

iv. **High-tech agriculture:** It mainly relates to commercial farming involving latest technologies, aimed at catering to the needs of domestic as well as export markets. The potential areas for high-tech agriculture covers soil less agriculture, cultivation in green house, hydroponics, aeroponics, and vertical farming.

v. **Forestry -** Forest is one of the richest natural resources of Sikkim with 82.32% of the area in the state (5,84,071 ha.) falling under forest land area which offer large scope for development of forestry. The composition ranges from tropical dry deciduous forests with Sal and its associates to the Alpine Shrub and grasslands in high altitudes. Climatic condition in the state is conducive for growth of bamboo. Thus, it can be promoted under National Bamboo Mission in the state.

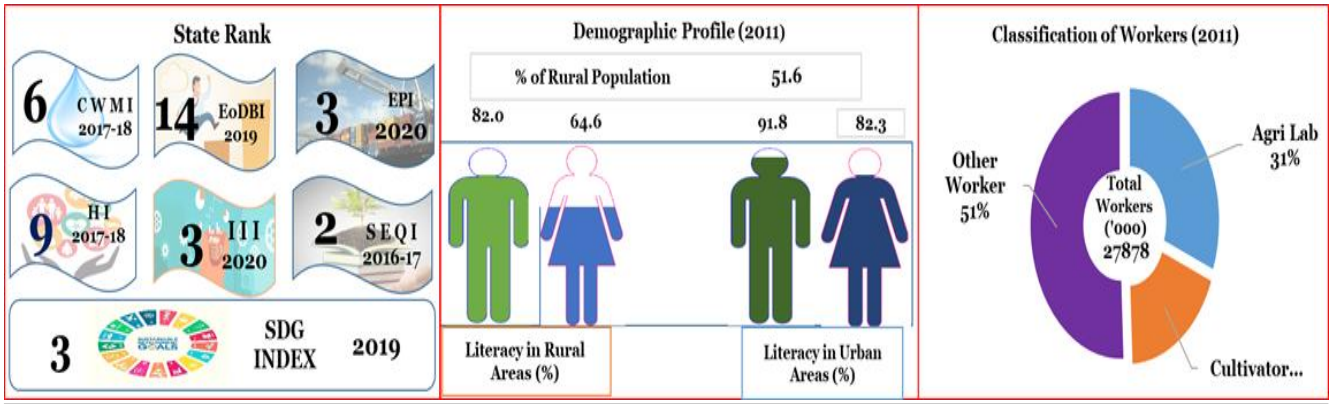
Conclusion: Sikkim, being the first organic state, has the potential to adopt some of the techniques of high-tech agriculture. With organic research, the practice of organic system of cultivation has been developed for major crops. 'Seed Village Scheme' is promoted to ensure availability of locally adapted high quality organic seeds. However, it needs a strong and dynamic food processing sector for diversification and commercialization of agriculture.

Tamil Nadu

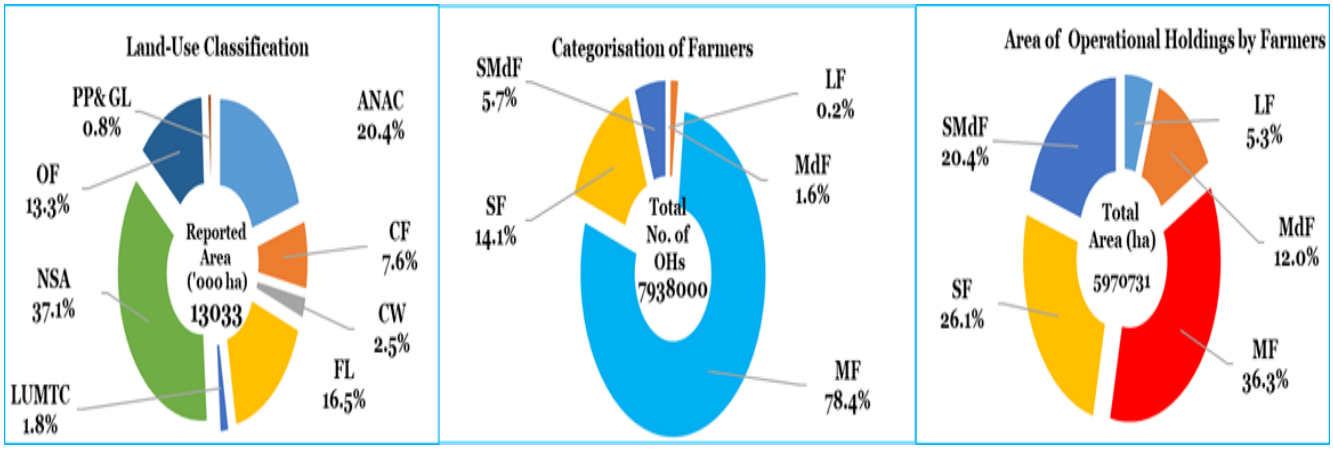
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
7	37	13083	941.9	227	16682

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
218599	1845853	13006	72147	37230

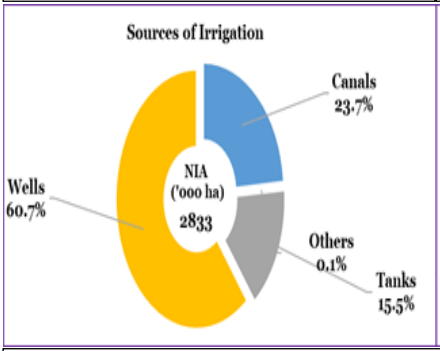
General Demographic Profile



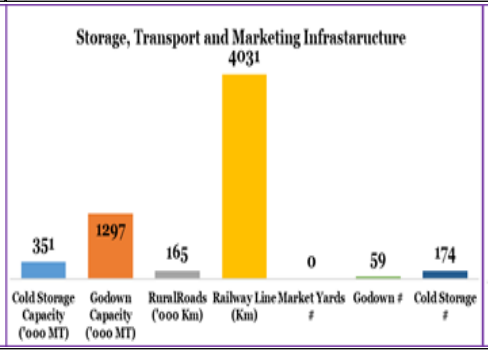
Land Usage (2015-16)

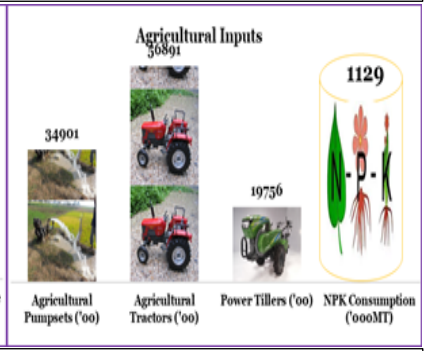


Irrigation

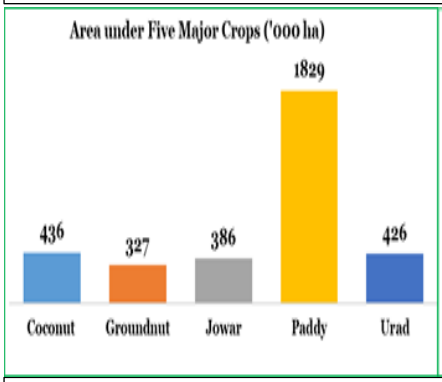


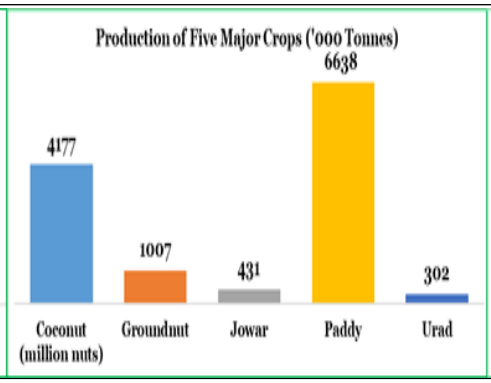
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

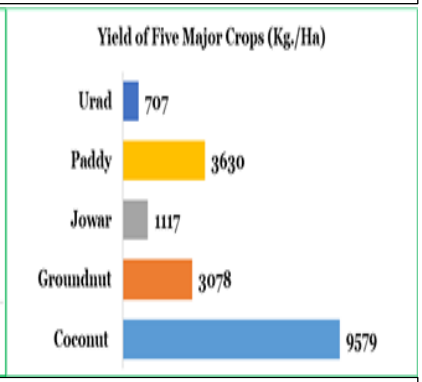




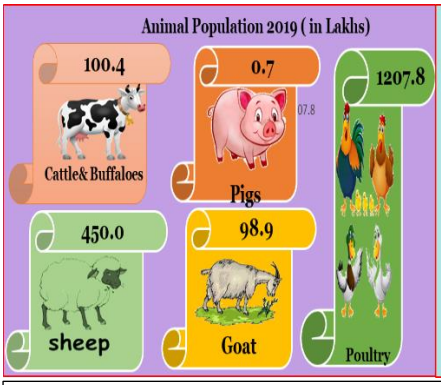
Area, Production and Yield of Five Major Crops 2017-18

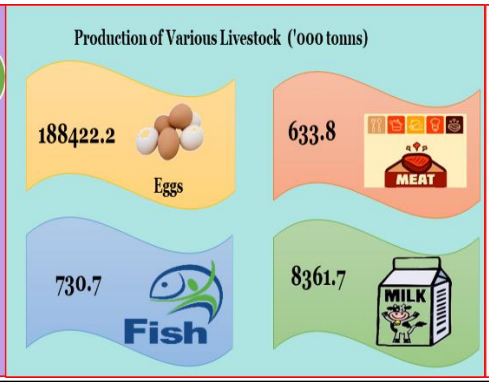


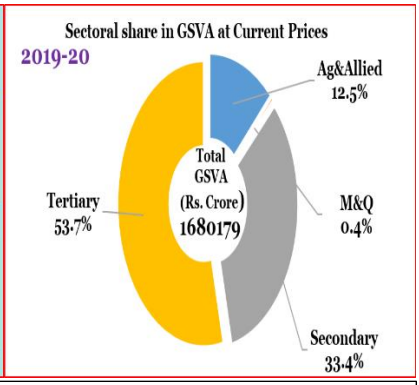




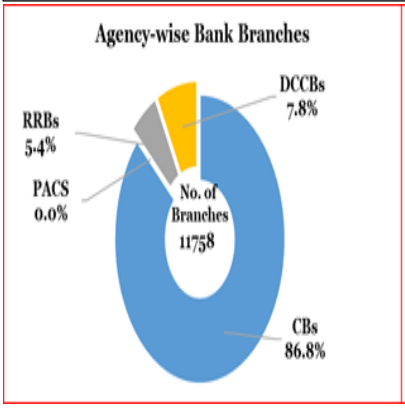
Allied Activities

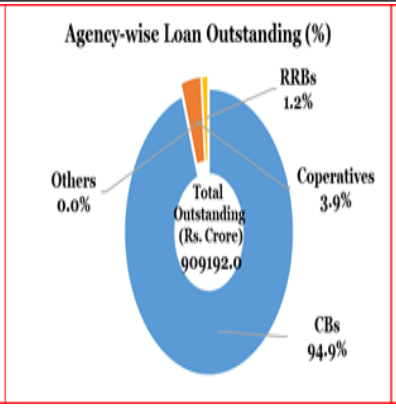


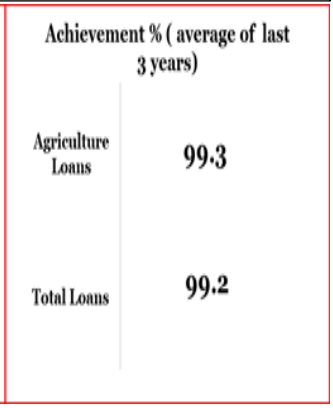




Agricultural Credit Details as on March 2019







Problems and Prospects of Agriculture in Tamil Nadu

Tamil Nadu is located in the Indian Peninsula between Bay of Bengal in the east and the Indian Ocean in the south. It is a progressive state that has been doing well on several social and economic parameters. With a geographical area of 1,30,058 sq. km, it is the 10th largest state in the country occupying 4% of the total area. It consists of 37 districts, 227 Taluks and 16682 revenue villages and has been divided into seven agro climatic zones. It is the 6th most populated State with a density of 555 persons per sq. km. It is one of the most urbanized and industrialised states of the country with the manufacturing sector accounting for more than one third of the state's GDP. It also ranks 11th among all Indian states in the Human Development Index.

