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#### Amalendu Kumar

Tirhut College of Agriculture,  
Dholi, Muzaffarpur Dr. RPCAU,  
Pusa, Samastipur, Bihar, India

#### RS Singh

Tirhut College of Agriculture,  
Dholi, Muzaffarpur Dr. RPCAU,  
Pusa, Samastipur, Bihar, India

#### CS Choudhary

Tirhut College of Agriculture,  
Dholi, Muzaffarpur Dr. RPCAU,  
Pusa, Samastipur, Bihar, India

## Agrarian structure of Bihar: Changes, challenges and policy options

Amalendu Kumar, RS Singh and CS Choudhary

### Abstract

Bihar is an agricultural state where more than 90% people directly or indirectly depends for livelihood. In the state more than 55.00% of the geographical area under agricultural use and per capita land is 0.11 hectare. In the state nearly 52% people are in poor condition due to lack of industries. In the past three-four years more than 50 lacs farmers who migrated in different state returns back in the state and create additional pressure on this sector. In view of above the present paper Agrarian structure of Bihar changes, challenges and policy options constructed with the view to access the possibilities of agricultural sustainability in the state by using secondary level data for attending the objectives. The study finds that in the state a diversify agro climatic situation and having own positive and negative effects on agriculture but after introduction of Agricultural road maps in the state a significant positive changes has been observed in this sector, it is emerged from the discussions that Bihar cannot meet the challenges of agricultural production and practices in the future unless sincere efforts are made to make the state agriculture environmentally sustainable. For the purpose of coping with various challenge under agriculture an optimum balance plan may be needed by increasing agricultural productivity, restoring and conserving natural resources for food security, promoting agriculture as per the people needs, value addition and processing level enhancement. This can be achieved by proper use of ecological conditions of a specific location / region of the state and by resource management in a manner that safeguard for future. The goal of sustainable development is through yields optimization without causing adverse short term or long term impacts on the nature.

**Keywords:** Agrarian, structure, changes, challenges, policy option, Bihar

### Introduction

The state of Bihar with an area of 93.60 lakh hectares accounts for about 3.00% of the total geographical area of the country. As per 2011 census, around 10.41 crores people live in the state which accounts around 8.00% of the country population. In the state in between 2001 and 2011 decadal growth was about 25.40%. The state is significantly higher population density 1106 person per square kilometer with compared to national average 880 person in 2011. In the total population around 89.00% population live in rural areas (9.26 crores) and directly dependent on agriculture & its related activities. It is observed from data that only 0.80 percent increase in urban areas in between 2001 to 2011 shows the dependency on agriculture. The ratios of land put under agricultural use was higher 55.20 percent with compared to 44.80 percent uncultivable land. The net sown area of the state is around 51.67 lakh hectares. As per the rural enquiry report on rural labour household 2016 around 50.39 percent labour households were without land, 69.80 percent of rural labour household were without land and average size of land per cultivated households in rural areas was 0.11 hectare. At the end of year 2021 the state population will be around 12.90 crores (added 2.49 crores in 2011 census) above data also goes below due to increase in population of the state. This showed inequalities in terms of land distribution.

The data of 2011-12 showed that in the state around 33.74 percent population lives below the poverty line and nearly 51.91 percent populations are poor. In the same year per capita income of the state was Rs. 25653.00 and was increased Rs. 46290.00 in 2020-21 but it is far below the other states and the national level. The low level of income along with deteriorating rural small and cottage industries force the rural labour to migrate for searching income in other developed state of the country. It is interesting to note here that in the end week of march 2020 the central government was taken decision for lockdown the country and all economic activities were stopped except agricultural. Due to decision around 35 to 40 lakh farmer workers were back to their native place and increase the pressure on agriculture sector.

