



## AGRICULTURAL SCENARIO OF BIHAR - NEED OF REVITALIZATION

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*The State of Bihar with a geographical area of 94.2 thousand square km is divided by river Ganges into two parts, the north Bihar with an area of 53.3 thousand square km, and the south Bihar having an area of 40.9 thousand square km. Based on soil characterization, rainfall, temperature and terrain, three main agro-climatic zones in Bihar have been identified. These are: Zone -I(North West Alluvial Plain), Zone - II (North East Alluvial Plain), and Zone-III (South Bihar Alluvial Plain), each with its own potential and prospects. All these zones have Chaur, Maund, Tal and Diara lands, which are submerged during the rainy season.*

Agriculture is the backbone of Bihar's economy with 81% of workforce and generating nearly 42% of the State Domestic Product. The percentage of population employed in agriculture production system in Bihar is estimated to 81%, which is much higher than the national average. Nearly 42 per cent of GDP of the state (2004-05) has been from agriculture sector (including forestry and fishing). The state has attained self sufficiency in food grains production. Barring maize and pulses productivity of various farm produce in Bihar is much below the national average. Though the area under cultivation is shrinking, there is tremendous scope for income generation, by improving agricultural productivity. Adverse climatic conditions, like draught and floods, do play a role in decreasing products. But these adverse conditions can be overcome to some extent by irrigation, flood control and drainage schemes. The agriculture production can only be increased to some extent through enhanced cropping 'intensity, change in cropping pattern, improvement in seeds of high yielding varieties, cultivation practices and with the availability of better post harvest technology etc. Government of Bihar is trying to re-orient agriculture through diversification policy and other measures [1].

This paper highlights the key issues related to agricultural sector in the state of Bihar and suggests some measures about the agricultural productivity revitalization.

### Introduction

Agriculture is the single largest private sector occupation in Bihar. The goal of the agriculture production system should be to maximize income of land owning and landless rural populace to improve their livelihoods. The vulnerability to income and consumption shocks makes it imperative to develop formal agriculture insurance mechanisms to cope with such risks. Agriculture productivity in Bihar was much better, compared to other states in fifties which is now much below the national average. In last two years, there has been an approachable growth, due to improved seeds, technologies and inputs.

The percentage of population employed in agricultural production system in Bihar is estimated to be 81%, which is much higher than the national average. Nearly 42 per cent of GDP of the state (2004-05) has been from agriculture sector (including forestry and fishing). High concentration of population, largely dependent on agriculture coupled with low yields of the major cereal crops, is main reason for high poverty ratio in the state. Consequently,

about 42 % of the State population is below poverty line as against national average of 26%. As urbanization in the state is still very poor, nearly 90 per cent of the population lives in rural areas. The State of Bihar is also lagging behind the national average on all socio-economic indicators like per capita income, average size of operational holding, per capita cultivated land, percentage of villages electrified, road length per thousand sq km, per capita deposit, per capita bank credit, credit-deposit ratio, male-female literacy, and life expectancy etc. Bihar is considered to be at the bottom.

The gross and net sown area in the State is estimated at 80.26 lakh ha and 56.38 lakh ha, respectively. The intensity of cropping is 1.42%. The principal crops are paddy, wheat, pulses, maize, potato, sugarcane, oil seeds, tobacco and jute. Rice, wheat and maize are the major crops. The average yields of rice and wheat are 1.45 and 2.19 t/ha, respectively, as against the production potential (experimental yields at research farm as well as realized in frontline demonstration) of 4.5-5.0 t/ha. Similarly, the average of maize yields of the State is about 2.38 t/ha as against its yield potential of 5 t/ha. State is rich in soil and water resources, its average yields of Rice, Wheat and Maize in the state are only about 32, 44 and 40 percents of the potential yields, respectively.

Although, Horticulture (Fruits, vegetables, spices, honey, medicinal and aromatic plants) occupies 15 percent of land area but income generated from horticulture is much higher. The state has a monopoly in production of litchi and makhana and continues to grow various fruits, vegetables, spices and floriculture is catching the imagination of people, reflected in their growing interest, across the state, in diversification of horticulture.