Agriculture, as for most states, is the backbone of the Tamil Nadu's economy providing livelihood as well as food security. But agriculture accounts for only 5.56% of the state's GDP, which is an all-time low contribution and is a matter of great concern as more than 40% of the population is dependent on this sector. The reasons attributed to this downward movement include failure of monsoon, non-release of Cauvery water, poor storage position in all major reservoirs, Gaja cyclone, severe drought etc., resulting in lesser area under major crops besides causing damage to the standing crops.

Problems

i. **Declining Landholding Size:** As per the agricultural census, the average landholding size decreased from 0.8 Ha in 2010-11 to 0.75 Ha in 2015-16. Interestingly the area of operational holdings also saw a decrease from 64.88 lakh Ha in 2010-11 to 59.71 Lakh Ha in 2015-16. The declining trend may be attributed to increasing urbanisation/migration and conversion of agricultural land for other purposes.

ii. **Poor Water Availability:** Water availability is a limiting factor influencing the production and productivity in agriculture. It is one of the most water starved States endowed with only 3% of the nation's water resources. Out of the total geographical area of 130 lakh ha, the net sown area is 46.39 lakh ha and net irrigated area is 26.26 lakh ha.

iii. **Menace of Middle Men:** For years, farmers have been at the mercy of commission agents and middlemen to sell their produce. Although regulated markets and Agricultural Producers Cooperative Marketing Societies were established to regulate physical trading of agricultural commodities, farmers seldom sell their produce in these markets. Further, the trading and auctioning processes in the regulated and cooperative markets are still entirely manual, which impairs the transparency of transactions.

iv. **Inadequate Agro-Processing Facilities:** The State contributes to about 3% of India's food grain production. It ranked second in productivity of rice, only next to Punjab, ranked first in the case of Maize, Bajra and Ragi. It is also the leading producer of Oil Seeds, Tamarind, Tapioca, Dairy, Poultry and Egg products. However, processing facilities for these primary produces are very limited. At present, only 4.6% of total agricultural production is processed and nearly 35% of fruits and vegetables are lost in storage and transportation due to lack of adequate cold chain and processing facilities.

v. **Low Capital Formation:** It spends inadequately on capital formation in agriculture. The share of capital expenditure in total agri & allied sectors, irrigation, etc. is only 23.60% of total expenditure (Revenue+Capital) on Agri & Allied sectors and irragation, which is low in comparison to major States like Andhra Pradesh (66.1%), Gujarat (58.00%), Odisha (46.00%), Jharkhand (42.60 %) etc.

Prospects

i. **Aggregation and Collectivisation:** The problem of small-scale holding can be overcome through aggregation and collectivisation. Aggregation can be undertaken by JLGs and FPOs. Infact, in Tamil Nadu, JLGs are being encouraged to federate themselves as Farmer Producer Organisations to reap the economies of scale in procurement of inputs and marketing of their produce/finished products. Aggregation in the form of FPOs is especially important as marginal farmers constitute 78% of total farmers operating 35% of the total area.

ii. **Horticulture Production:** It is one of the leading horticulture States in India on account of its location and varied agro climatic factors. It contributes 5.88% to the National horticulture production with 5.4% horticultural cropped area at National level. It also accounts for nearly 4.8% and 2.5% of the area under fruits and vegetables respectively in the country. In terms of production, its share is nearly 6.5 % in fruits, 3.6 % in vegetables and 19 % in flowers. It holds lot of potential for increasing farmers' income.

iii. **Adoption of Water Saving Technology: -** As Tamil Nadu is one of the most water starved State. Massive Promotion of water saving technologies like summer ploughing, Direct sowing, System of Rice Intensification, machine planting, System of Pulses Intensification, Sustainable Sugarcane Initiative etc., will help maximize water use efficiency, improve soil health thus promoting sustainable agriculture.

iv. **Eco-Tourism:** The forest health has been the State's mandate recognizing its role in water, food, and wood and livelihood security. Water augmentation through forest conservation and integrated watershed management involving local people, especially the tribal communities in protection, conservation and wildlife management can be encouraged. Eco -Tourism for providing livelihood to the local people can be developed.

v. **Livestock Sector:** The contribution of livestock sector to the Gross State Value Added (GSVA) is 5.29% and that to the agriculture and allied activities is 42.05%. The estimated milk production, which was 54.74 lakh Metric Tonnes (LMT) during 2005-06 increased to 83.62 LMT during 2018-19. Livestock sector provides supplementary employment and sustainable source of income to many small and marginal farmers. The livestock sector can be prioritized and developed.

vi. **Fisheries:** It ranks 4th in total marine fish production of the country. It exported 0.129 MT of marine products and earned a foreign exchange of ₹5591.49 cr. during 2018-19. Aquaculture is emerging as a prominent activity for enhancing fish production and income generation in rural areas. Integration of fish culture with agriculture has proved to be an option for augmenting the unit productivity from aquaculture systems.

vii. **Sericulture:** It is the leading State in bivoltine silk production. The handloom silk sarees including Kancheepuram sarees are world famous because of their enchanting craftsmanship. The demand for raw silk is perennial in the State and it produces nearly 1984 Metric Tonnes against the estimated demand of 3,000 Metric Tonnes. Sericulture needs to be focussed upon and promoted.

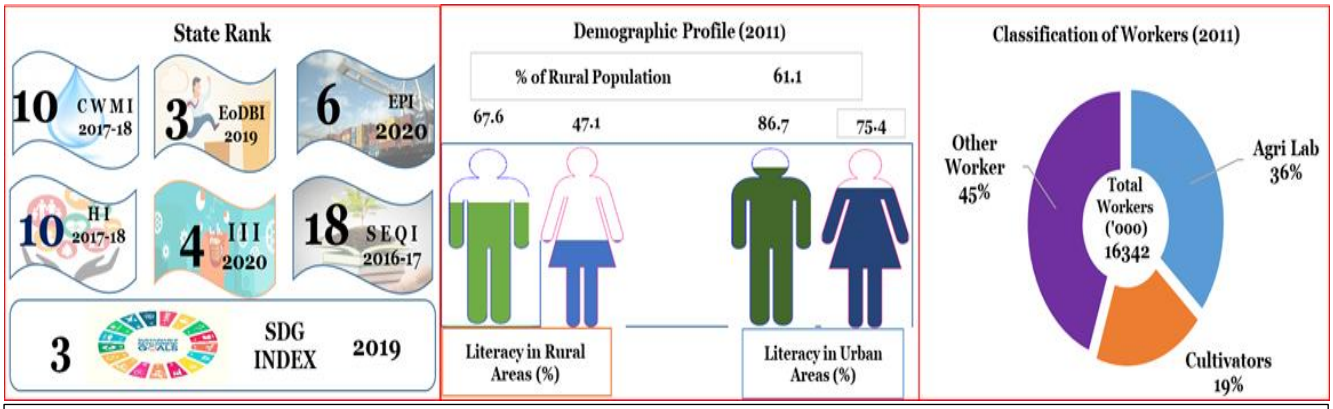
Conclusion: Agriculture and the allied sector is very important for the economy of Tamil Nadu. Given the declining trend in average size of landholding, increasing focus would need to be on exploring high tech agricultural practices like Hydroponics, Aquaponics, Tissue culture, Precision Farming etc which will result in enhancement in production, productivity and total area expansion of food crops, thus ensuring sustainable economic growth.

Telangana

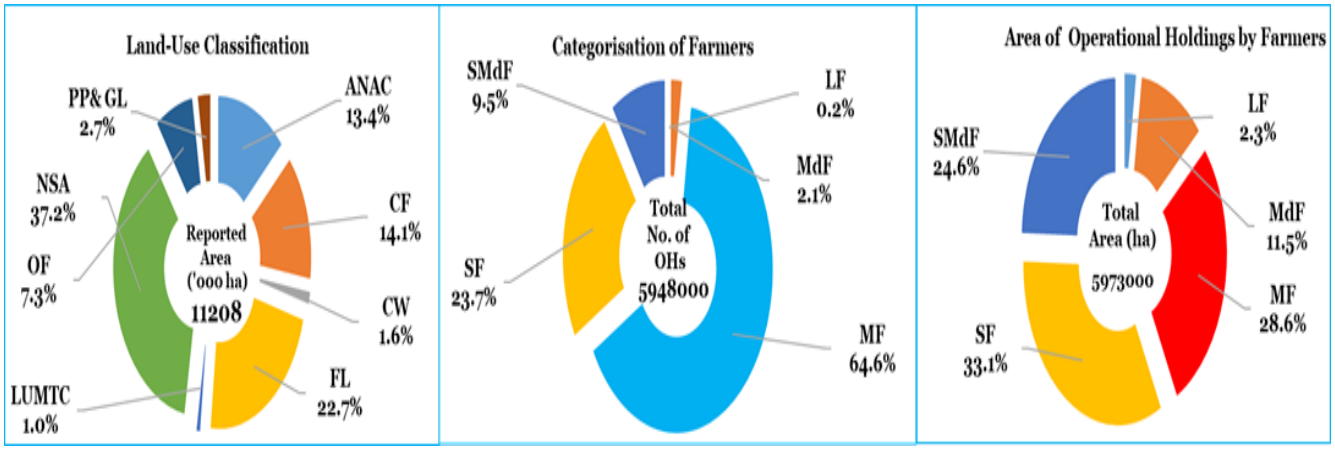
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
3	31	12751	956.6	584	10434

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
228216	969604	11210	35004	21395

General Demographic Profile

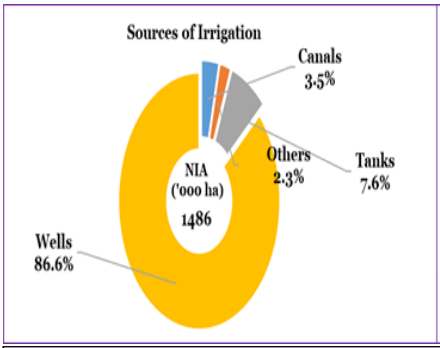


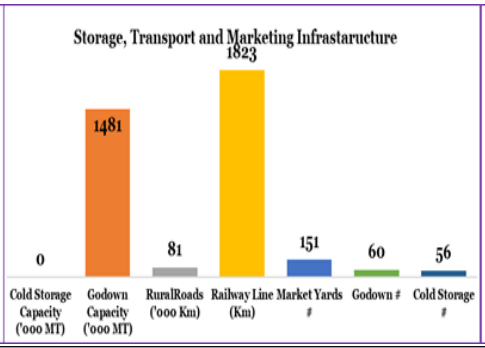
Land Usage (2015-16)

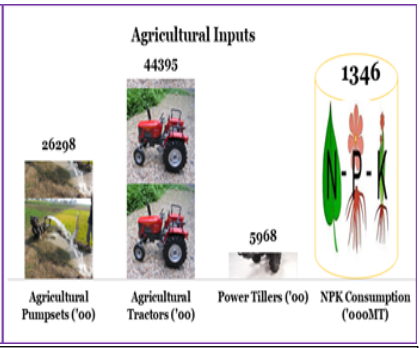


Irrigation

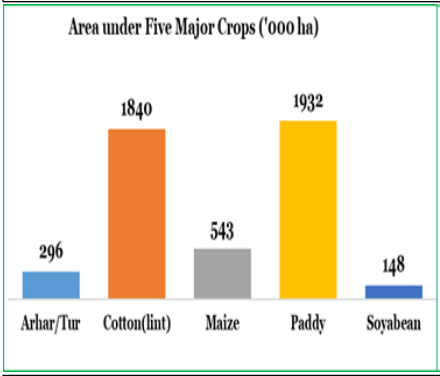
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

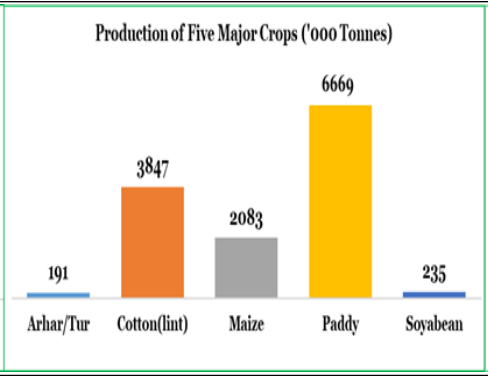


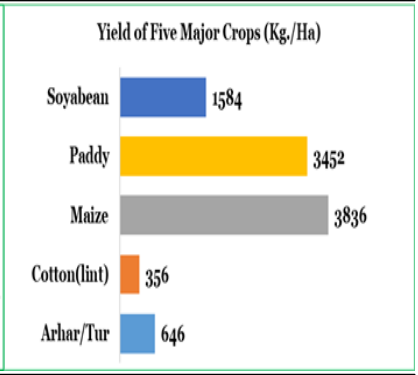




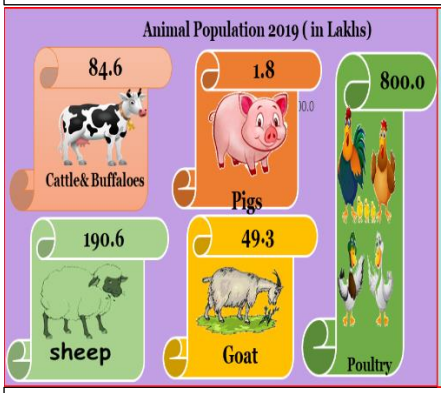
Area, Production and Yield of Five Major Crops 2018-19