#### Corresponding Author:

#### Amalendu Kumar

Tirhut College of Agriculture,  
Dholi, Muzaffarpur Dr. RPCAU,  
Pusa, Samastipur, Bihar, India

The other categories of workers like food processing, dairy sector sugar industries manufacturing units, construction sector were fully unemployed and additional load comes on agriculture sector. That was the time to maintain income level, livelihood and nutritional level of the people resides in the state. To cope up with situation the state government taken measures and started to give emphasis on livestock, horticulture, floriculture, fisheries medicinal; other cash crops, value addition, processing, etc. for engaging the unemployed persons of the state for providing better income and livelihood. The government was target to landless, marginal, small farmers, unemployed youths, women, etc. for gaining normal life and bringing employment generation in the state. The reason behind it was to stabilize the growth of overall economy. The policy makers were aware and known that if the growth rate of agriculture will be stabilized, it would provide a positive impact on other sectors and stabilized the state income. In this backdrop present paper prepared to access and discuss the changes, challenges and policy options in the present situation as a broader objectives. In this paper secondary level data collected from reliable sources was utilized to present the real facts. The data is presented in various sub sections in the text of the paper.

#### Agro- climatic situation of Bihar

The state has four distinct important agro- climatic zones i.e. North Alluvial plain popularly known as Zone-1 includes 13 districts. the zone have 3.26 million hectares geographical area and out of it around 65.95 percent (2.15 M. Ha) under net sown area. In the zone rain fall found varied between 1040 mm to 1450 mm with an average 1245 mm. The minimum-maximum temperature ran gage between 7.7 to 36.60 degree Celsius. The important crops of the zone are rice, wheat, maize, Arhar, moong, potato, sugarcane, etc. and the soil is mostly sandy loam and loam. North – East Alluvial plain known as zone 2 comprises eight districts of the state. The geographical area is 2.08 M. Ha and out of it 1.21 M Ha under net sown area around 58.17percent. In the zone about 19.83 percent area is under irrigation. In the zone rainfall ranges between 1200 mm to 1700 mm and average is 1450 mm. The temperature ranges between 8.8 to 33.80 degree Celsius as minimum and maximum. Important crops in the zone are jute, rice, wheat, potato, maize, mustard, moong, etc. The South zone alluvial plain (Zone III) comprising 17 district. The geographical area is divided into two part i.e East South Alluvial plain comprises 6 district and having 1.11 M.tta of geographical area and out of it only 44.14 percent is under cultivation. Rainfall range between 990 mm to 1240 mm with an average of 1115 mm. The main crops grown under the area is Rice, Wheat, Moong, Gram, Potato, Onion etc. The second sub-zones in the zone is West South Alluvial Plain. It comprises 11 district and its geographical area is 2.92 M.tta in the total geographical area 57.53 percent area under net sown and 81.15 percent area under irrigation. The average rain fall of the zone is raised between 990 mm to 1300 mm and temp. Range between 37.10 to 7.80 degree Celsius. The main crop of the zone is Rice, Gram, Moong, Wheat etc.

The State as a whole affected by two sets of stress live flood and drought. In the entire zone area under food grains decreased (Cereals, Coarse Cereals, pulses) and the area under fruits, sugarcane increased. It is important to highlight that the area under food grains till occupies more than 85 percent of the total cropped area due to traditional cropping pattern and traditional food habits.

#### Operational Holdings

In the state average land holding size is very small, fragmental and scattered due to land ceiling acts, breakup of joint family and family disputes. In the state presently more than 91 percent holdings are marginal and rest 9 percent were small, medium, semi-medium, and medium holding of land. This is the main reasons for traditional farming, Due to less of land reforms in the state violence, clashes, share cropping, low agricultural wages. etc. were developed. The naxal movement is also the outcome of the weak implementation of land reform policy.