Fertilizers, the most important component of new technology, play a very important role in enhancing the agricultural production in the State. Since the introduction of high yielding varieties, the consumption of chemical fertilizers has been increasing steadily. Fertilizer consumption in Bihar was a mere 22 kg NPK (Nitrogen, Phosphorous, and Potash (Potassium))/ha, in TE 1982 which increased to 63 kg/ha. In TE 1991 and reached a level of 82 kg/ha, in TE 1998. Fertilizer consumption increased in all the zones, during this period. Total consumption of chemical fertilizers in Bihar was 731.6 thousand MT during 2004-05. The level of consumption has increased to 1064.8 thousand MT during 2006-07. But there is unbalanced use of N, P and K. While the ideal ratio would be 4:2:1, this was 14.7:7:1 in 2004-05 but improved significantly to 6.8:3:1 in 2005-06.

#### **Agricultural Productivity: Key Issues**

The objective of the agriculture policy in the State of Bihar is to increase productivity of major crops so as to bring it close to national average. Opening up of markets has necessitated increased production at competitive prices. Adapting as well as popularizing proven Research and Development efforts is also important.

Two strategies adopted for increasing agriculture production and productivity are research and extension i.e. from labs to farms. Delivery systems to make available quality seeds, pesticides and extension system to farmers are also being strengthened [1]. Bihar, with its bountiful natural resources of fertile soil, abundant water, varied climate and rich

cultural and historical heritage is one of the most fascinating states of India. The farmers are intelligent and hard working. Therefore agriculture has been described as the core competence of Bihar by the Hon'ble President of India.

Agriculture is the vital source of wealth in Bihar. A very large proportion of population as described above is engaged in agricultural pursuits. Bihar's productive contribution in food grain, fruit, vegetables, spices and flowers can increase manifold with improved methods and system management.

Bihar has a total geographical area of about 93.60 lakh hectare, out of which only 56.03 lakh hectares is the net cultivated area and gross cultivated area being 79.46 lakh hectares. About 33.51 lakh hectare net area and 43.86 lakh hectare gross area receive irrigation from different sources. Principal food crops are paddy, wheat, maize and pulses. Main cash crops are sugarcane, potato, tobacco, oilseeds, onion, chilies and jute and. Bihar has notified forest area of 6,764.14 sq km, which is 7.1 per cent of its geographical area. Bihar is located in the eastern part of the country (between 83°-30' to 88°-00' longitude). It is an entirely land-locked state, although the outlet to the sea through the port of Kolkata is not far away. Bihar lies mid-way between the humid West Bengal in the east and the sub humid Uttar Pradesh in the west which provides it with a transitional position in respect of climate, economy and culture. It is bounded by Nepal in the north and by Jharkhand in the south. The Bihar plain is divided into two unequal halves by the river Ganga which flows through the middle from west to east.

Bihar with a geographical area of about 94.2 thousand square km is divided by river Ganges into two parts, the north Bihar with an area of 53.3 thousand square km and the south Bihar having an area of 40.9 thousand square km. Based on soil characterization, rainfall, temperature and terrain, four main agro-climatic zones in Bihar have been identified. These are: Zone-I, North Alluvial Plain, Zone-II, north East Alluvial Plain, Zone-III A South East Alluvial Plain and Zone-III B, South West Alluvial Plain, each with its own unique prospects.

The principal agricultural crops are rice, paddy, wheat, jute, maize and oil seeds. Cauliflower, cabbage, tomato, radish, carrot, beat etc. are some of the vegetables grown in the state. Sugarcane, potato and barley are some of the non-cereal crops grown. The entire agricultural operations are divided into two crop seasons Kharif and Rabi. The Kharif season starts from the third week of May and lasts till the end of October followed by the Rabi season.

Though endowed with good soil, adequate rainfall and good ground water availability Bihar has not get realized its full agricultural potential. Its agricultural productivity is one of the lowest in the country, leading to rural poverty, low nutrition and migration of labour. This road map is aimed to trigger processes of development in agriculture and allied sector.