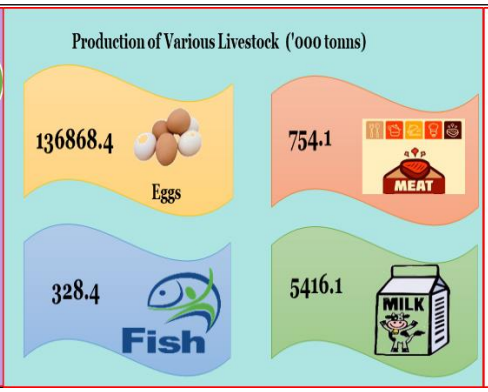


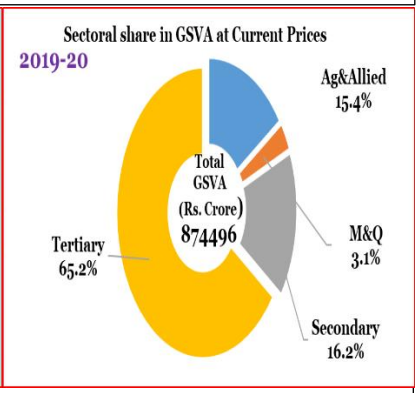




Allied Activities







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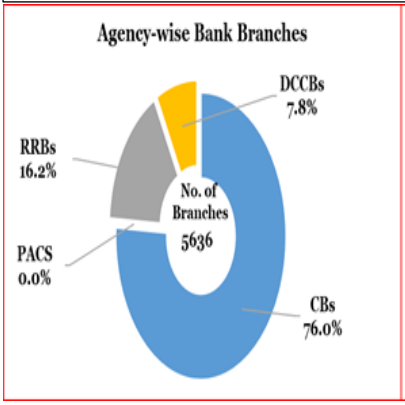
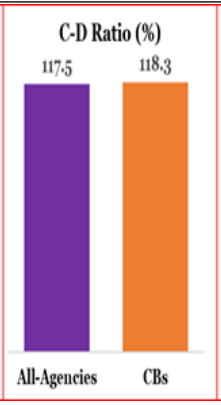
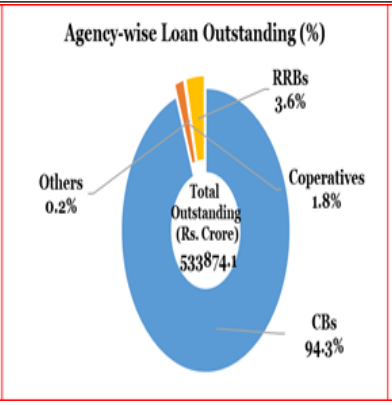
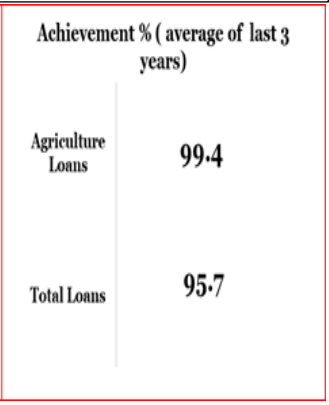








Problems and Prospects of Agriculture in Telangana

Telangana is divided into three agro-climatic zones based on the geographical characteristics such as rainfall, nature of soils, climate, etc.: i) Northern Telangana Zone, ii) Central Telangana Zone, and iii) Southern Telangana Zone. It is located in the semi-arid regions of the Deccan Plateau and rainfall plays a crucial role for agriculture growth in the State. The normal rainfall in the state is 906 mm as against the national level of 1083 mm.

The key production trends in the state are as follows –

i. Food crops are cultivated on 61.2% of the gross sown area but this share has been on the decline,
ii. Paddy, maize and cotton were the most cultivated crops in 2018-19
iii. The share of cotton has been on the rise in recent years,
iv. The GVA share of crops has been declining, whereas GVA share of livestock has been on the rise.

The Government has taken up a number of measures like Rythu Bandhu for investment support, Rythu Bima for farmers' life insurance, crop insurance scheme providing Soil Health Cards, credit, seeds, mechanical implements etc. for the welfare of the farmer.

Problems

i. **Fragmented Landholdings**- As per Agricultural Census 2015-16, the average size of land holding was 1.00 ha as against all India average of 1.08 ha. The small size of land holdings raises doubt over the viability of agriculture and calls for adoption of aggregation approach.

ii. **Rain fed Agriculture-** Prominence of rain fed agriculture and dependency on well irrigation is a key concern. The ground water resources have been depleting and the state is adversely affected by the variability in rainfall. Climate Smart Agriculture Practices have been confined to smaller geographies.

iii. **Marketing Linkages**- Crop production and trends in cropping pattern: paddy, maize and cotton are the important crops which occupy more than 68% of the total gross cropped area. Policy initiatives of the State, besides targeting higher productivity in respect of food crops, need to focus on establishment and strengthening of linkages. Secondary linkages of agriculture also assume paramount importance especially in the context of production of commercial crops.

iv. **Poor access to improved seeds:** Although Telangana is a hub of seed production, the farmers do not have access to new and improved seeds. Besides, there are instances of selling of spurious seeds to the ignorant farmers, necessitating the need for greater co-ordination among different government agencies, input supplying agencies and research bodies

v. **Inadequate Farm Power:** The average supply of farm power is 1.98 kw/ha at present which has to be increased to 4 kw/ha in order to achieve the desired crop production and productivity levels.

Prospects

i. **Aggregation of Farm Produce-** Taking into account, the shrinking size of land holding and category of farmers, majority being small and marginal, aggregation is relevant for production as well as marketing of farm produce. It reduces transaction costs for availing services/inputs and also enables the producers to negotiate for better prices. Leasing out land to individuals/tenants under the Loan Eligibility Card (LEC) Scheme on a long-term basis can be contemplated. Cooperative farming, collective farming, Producers Organizations, Joint Liability Groups (JLGs) and contract farming are some of the possible ways of aggregation.

ii. **Horticulture-** Semi-arid climate of Telangana offers immense potential for Horticulture. Cultivation of horticultural crops of high yielding varieties, coupled with micro irrigation, mulching and post-harvest practices have excellent potential to enhance farmers' income and can act as one of the means of doubling of farmers' income. In 2018-19, 71.52 lakh MTs of horticulture crops were cultivated on 12.40 lakh acres of land. Among this 25.69 lakh MTs of fruits grown on an area of 4.42 lakh acres which place Telangana 3rd among Indian states in terms of area cultivated, and 8th in terms of the quantum of production. It is also the national leader in turmeric cultivation.

iii. **Food and Agro Processing-** Food and Agro processing play a significant role in increasing value addition in agriculture and horticultural produce, diversification and commercialization of agriculture, reduction in wastage of farm produce, generating employment opportunities and enhancing export earnings. Variety and quantity of crops produced in the state offers a vast potential for specific agro processing activity.

iv. **Increasing the Irrigation Potential**- Cautious development of ground water irrigation has been one of the mainstays of irrigation development in the state so far. The strategy needs to be a more rapid ground water development in safe mandals and a calibrated movement in the other ground water stressed mandals. Watershed approach along with appropriate rainfed farming practices, need to be followed in the rainfed areas. Promotion of micro irrigation in the well command areas is another way to improve the irrigation potential.

v. **Fisheries-** Fisheries is one of the fast-growing sectors generating income and employment. The state is ranked 3rd in terms of inland fishery resources after Karnataka and Tamil Nadu and ranked 7th in terms of fish production. The renovation of tanks being taken up on a massive scale by the State Government offers further opportunities for fisheries.

vi. **Imparting Training-** There is good network of tractor dealers, servicing centres, spare parts, and pump set dealers, manufacturing units and diesel supply outlets in the state. Training of rural youth in operation, repair and maintenance of farm machinery and equipment would prove to be beneficial.

Conclusion

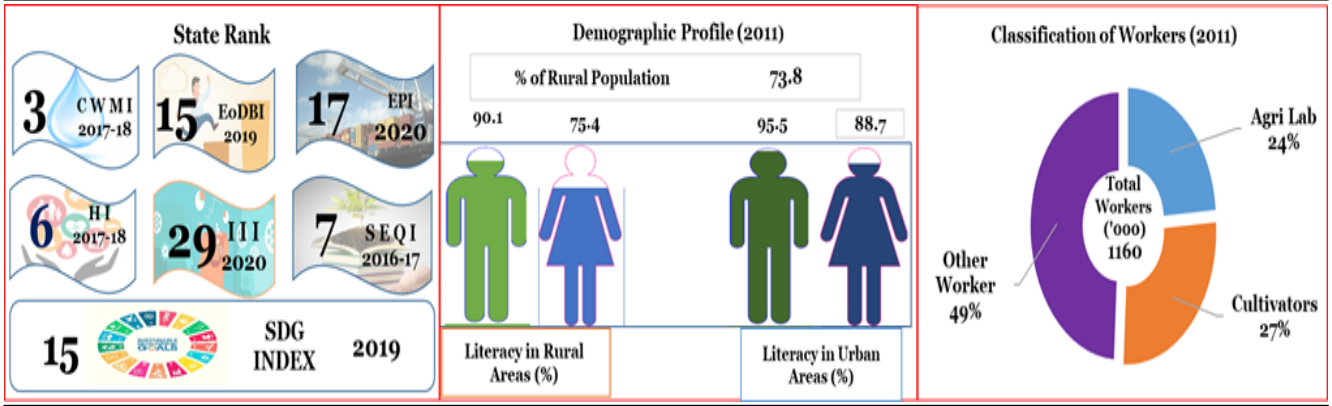
Agriculture sector may be boosted in Telangana by focusing on the small-holders, water-use efficiency, increasing the production of pulses, millets and oilseeds not only through biotechnological tools but also through other measures viz. incentives, inputs supply and bonus price to farmers.

Tripura

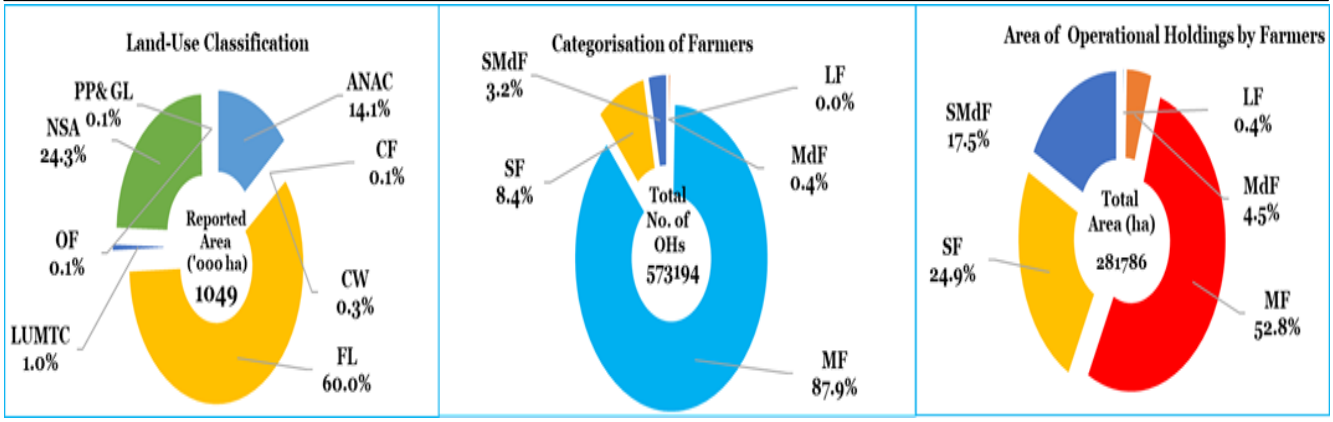
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
1	8	511	2392.8	58	1405

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
137981	55358	1049	3674	2712