#### Mechanization in Agriculture

In the state decreasing operational land holding trends, high price of agricultural machines, poor credit network & system forces the farmers to adopt the traditional ways of agriculture. However, mechanization save time labour production cost and boosts the production in agricultural harvester, threshers, sprayers, winnowing machines are popularized in the state but due to poor economic conditions of marginal and small farmers they beyond the reach and ultimately per capita availability is much lower in the state of Bihar with compared to agriculturally developed states. The state Government provides subsidy to farmers but due to lack of capital it is not goes to the needy farmers or targeted farmers.

#### Irrigational states

The state government has been taken several initiatives to increase the gross irrigated area but due to power problems pump sets still depends on the use of diesel which is presently much costlier. The irrigation potential has not significantly increased, however the state government also provide subside under various scheme on pump sets, ground water, etc but only zone-3 West South Alluvial plain has created irrigation potentials up to more than 80 percent in the state due to agriculturally developed districts in this zone. How water use efficiency, poor maintenance of irrigation systems and poor water recharges (Zone-3) are some of the major problem is irrigation system. In the state a vast amount of unutilized water potential but extraction is found not satisfactory in Bihar total ground water resources 29.19 billion cubic meters per year and available ground water resources for irrigation is 27.042 BCM per year.

#### Cropping Pattern

In the state variety of crops were grown due to favorable agro climatic conditions. the details are presented under here after introduction of road maps for agriculture.

**Table 1:** Year-wise cropping pattern in Bihar (2007-08 to 2020-21)

Year	Food Grains	Cereals	Pulses	Other crops
2007-08	94.50	86.5	8.0	5.5
2008-09	94.70	86.8	8.0	5.2
2009-10	94.90	86.8	8.1	5.1
2010-11	92.30	83.2	9.1	7.7
2011-12	93.00	85.6	7.4	7.0
2012-13	93.02	85.90	7.11	6.99
2013-14	92.57	85.52	7.37	7.11
2017-18	93.70	86.90	6.80	6.30
2019-20	94.10	87.40	6.70	5.90
2020-21				

**Source:** Economic survey of Bihar various issues & Bihar through figure

**Table 2:** Cropping pattern of the state from triennium ending (2007-2022)

Triennium ending	Food grains	Cereals	Pulses	Other crops
2007-10	94.70	86.67	8.03	5.30
2010-13	92.77	84.90	7.87	7.23
2013-16	93.08	85.70	7.38	6.92
2016-19	93.67	86.70	6.97	6.33
2019-2022	93.46	86.50	6.96	6.54

**Source:** Economic survey of Bihar various issues & Bihar through figure.

It may be observed from the above table stated above that the cropping pattern of various crops for the period from triennium ending 2007-10 to 2019-2022 reveals that the agricultural pattern is very much oriented towards subsistence. Productivity is as much as the average under food grain production is more than 92 percent. Under food grains the percentage share of cereals has been more than 85.0 percent and pulses share varied between 7.0 to 8.0 percent across the reference period. The other crops like oilseed, fiber, sugarcane, etc. range between more than 5.0 percent to 7 percent in the state. The variation was due to agro climatic conditions which varied from one zone to another.

### Production of food grain commodities

In the state food grains production presented under the table given below –

**Table 3:** Production of food grain commodities

Triennium ending	Production lakh tones	% change	productivity
2007-10	115.12	-	1707
2010-13	154.06	33.83	2045
2013-16	153.25	38.13	2364
2016-19	181.82	57.94	2476
2019-22	177.46	54.15	2578