The state is endowed with rich biodiversity. Agriculture provides ample supply of raw materials for the establishment of Agro based industries. Bihar is the third largest producer of vegetables and fourth largest producer of fruits in the country. It is the largest producer

of Litchi, Makhana, Guava, Lady's finger in India. The state already exports Litchi, Basmati rice and snow pea. It has competitiveness in maize, rice and fruit such as banana, mango, litchi and vegetables like onions, tomato, potato and brinjal. High, stable and regular supply of agricultural produce provides adequate opportunity for marketing and food processing industries.

Farmer's willingness to accept modern cultivation technologies and contract farming practices provide encouraging trends for investment in Agriculture sector. Necessary legislative changes to promote contract farming and private investment in marketing are being undertaken. Agricultural growth in the state is supported by institutional infrastructure of Rajendra Agricultural University, Pusa (Samastipur) and its network of Krishi Vigyan Kendra, ICAR eastern zone complex at Patna, National Research Centres for Litchi, Makhana and Pan. Small Farmer's Agri-business Consortium (SFAC) and Agricultural Technology Management Agency (ATMA) are others institutions supporting Agricultural growth in the State. Public sector Agricultural extension system is creating enabling ground for Public-Private partnership for rapid Agricultural growth in the state.

Agri-clinics will be encouraged to carry standard seeds, fertilizers, agricultural information to the farmers. They will be the carrier of the public programs to the farmers. Extension system will forge relationship with agri-clinics for creating synergy of the extension efforts. The expert services of the agri-clinics will be gainfully utilized in conducting training/ demonstration and their services will be treated at par with the services of agriculture scientists. To make the program of agri-clinics viable for the banking sector and to make them more attractive for agriculture graduates convergence of all programs will be created there. They will get preference in allocation of seed/fertilizer shops, outsourcing of block level soil labs, etc.

Krishi Vigyan Kendras will continue to receive prime attention in view of their utility as centre of excellence in spreading agricultural knowledge to the rural masses. They will also be encouraged to cater to post harvest handling of the agricultural products and develop entrepreneurial skill among the rural youth. The KVK's will function in FIVE MISSION MODE, viz. on honey bee, seed production including seed villages, conservation agriculture, integrated farming and vermi-compost.

Extension reforms will receive attention through Agriculture Technology Management Agency. ATMA will be established in all the districts of Bihar. The objective of convergence, farming system, group extension approach and increased use of ICT in agricultural extension will be pursued. Sustainability of the agriculture extension will also be explored. Public-private partnership in agriculture extension will be encouraged. Effort will be made to bring every farmer into the ambit of agriculture technology training in 5-year period.

The strategy will be to reach information, technology and services to the farmers in the quickest possible time. The emphasis of ICT will be more on developing application software and providing useful services to the farmers in the villages. Farmer useful services will be integrated with information and non-agricultural services and emphasis will be laid

on one point solution to the farmers' problems.

**Use of Quality Seed:** Seed is the most critical input in modern agriculture. It is the carrier of the modern technology. There is an apparent need to step up investment in both public & private sector. The prevailing seed replacement rate which is less than 10% in case of rice and wheat cannot sustain higher productivity growth rate. Therefore the objective of the seed production programme involve increase the seed replacement rate, promotion of hybrid seeds and crop varieties, which are new and adapted to the agro-climatic conditions of the state. Seed production on Government farms will be revived. Bihar Rajya Beej Nigam will be encouraged to undertake seed multiplication for recently released public sector varieties to make them timely available to the farmers at reasonable cost. Pusa Seed Society will be encouraged to improve supply of quality seed to the farmers. While the seed production under public sector will be revived, seed production through farmers' direct participation under seed-village program will be the corner stone of the strategy during 11th plan. Bihar Rajya Beej Nigam and Pusa Seed Society will be encouraged to buy-back seeds produced under seed village and provide processing & marketing support. Private seed companies will be encouraged to ensure availability of latest technology to the farmers and also to ensure fair competition with public sector seed companies for the benefit of the farmers.