General Demographic Profile

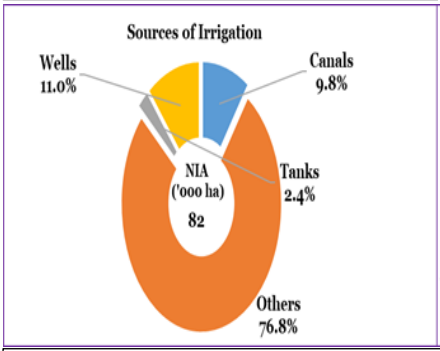


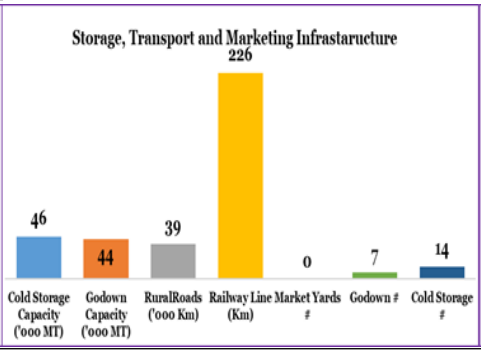
Land Usage (2015-16)

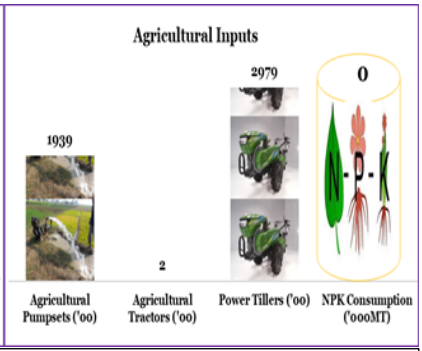


Irrigation

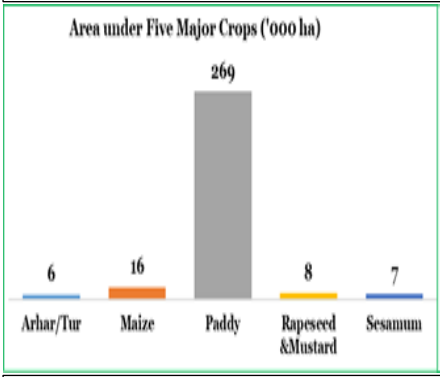
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

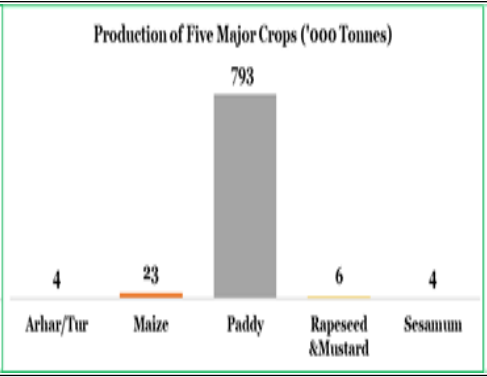


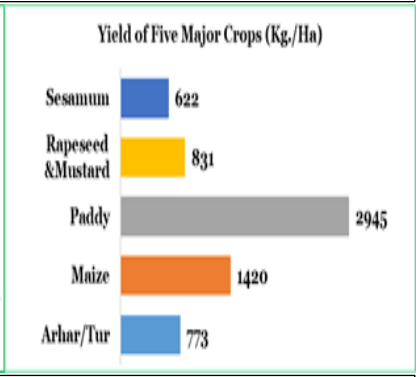




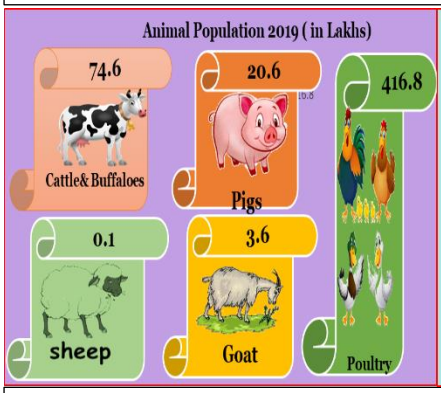
Area, Production and Yield of Five Major Crops 2018-19

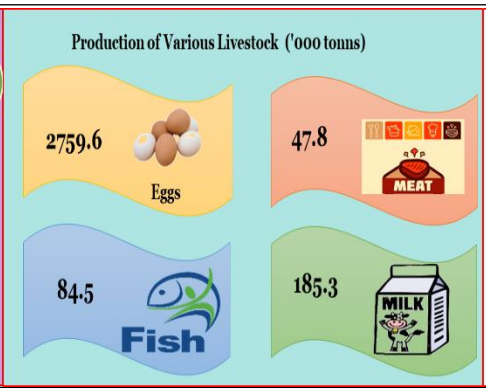


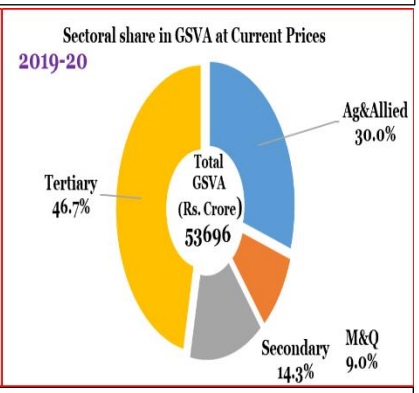




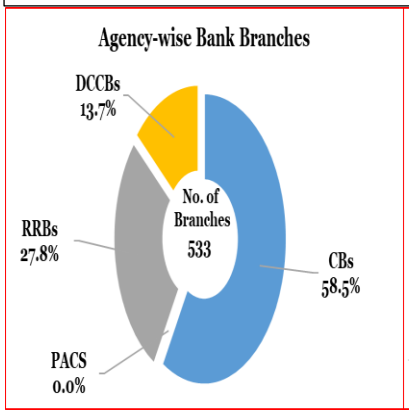
Allied Activities

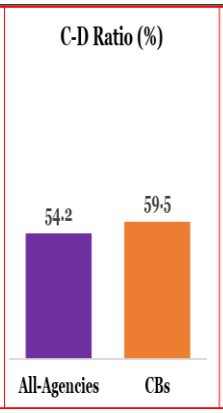


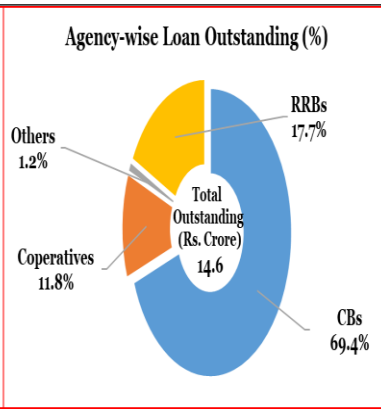


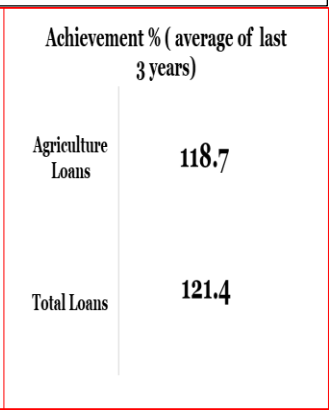


Agricultural Credit Details as on March 2018









Problems and prospects of Agriculture in Tripura

Tripura is located in the South-West extreme corner of the North-Eastern region. It has a humid sub-tropical climate characterized by high rainfall. The annual rainfall ranges between 2,000 to 3,000 mm; while humidity ranges between 100% to 42%. Agriculture and allied activities occupy an important place in the State's economy. As regards, cropping pattern, parallel farming systems, viz., (i) shifting cultivation or jhum in the hill slopes and (ii) settled farming cultivation in the plains, are in vogue. Paddy is the predominant crop in both the systems. Rice alone contributes 96% of the total food grain production. The productivity of Rice @3,031 kg/ha during 2019-20 was higher than all India average.

Problems

i. **Dominance of rain fed cultivation** - More than 70 % of the cultivated area is under rain fed condition and rice which requires more water is cultivated in 90 % of the cultivated area. Assured and well managed irrigation is meager. Large area of the state remains fallow in the dry season.

ii. **Constrains in Inputs supply** – There is unreliable input supply viz. fertilizer, seeds etc. and low per unit consumption of fertilizer. There are untrained traders of agricultural inputs and unavailability of agricultural input distributor/ dealer network resulting in very less area under hybrid paddy. There is an issue of untimely arrival and insufficient quantity of seeds and fertilizers at the agro stores due to transportation bottleneck.

iii. **Low Credit Deposit Ratio** - The overall CD ratio, though, is not satisfactory, but has steadily improved from 41% as on 31 March 2015 to 45% as on 31 March 2016 and 57 % as on 31 March 2020. The CD ratio, however, declined to 43% as on 31 March 2017 due to unprecedented growth in deposits and it further increased to 48% as on 31 March 2018. The CD ratio ranged from 52 % in North Tripura district to 96 % in Dhalai District, as on 31 March 2020 showing a huge variation within a small state.

iv. **Farm Mechanization** – Due to low investment capacity of the farmers, the level of farm mechanization is very low leading to low productivity and production.

v. **Lack of Extension Services & Technical Knowledge** – Farmers have very poor extension services and technical support for identification of proper plant protection chemicals for their crops, consequently, at times they end up applying wrong chemicals and wasting a lot of money. People are unaware of the right pesticides to be used as the market is totally privatized.

vi. **Lack of infrastructure** – There is a lack of post-harvest infrastructure facilities and lack of mechanized boilers in the rice mills. Also, there is lack of adequate surveillance system of pests and diseases. Similarly, there is lack of profitable production technology especially for the pulses and the oilseeds.

vii. **Soil health -** There is low per unit consumption of fertilizer and less farm mechanization. Farmers are ignorant about soil health, especially due to absence of soil health cards. Also, there is deficiency of micronutrients in irrigated area, resulting in decreased productivity.

Prospects

i. **Crop diversification** - Average rainfall of 2,000 to 3,000 mm, distributed over 8-9

months in a year is conducive for crop diversification for maize, peas, etc., along with the staple crops, owing to the highly suitable agro-climatic conditions. The major fruits grown are pineapple, banana, lemon, litchi, cashew nut, etc. Fruit crops are spread in all the eight districts of Tripura, however, South Tripura, Dhalai and North Tripura has very vast area under fruit crops. South Tripura has also vast area under potato plantation. Sepahijala has highest area under vegetable cultivation. North Tripura also has big area under floriculture. Therefore, there is high scope for crop diversification and their commercialization.

ii. **Vegetable cultivation**: Due to diversified climate, it has a huge potential for vegetable cultivation. They are good source of nutrition and extremely important for nutritional security of the state. Being short duration crops they fit well in multiple cropping systems and also provide good economic returns to the farmers. The major vegetables are potato, chilli, cabbage cauliflower, reddish, pumpkin, watermelon, french bean, groundnut, cow pea, cucumber, gourds, tomato, brinjal, etc. The cultivation is especially important for small and marginal farmers for meeting their cash needs.

iii. **Innovative farming practices** - Farming community is open to adopt new technologies and is hard working. New technologies have been introduced and accepted by the people; the most effective example is of SRI. To enhance the productivity of rice, System of Rice Intensification (SRI) was introduced in the state through demonstration in the year 2002-03 with 9 ha. land, which increased to 93,345 hectares during 2018–19 with 41 % share of the rice area under SRI which makes the state a leader in SRI.

iv. **Livestock Rearing:** Animal Husbandry sector is one of the major thrust areas that needs to be developed. There is a great demand for pig rearing, poultry farming, and fish cultivation. However, pig rearing and poultry farming stands out in terms of self-inclination of the farmers towards choosing these activities as one of their main occupations. Pig rearing can be especially boosted in the Autonomous District Council (ADC) areas as they are culturally related with it.

v. **Forestry:** Tripura accounts for about 6 per cent of bamboo sticks, used for making incense sticks in India. Around 21 of the 130 bamboo species known in India are grown in the state. Tripura holds a strong tea plantation base, with 58 tea gardens covering an area of over 7,000 hectares in 2014-15. Tea produced in Tripura is famous for its blending qualities. The state has a wide variety of medical plants having 266 medicinal plants, 379 species of trees, 581 herbs, 320 shrubs and 165 climbers. With proper policy and support by state government these activities can be taken on large and commercial scale which will help in increasing farmer's income.