**Source:** Directorate of Economics and statistics, GoB, Patna

**Note:** During 2020-21 production level was 179.52 lakh tones and 2021-22 it was 184.86 lakh tones.

It may be observed from table 2 that the increase in the production of food grains that increased from 115.12 lakh tones during the triennium ending (2007-2010) to 177.46 lakh tones during the triennium ending (2019-2020). However it was higher during the triennium ending 2016-2019 above 181.82 lakh tones. It is noted that the state government launched agricultural road map in 2008 with a view to increase the farm production on sustainable basis. Under this road map stress was given to availability of seed, Bio-farming and modern agricultural equipments from 2007-08 to 2011-12 and the production touched 178.29 lakh tones in 2012. After this Road Map second road map launched in 2012 with the aim of food security, nutrition security and increase with income of farmers through connect village by concrete roads and production reached during 2016-17 was 252.01 lakh tones (about 73.72 lakh tones) higher from the 1<sup>st</sup> agricultural road map. The third road map was launched for a period of 2017 to 2022 but it continued for six year tenure during 2023. In this road map emphasis was given on all round development of agriculture sector through food processing, irrigation & developed organic farming corridors on major rivers but the production level of food grains was declined about 3.79 percent due to environmental factors & new limitations.

### Zone wise major constraints in Agricultural Development

#### Zone-I

1. Subsistence Agriculture and lesser degree of diversification of agriculture.
2. Low crop productivity due to soil salinity
3. Erratic crop production due to flood every year
4. Irrigated land is below 30 percent of the total cultivable area.
5. Low adoption of scientific technologies due to lack of resources to marginal and small farmers.
6. Market facilities and infrastructures inadequate.
7. Potential for horticultural crops but processing level is very low.
8. Farming systems for flood and waterlogging are not available.

#### Zone-II

1. Due to recurring floods erratic crops production is rule.
2. Irrigation level is very low up to 20% only of the total cropped area.
3. In north eastern part soils are mostly acidic.
4. In this zone micro-nutrients deficiency occurred due to leaching.
5. Complete absence of processing industries and market infrastructure.

#### Zone-III

1. Zone is agriculturally developed but both Tal and Diara area covered a large area.
2. Due to water logging conditions in Tal and Diara only mono cropping (*rabi* season) rule.
3. Region is not free from flood.
4. Lack of storage facilities, marketing facilities in remote area is big problem.
5. Poor input delivery system.

All above noted problems are the main and powerful barrier in crop production at sustainable basis across the agro climate zone and the state of Bihar also. In entire zone there is need for planning to develop institutes like market, credit etc. for controlling increasing unemployment, erratic food grains productions, and poverty reduction on priority basis.

### Changes in agriculture practices

The state government launched agricultural road map with a view to changes in agricultural productivity and production on sustainable basis. The first road map launched in 2007 for five years with the aim of seed development, Bio farming and use of modern agricultural equipments in the farm sector. The second road map was launched in the year 2012 and the aim was food security, nutrition security and increase the income level of farming. After that in the year 2017 the third road map was launched and its tenure was six year 2017-2023 with the aim of all round development of agriculture and allied through food grain processing, irrigation potential enhancement and dairy development. At present preparation of 4<sup>th</sup> road map is going on. Since introduction of road maps in the state a significant increase in agricultural production more than 75 lakh tons recorded during the period. The dairy sector, fisheries sector and processing status also observed significantly a positive increase in the state. It is interesting to note here that the state is most flood prone 73.06% area and

more than 12 districts are drought affected also. In this situation increase in production is appreciable.

### **Conclusions and suggestions**

After analyzing the various aspects of agricultural situations in the state of Bihar, it is emerged to the conclusion that Bihar cannot meet the challenges of agricultural production and practices in the future unless sincere efforts are made to make the state agriculture environmentally sustainable. For the purpose of coping with various challenge under agriculture an optimum balance plan may be needed by increasing agricultural productivity, restoring and conserving natural resources for food security, promoting agriculture as per the people needs, valu addition and processing level enhancement. This can be achieved by proper use of ecological conditions of a specific location / region of the state and by resource management in a manner that safeguard for future. The goal of sustainable development through yields optimization without causing adverse short term or long term impacts on the nature.

Thus, to make sustainable agriculture in state, efforts must be made to raise soil fertility, improve water storage capacity as well as its quality, agriculture diversification in right ways, raise farmers' s capability to cope with risk and natural calamities, optimum energy consumption, etc. by the state level Department as policy measures.

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