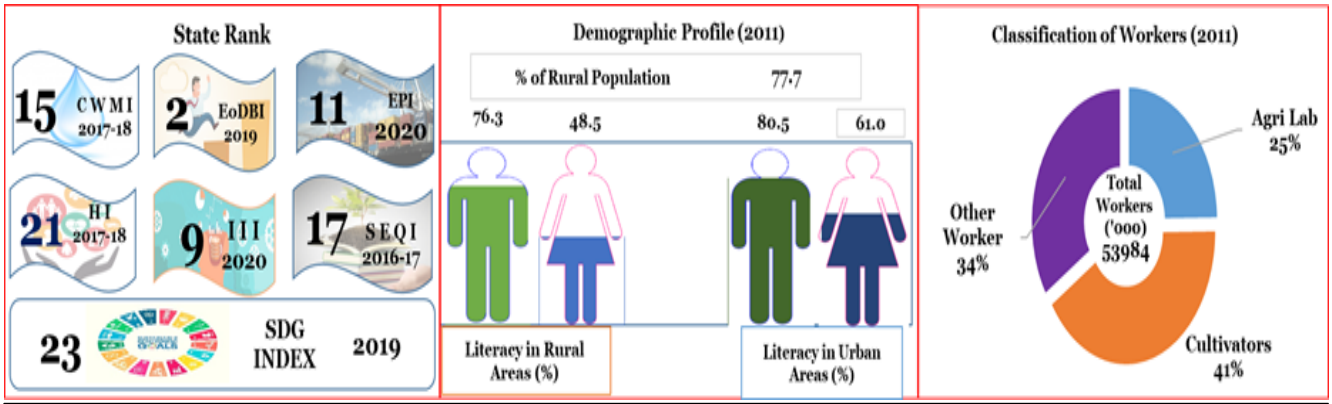
Conclusion: The state has rich agro climatic conditions, fertile soils and abundant rainfall which offers immense potential for production of a number of tropical and sub-tropical fruits and vegetables. Fisheries and Animal Husbandry are the other promising sectors. There is a need to emphasize on basic infrastructure because of the geographical location as well as low availability of infrastructure. The State is relatively isolated within the country and needs modern and reliable methods of communication and transport facilities to remain connected with the rest of the country, and particularly with trade centres such as Kolkata and Guwahati.

Uttar Pradesh

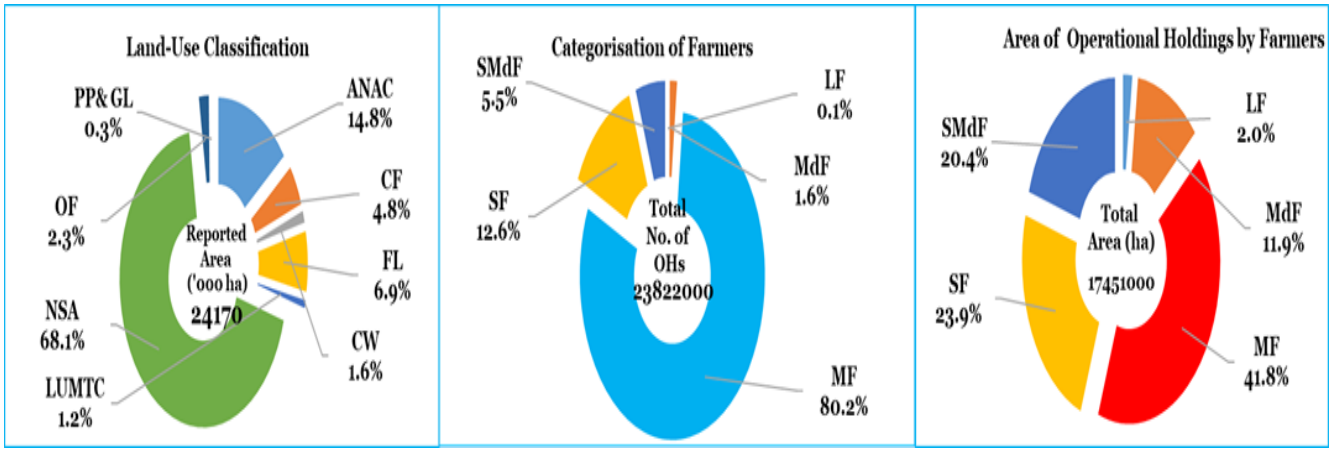
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
9	75	59163	890.2	821	97814

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
70419	1794508	24093	199812	155317

General Demographic Profile

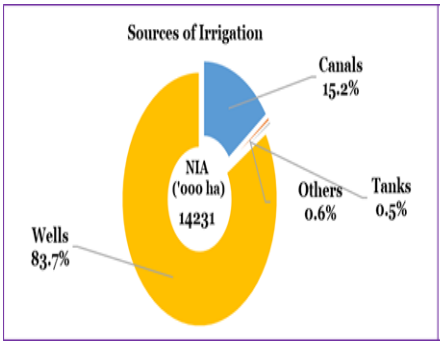


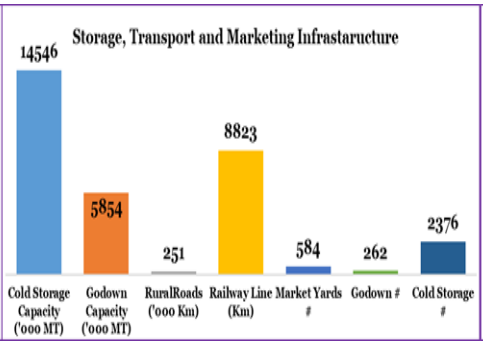
Land Usage (2015-16)

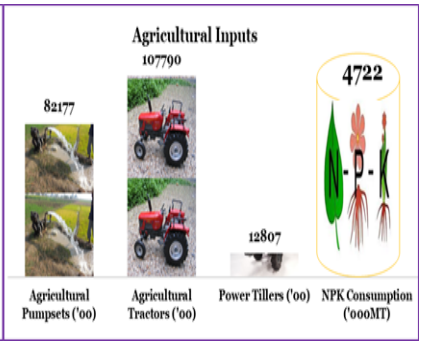


Irrigation

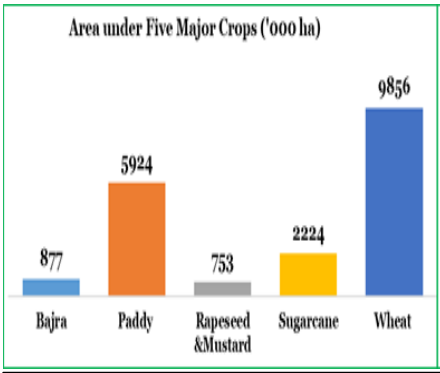
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

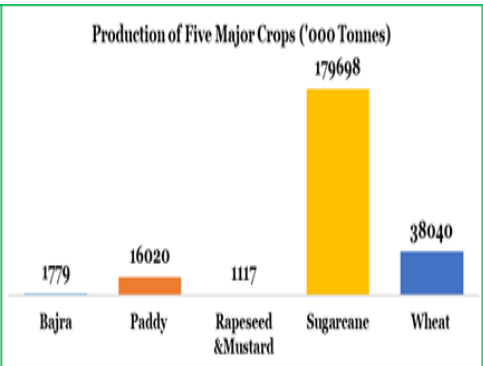


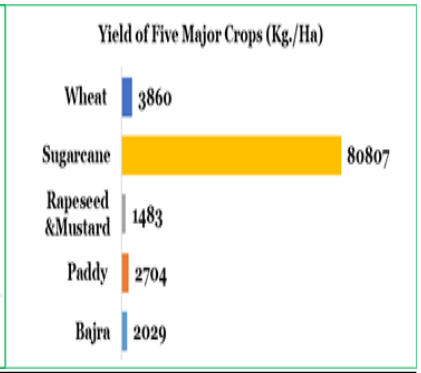




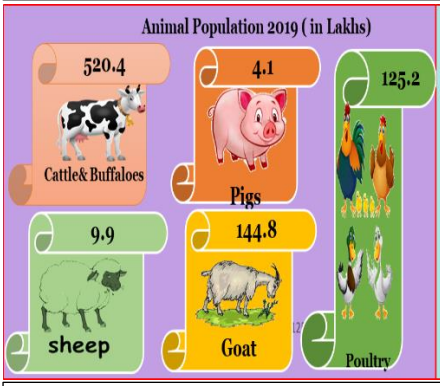
Area, Production and Yield of Five Major Crops 2018-19

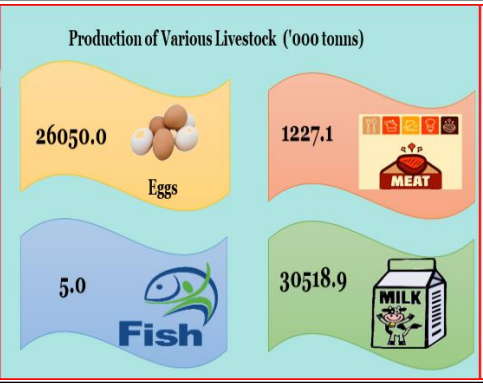


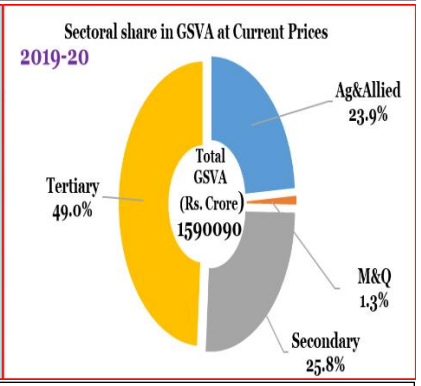




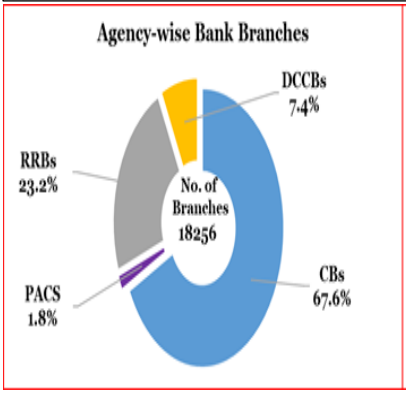
Allied Activities

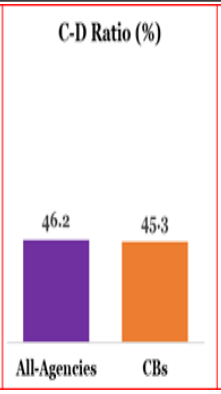


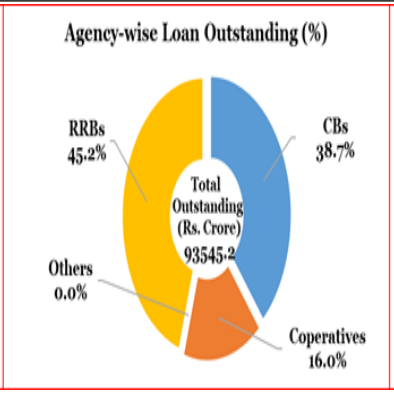


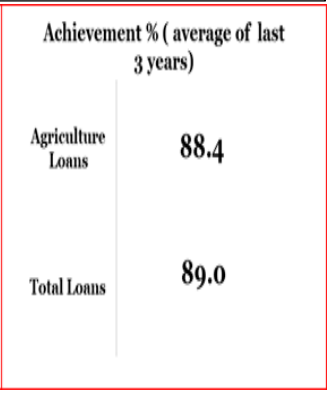


Agricultural Credit Details as on March 2017









Problems and Prospects of Agriculture in Uttar Pradesh

Uttar Pradesh is the largest state by population and the third largest economy in India after Maharashtra and Tamil Nadu. Agriculture dominates the economy of the state as it provides employment to 59.2 per cent of the working population and contributes to 27.3% in SGDP. There are regional variations within the state in agricultural productivity and land under cultivation. Agriculture is relatively advanced in the western region of the state compared to the eastern parts. Uttar Pradesh has the highest contribution in the value of output of agriculture in the country of around 13.2 per cent. The net sown area and gross cropped area in the State is 165.98 lakh ha and 258.64 lakh ha respectively, while the cropping intensity is 156%. The average size of operational land holdings is only 0.76 ha, which is much lower than the national average of 1.08 ha. Uttar Pradesh is the top producer of food grain in Uttar Pradesh.

Problems:

i. **Fragmented land holding -** Fragmented land holding is one of the main reasons for low crop productivity especially in densely populated areas. Irrigation becomes difficult on such small and fragmented land holdings and a lot of fertile land is wasted in forming boundaries (bunds) of the field. The small land holdings cause inefficient and uneconomical use of land resulting in low crop yields. Small land holdings are also a big impediment for adoption of modern agriculture technology.

ii. **Over exploitation of ground water -** 70% of irrigation, 80 % of drinking water and 85% of industrial demands are being met from the ground water in the state. Due to unecological farming there is rapid decline in the ground water table e.g Rice and sugarcane, both the crops have high water requirement and are grown in semi-arid region of the state. The annual average water requirement of the rice and sugarcane is 180 cm and 260 cm respectively. However, the region receives only 140 cm of annual rainfall. As such cultivation of these crops leads to depletion of ground water table at the rate of 91 cm/ year.

iii. **Low Productivity -**It is the largest producer of wheat, potato, sugarcane, milk and cereals in India producing 32.74, 15.55, 179.72, 30.52 and 58.01 million tonnes, respectively during 2018-19, and accounting for about 32.04%(wheat), 44.33%(Sugarcane), 16.26%(milk), 19.57%(cereals) respectively for all India production. Despite being the largest producer and State's location in the Gangetic Plains having fertile land, the productivity levels of wheat need to catch up with that of the neighbouring States of Punjab (4704 kg/ha), Haryana (4513 kg/ha). Similarly, in case of Rice when compared to agriculture intensive States of Andhra Pradesh (3540 kg/ha) and Punjab (3998 kg/ha)., it lags behind in productivity levels.

iv. **Soil Salinity and Alkalinity** - The paddy-wheat rotation practice and excessive dependence on chemical fertilizers has resulted in deterioration of soil health and reduction in soil fertility in western UP districts. Due to prevalent practice of canal irrigation, there is rise in soil salinity making the soil infertile and unsuitable for crop production. More than 8.67 per cent of total geographical area of the western UP is affected by problem of soil salinity and alkalinity

v. **Inadequate storage infrastructure - Uttar** Pradesh is a major contributor to the national food grain stock. In 2019-20, State produced 56.17 million MT of food grain which is 18.88 % country's total food grains production. The food Corporation of India (FCI) has insufficient number of grain silos (modern storage facilities), and covered godowns with adequate storage capacities. Hence grains are stored in outdoors under CAP storage (Cover and Plinth) across the State. This makes grains prone to rodents, moisture, birds and pests and unexpected weather conditions. Every year tons of food grains go waste because of inadequate storage and infrastructure facilities.

Prospects:

i. **Ground Water Recharge: -** CGWB has identified area of 110783 sq.km in the State for artificial recharge. Volume of water to be harnessed is 5185 million Cubic Meters (MCM). A planned approach to increase use of artificial recharge measures through construction of rain water harvesting structures like rain water storage tanks, percolation tanks, farm ponds, check dams etc. mainly to be considered in Bundelkhand region and those blocks where water table has declined considerably can be taken. This will be bringing more fields under irrigation thereby reduce dependence on rains.

ii. **Credit Provisions:** - As the number tenant farmers/landless farmers or oral lessees are increasing, Joint Liability Group (JLG) mode of financing to tenant farmers can be explored by banks. Also, the State needs to frame a policy so that the tenant farmers/ oral lessees are eligible for institutional finance and other benefits.

iii. **Quality Seeds and Agro-Forestry: -** Focus should be given on drought tolerant varieties of tomatoes, rainfed onion, coriander, turmeric, ginger, beetle leaves which have special niche in water stressed areas in the state like Bundelkhand etc. Also, Minor Forest produce such as Tendu leaves, Palas leaves, Bamboo, Mahua, Ber, Bael, Neem, medicinal plants and honey should be promoted as they provide livelihood to local communities.

iv. **Agro-Processing: -** Promotion of agro based industries in central region districts like Lucknow, Kanpur, Sitapur and Unnao districts due to locational proximity to good urban markets is needed. Promotion of FPOs for aggregation of output & collective purchase of inputs to tackle the problem of land fragmentation and low farmers' income should be our continued priority.

v. **Marketing Infrastructure -** Though 100 mandis have been brought under e-NAM, farmers will get full benefit only if they are able to sell their produce without actually carrying their produce to the market. Collection points may be established at village level to facilitate farmer to sell his produce without the hassle of carrying produce to the mandis.

vi. **Farm Mechanisation:** - The high cost and energy efficient farm machinery are capital intensive and majority of Indian farmers are not able to acquire these assets due to shortage of capital with them. Small average size of land holding restricts the scope for large scale farm mechanization; custom hiring of farm equipment may be encouraged. Farm Mechanization Hubs and Custom Hiring Centres may be established in PACS and FPOs. Govt. may incentivize/subsidize the same. This will help in increase the productivity where the state is lacking behind.

vii. **Water Saving Technology** – Micro irrigation and sprinkler irrigation techniques need to be propagated in water starved districts of Bundelkhand region through increasing awareness and subsidised availability of such techniques.

Conclusion

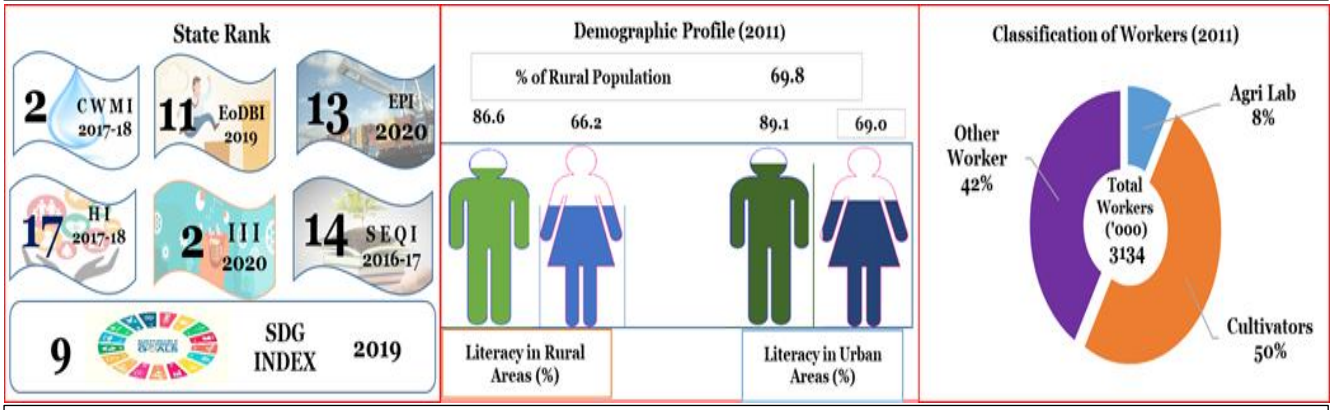
Sustained growth in agricultural production and productivity is essential for overall sustainability of the state economy. Huge quantity of water could be saved by diversification of cropping pattern from the crops to less water consuming crops. Technological improvement and change in the agricultural practices in general and irrigation practices, in particular, could also help to reduce the water consumption in rice, wheat and sugarcane.

Uttarakhand

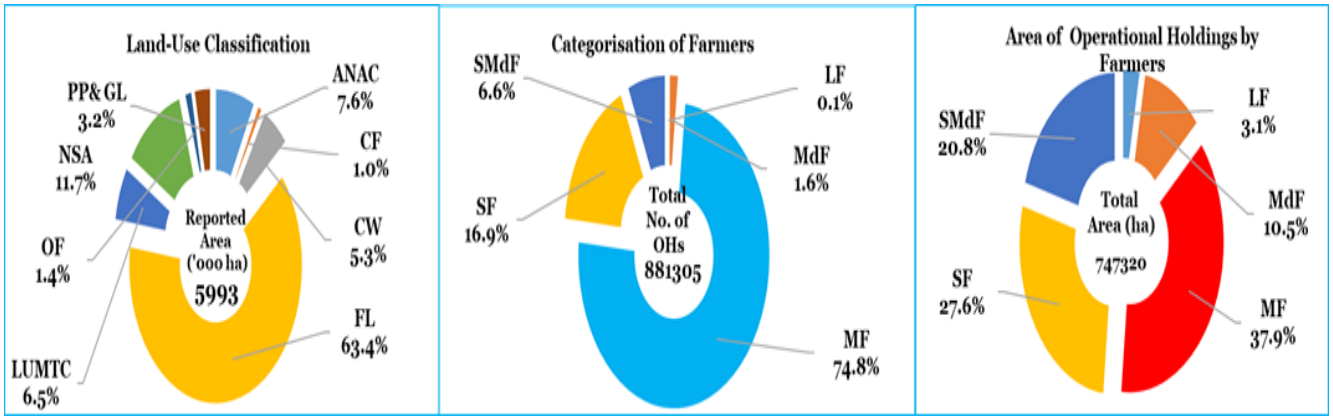
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
4	13	8260	1494.1	95	16793

Percapita Income (2018-19)(Rs.)	GSDP (2018-19) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
198738	245895	5348	10086	7037

General Demographic Profile

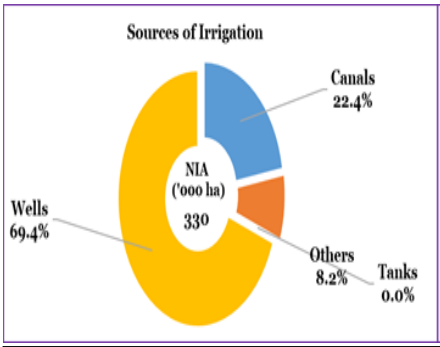


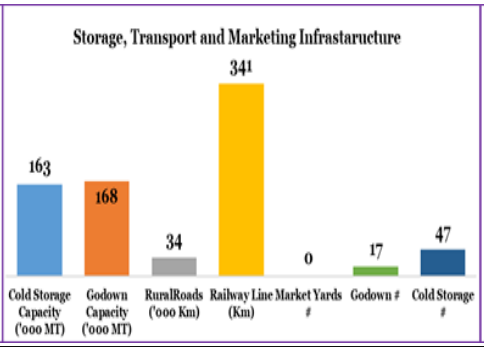
Land Usage (2015-16)

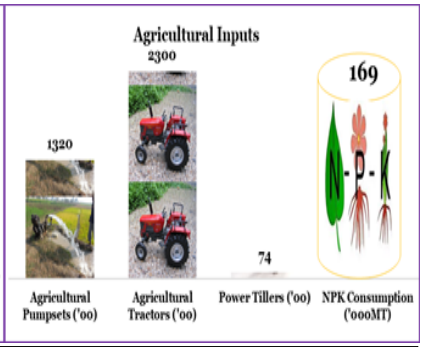


Irrigation

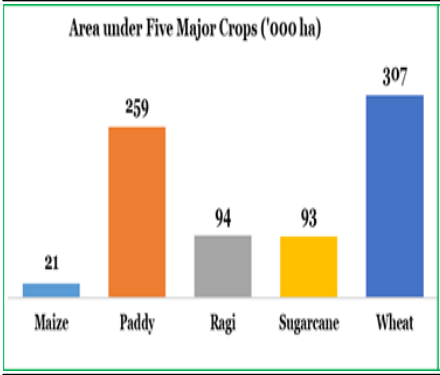
Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

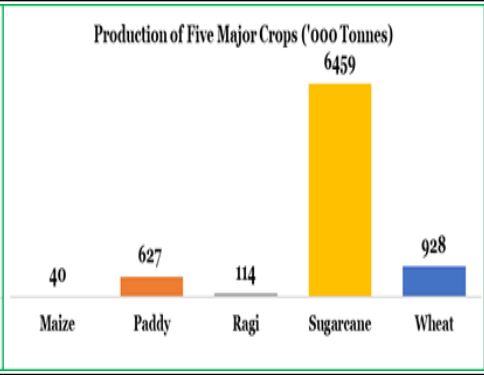


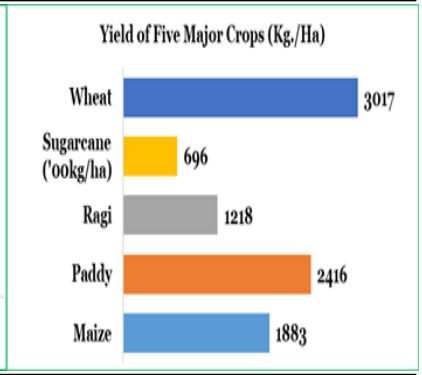




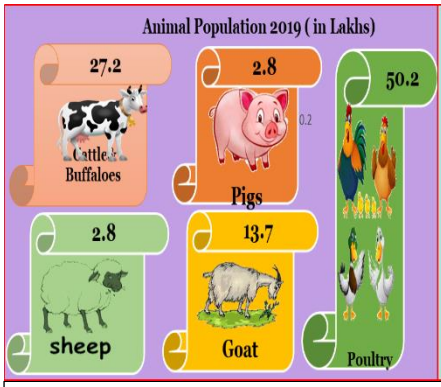
Area, Production and Yield of Five Major Crops 2018-19

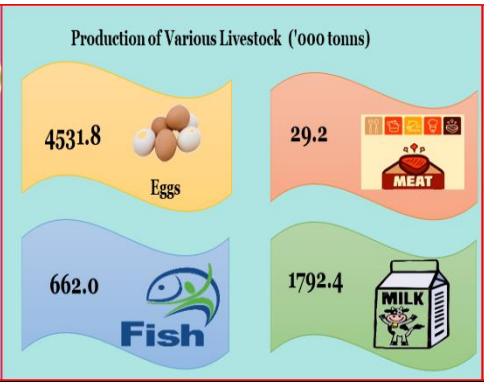


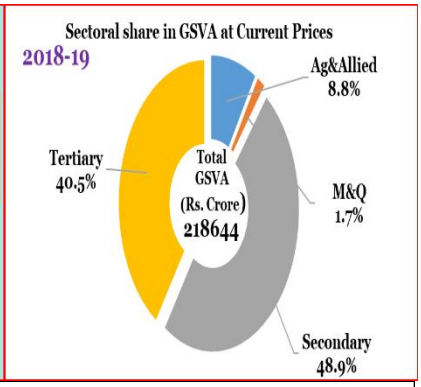




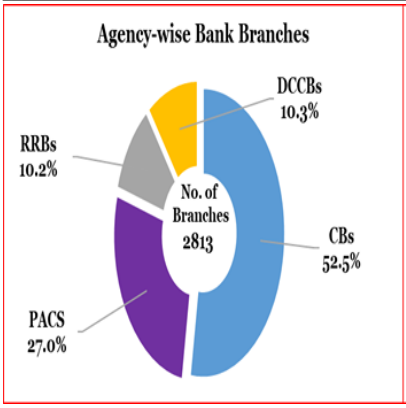
Allied Activities

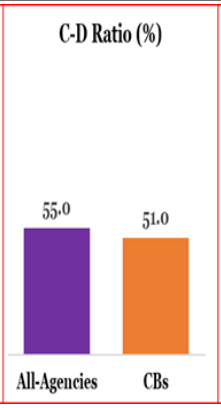


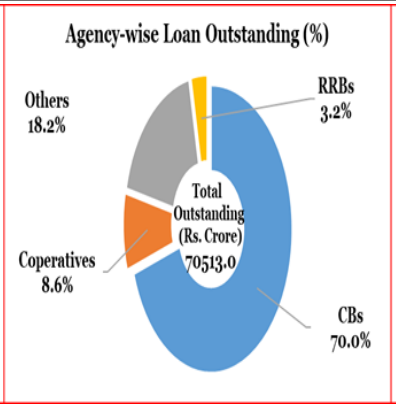


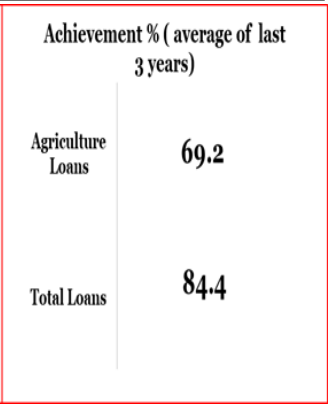


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in Uttarakhand

The Himalayan State of Uttarakhand with a population of 100.86 lakh is spread over an area of 53483 sq. km which is divided into two regions, the Western Region called as Garhwal Mandal and the Eastern Region known as the Kumaon Mandal. The total geographical area of Uttarakhand is divided into four main Physiographic zones namely Tropical zone (Zone A: up to 1000 mtrs - Plains, Tarai, Shivalik hills, valleys); Subtropical Zone (Zone B 1000-1500 mtrs - largely non irrigated area); Cool Temperate Zone (Zone C -1500 to 2400 mtrs - mid Himalayas) and Sub-Alpine and Alpine Zone (Zone D- more than 2400 mtrs - mostly covered with snow). While Paddy, Wheat, Sugarcane, Maize, Mango, Litchi, Pulses, Oilseeds, Soybean etc. are grown in Zone A, Paddy, Wheat, Mandua, Pulses grow in areas falling under Zone B. Kharif crops, Horticulture, Floriculture, Medicinal and aromatic plants are some of the important crops grown in Zone C area. Hardly any agriculture activities are carried out in the geographical area falling under Zone D. Pastures, alpine meadows rare herbs etc. grow in the wild in these areas.

The net irrigated area to net sown area for the state is 47.61 percent. Irrigation is available mostly in the plains where 94% and 13% in hills of net sown area is irrigated. Around half the population in Uttarakhand is engaged in agriculture although the cultivable area is less than 15 percent of the total geographical area of the state. Thus, it is important to understand the problems and prospects of in agriculture for the State

Problems

i. **Low Average Yields in Hill Areas**: The existing average yield level of important crops is low in hills. Non-adoption of improved technologies, dependence on rainfed agriculture, less soil fertility, low seed replacement, continuation of traditional system of agriculture, small size of land holdings, fragmented land holding and low farm mechanization are the major reasons for low crop yield in the hilly regions of the State.

ii. **Infrastructural Bottlenecks:** The State also faces large infrastructural bottlenecks for both foodgrain and horticulture produce. Thus, there are huge post-harvest wastages and losses of agricultural produce due to inefficient supply chain management which are mainly attributed to lack of scientific storage facilities, improper transportation, poor front-end infrastructure, such as inadequate warehousing facilities, redundant food processing technology and farmers' inaccessibility to value-added services.

iii. **Inefficient Allied Sector:** In Uttarakhand the allied sector (Animal Husbandry and Dairy) plays a pivotal role in providing livelihood to the small and marginal farmers and sustainable development of rural areas. Agriculture in Uttarakhand is interlinked with animal husbandry and forestry to form a production system. Small and marginal farmers in the state have a strong dependence on livestock sector as it is not only a source of milk and draught power, but the by products, such as, manure, hides, bones, etc. help in supplementing the farm income. However, the animal husbandry sector in the state is characterized by very high population of animals but very low productivity.

iv. **Untapped Natural Resources and Poor Marketing Linkages**: Uttarakhand is endowed with a large network of rivers and their tributaries, high and low altitude natural lakes, reservoirs and ponds. The State has numerous varieties of fish species and various types of water resources both natural and manmade. Aquaculture can be a source of livelihood for the locals by providing opportunities for angling and eco-tourism also. However, the state suffers from lack of strong extension network and

coupled with untrained farmers has resulted in poor productivity in ponds and tanks. Also there is a lack of market linkages and cold storage infrastructure which prevents full price realisation for farmers. Similar problems of lack of infrastructure, credit access and market access also hinder the growth of the poultry sector in the state.

Prospects

i. **Agro-processing Industry:** In Uttarakhand, agro-processing industries, grading and packing units need to be encouraged particularly in the field of processing of maize, tomato, peas, apple, milk, medicinal and horticulture products by giving incentives and marketing support in the State. Private investment in post-harvest infrastructure (quality testing labs, cold chain, etc.) needs to be encouraged.

ii. **Promoting Hill Friendly Agri Implements**: There is also need to promote small size gender friendly tools in the hilly regions. Efforts need to be made for development of mechanized tools for small farmers, which may be operated by alternative energy sources like wind, solar etc.

iii. **Creating Agri-Market Linkages**: The hill districts of Uttarakhand have diversified into the production of condiments and spices besides horticulture crops, tea plantation, floriculture, oilseeds and traditional hill grains. Efforts need to be encouraged for necessary backward and forward linkages for plantation and horticulture. Focus of strengthening the FPO and PACS network in the State will address the issue of collectivisation and market access to a large extent. The state has a lot of scope in the medicinal and aromatic plants sector. Thus, there is need to scale up the measures for improving productivity and production of herbal and medicinal plants for establishing market linkages. Contract Farming arrangement especially for medicinal herbs and horticulture products need to be introduced.

iv. **Strengthening Dairy and Poultry Value Chains:** The allied sector has a lot of growth potential in the State. In order to improve the milk yield/the milk production, indigenous cattle may be upgraded through establishment of Artificial Insemination Centers and bull mother farms in select pockets of the state. The arrangement for supply of quality milch animals may be suitably strengthened. In this regard State/District Milk Federation(s) can play a big role.

v. **Aquaculture and Fisheries:** Organic fish culture is being practiced in almost the entire State by default, as almost negligible quantity of chemical fertilizers is being used. The State Government may consider promoting the technology of organic fish farming with an ultimate view to export organic fish harvest to fetch a better market price. Training and awareness programmes for the fish farmers along with investments in the supply chain infrastructure will allow the State to realise its full potential in the sector.

Conclusion

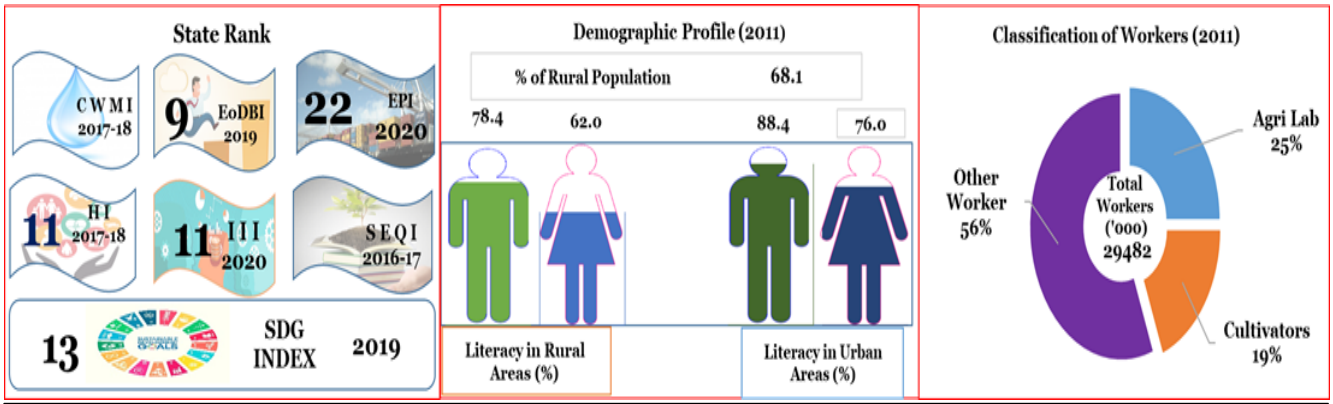
Even though agriculture in Uttarakhand is marred by difficult terrain and low productivity it has tremendous potential in agriculture and allied sector. Agriculture in the state can realise its full potential if there is an enhanced focus on crop diversification, promoting high value crops, developing integrated farming systems and adopt organic farming which has a lot of potential in the state.

West Bengal

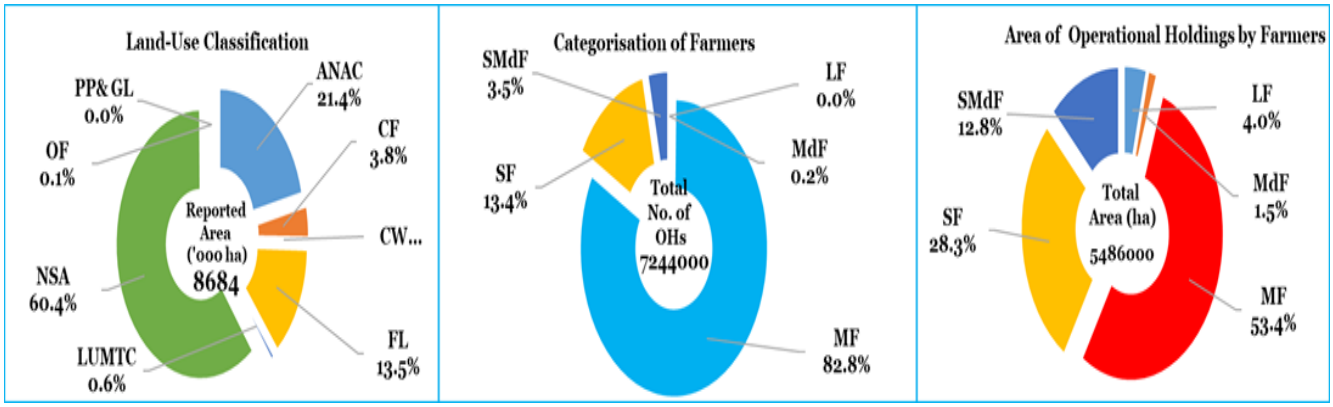
Agro-Climatic Zone	No. of Districts	No. of Panchayats	Rainfall LPA (in mm)	No. of Blocks	No. of Villages
6	23	3354	1831	346	37469

Percapita Income (2019-20)(Rs.)	GSDP (2019-20) (Rs. Crore)	Geographical Area in 2015-16 ('000 ha.)	Total Population('000)	Rural Population ('000)
115748	1253832	8875	91726	62183

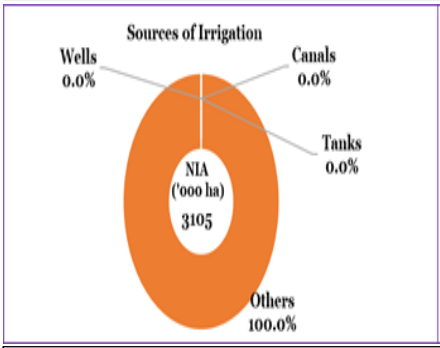
General Demographic Profile

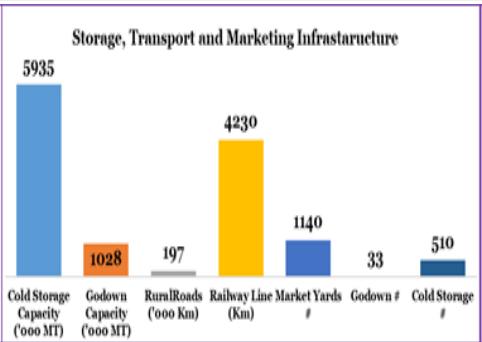


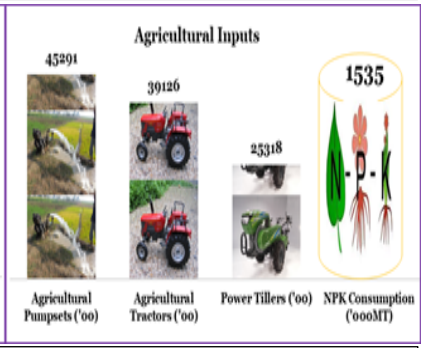
Land Usage (2015-16)



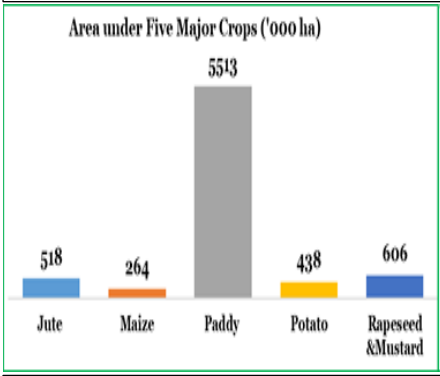
Irrigation	Agriculture Infrastructure (Roads for 2016-17, Railway for 2019, Godowns for 2018, Cold Storage and NPK for 2018-19 and Agricultural Tractors, Pumpsets and Power Tillers for 2016-17)

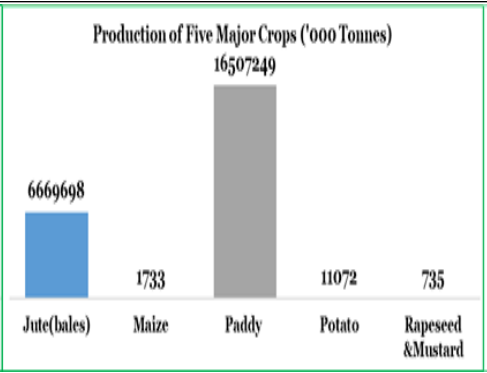


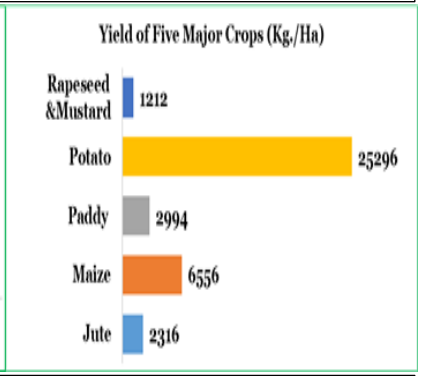




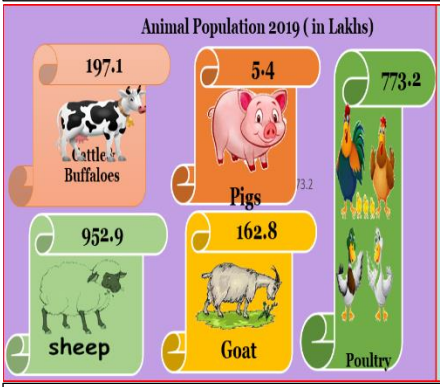
Area, Production and Yield of Five Major Crops 2018-19

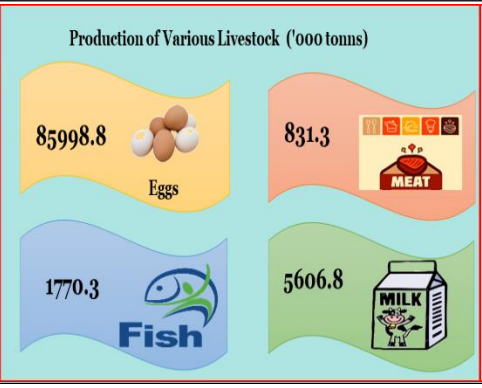


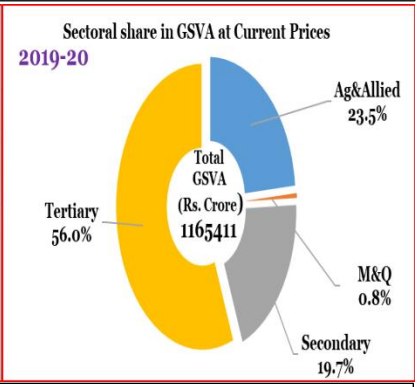




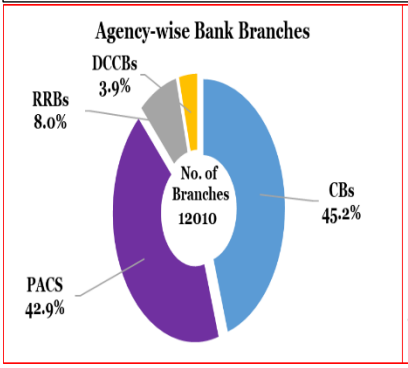
Allied Activities

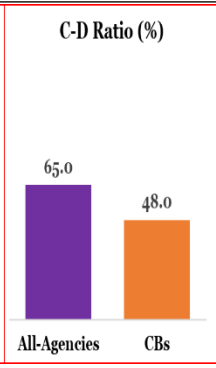


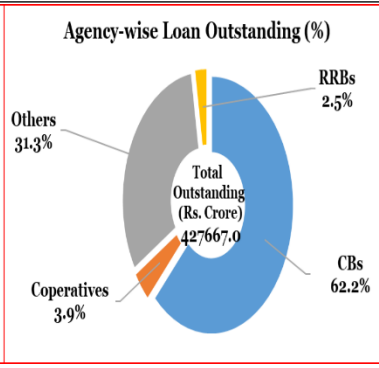


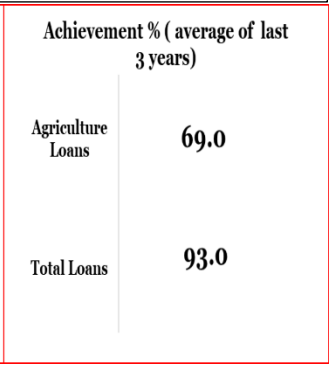


Agricultural Credit Details as on March 2019









Problems and Prospects of Agriculture in West Bengal

West Bengal, located in the eastern part of covers about 3% of the total area of the country with a coastline of 150 kms and also serves as a gateway to the North-Eastern states and Nepal, Bhutan and South-East Asian countries. West Bengal is the 4th most populated state in India. It has 14 major rivers. The average annual rainfall is 1,760 mm. However, because of erratic rainfall pattern, frequent floods *(about 42.30% of the total area is susceptible to floods)* and droughts have become almost a regular feature, severely affecting the agrarian economy of the state.

'Bengal is on the Rise' and the state has come up with a punchline 'Bengal means Business'. It is observed that the share of agriculture is low in the state, but the level of dependents on agriculture is more than 50% as it plays a crucial role in the economy in terms of food and nutritional security. Agriculture is currently facing multiple challenges, such as slowing down of total factor productivity growth, rising cost of cultivation, rapid division and fragmentation of land, inadequate mechanization, labour shortage, post-harvest management, inefficient use of inputs, higher incidence of diseases and pests, change in consumer preferences towards healthy foods, etc.

Problems

i. **Share cropping / tenant farming:** It is one of the dominant features in the state. The leased-in-area as a percentage to operated area of agricultural land was 14.25% in 2012-13 (NSSO 70th Round Survey). Agricultural sector mainly comprises of small and marginal farmers. The average size of land holding is 0.77 ha. in comparison to all India average of 1.08 ha. As per the NSSO 70th Round Survey, the average monthly income of agri-households is very low compared to their expenses, leaving them with negative surplus. The small size of land holdings, along with large scale fragmentation, creates problem for farm mechanization and capital investment.

ii. **Stagnant Agriculture growth** - Though Bengal ranks 1st in rice and jute production in the country and accounts for 14-16% of the country's rice production and 66% of jute production. The predominance of rice-based mono-cropping and or with potato /jute in sequence and less preference for crop rotation and diversification has led to stagnation in agricultural growth

iii. **Irrigation:** Agriculture in West Bengal is largely dependent on monsoon, which in recent years has shown highly erratic patterns on account of climate change leading to frequent floods and droughts. The net sown area in the state was 52.74 lakh ha. and the gross cropped area was 94.59 lakh ha. The net irrigated area was 30.99 lakh ha which is 58.7% of NSA. Several parts of the states are flood prone with persisting drainage problem.

iv. **Low productivity in fishing: -** Large water bodies are under derelict and semi-derelict conditions. Lack of organized fish culture at village level is resulting in wide gap in potential and actual productivity. There are shortcomings in marketing, absence of adequate ice plant and cold storage facilities at the production point. Bank financing in the fishery sector is not adequate. Productivity is low under beels (100 to 300 kg/ha) and ponds (3000 kg/ha) due to underutilization and poor management.

v. **Lack of Modern Technology: -** Inadequacies in availability of quality seed/plant material for all the major crops grown in the State is resulting in low levels of seed replacement. Total dependence on other states like Punjab for meeting the seed potato requirements. Though the State is a major producer of fruits and vegetables,

inadequate post-harvest handling and cold storage facilities for perishable horticulture produce including potato is resulting in seasonal gluts and distress sales besides huge losses.

Prospects

i. **Productivity Enhancement** - Despite these constraints, there is a lot of potential for productivity enhancement. The Govt. of India has launched "Operation Greens" on the lines of "Operation Flood" for promotion of 3 major horticultural crops – tomato, onion and potato through thrust on FPOs, agri-logistics, processing facilities.

ii. **Food and Agro processing** is important for reducing post-harvest losses. It has a strong agri-horticultural resource base with 5 food parks and 2 mega food parks. The SAMPADA yojana and the state government's thrust on development of food and agro processing clusters in every district of the state has created positive environment for development of the sector. The State Govt has 'Amar Dhan Amar Chatal' scheme.

iii. **Marketing -**The availability of markets for the farmers has been taken up with the amendment of the APMC Act in March 2017 and operationalization of e-NAMs, e-GrAMs to introduce e-trading facility, single point levy and licensing throughout the state and direct sale of farmers produce through Krishak Bazaars and FPOs.

iv. **Huge Scope for Fishery -** Per capita consumption of fish is highest in world and hence high demand for production of fish. The State has 2.10 lakh ha of impounded brackish water resources (highest in country) of which only 0.48 lakh ha have been developed signifying the opportunity for further development. Also, there is good scope to improve yield potential to 1000 kg/ha under beels and up to 7500 kg/ha under ponds. Introduction of new concepts like cage & pen culture in earthen canals, beels, reservoirs and diversification into fresh water prawn farming will help to increase income level and the demand.

v. **Capital formation:** Boosting investment credit in agriculture along with increasing the level of public investment is a pre-requisite for capital formation in agriculture. Institutional credit has been one of the crucial inputs for fueling the economy. During the last five years (2014-15 to 2018-19) it has grown with CAGR of 18.5% and the share of priority sectors in total ground level credit disbursement ranged from 65% to 87% with CAGR of 27.8% for the above mentioned five years.

Conclusion

The main responsibility of the State Government is to allocate larger funds for the expansion of the irrigation schemes as well as ensuring easy access to credit for installing minor irrigation capacities by the marginal and small farmers who lack in their own resources. However, the spread of technology and infrastructure development still remains a major requirement of the day. Institutional reforms coupled with technological change will induce the marginal farmers to realise the benefits of higher diversification and raise their income levels further.