**Marketing and Processing:** Any target for production can be achieved only if the farmers get proper price for their produce. Hence the success of this agriculture development strategy is dependent upon taking appropriate measures in the fields of marketing and processing. Agriculture marketing has been in the public domain with explicit limitations. Therefore the Agriculture produce market committee act has been abolished. Private sector and cooperative sector will be encouraged to establish market, enter into buy-back arrangement and purchase directly from the farmers. Contract farming will be encouraged, particularly for fruits and vegetables. The expansion of market facilities and better realization to the farmers will be the core of the market reforms. Farmers will be organized along the enterprises to establish economy of scale and to act as collective voice to safeguard their interest. This will include excursions into processing and marketing centres of excellence in the country, formation of farmer interest group and federating them at the various levels. Co-operative marketing shall be encouraged in the area of fruits and vegetables on lines of milk or dairy. Efforts will be made to make farmers aware of the market demand of the agricultural commodities. Extension will be made market oriented and efforts shall be made to make crop planning market oriented. Agriculture market information regarding price, arrival will be widely disseminated. Market yards and rural haats will be left to farmer groups for organized marketing in the state. Private sector participation in the development of modern and specialty market will be encouraged. Terminal market will be established in strategic locations.

**Risk Management:** Agriculture is prone to natural disasters, particularly flood in north Bihar and drought in south Bihar. Risk of natural disasters will be minimized through use of appropriate crop technology and extending crop insurance to all farmers. Insurance

cover will be extended to horticultural and cash crops. Seed bank will be maintained to quickly restore supply of seed material. Human resource will be developed to quickly react and restore normalcy in case of a natural disaster.

**Seasons:** Cold weather season (December to February), Hot weather season (March to May), Southwest monsoon (June to September) and Retreating southwest monsoon - October to November.

**Soil:** There are three major types of soil in Bihar i.e. Piedmont Swamp Soil - found in northwestern part of West Champaran district. Terai Soil - found in northern part of the state along the border of Nepal. Gangetic Alluvium - the plain of Bihar is covered by gangetic alluvium (both new as well as old).

**Fertile Land:** The topography of Bihar can be easily described as a fertile alluvial plain occupying the Gangetic Valley. The plain extends from the foothills of the Himalayas in the north to a few miles south of the river Ganges as it flows through the State from the west to the east. Rich farmland and lush orchards extend throughout the state. Following are the major crops: Paddy, Wheat, Lentils, Sugarcane, Jute (hemp, related to the marijuana plant, but a source of tough fibers and "gunny bags"). Also, cane grows wild in the marshes of West Champaran. The principal fruits are: Mangoes, Banana, Guava and Litchis. This is one of the very few areas outside China which produces litchi.

Based on this background the SWOT Analysis of Bihar Agriculture can be summarized in the following Table 1.

**Table 1: SWOT Analysis of Bihar Agriculture**

Strengths	Weaknesses	Opportunities	Threats
The soils are light, alluvium - derived soils mostly khaddar (recent alluvium) and hanger (Old alluvium). In many places the soils are deep, loamy and high in organic matter content and hence very suitable for intensive cultivation.	The average operational holding size is only 0.75 ha, which is further fragmented to 3-4 parcels. This makes farm operations	By providing quality seed and planting material to farmers overall productivity can easily be increased 2-3 times.	Due to land tenancy laws, the operational holdings will be further getting smaller which may reduce the scope for intensive agriculture.
The state has high irrigation potential since water table is high.	The population pressure in this region is exceedingly high. The population density is 880/km <sup>2</sup> as against the national average of 324/km <sup>2</sup> . Due to high density of population and less resources, more number of people are dependent on agriculture and the percentage of population below the poverty line is 42.60% as against the national average of 26.10%.	The region receives good rainfall and the water table is high. By adopting proper water management practices the entire agricultural land can be converted into irrigated land whereby maximum benefit can be derived from the quality seed of improved varieties.	At the interface of diminishing contribution of agriculture sector to the state GDP, there is a danger that the future allocations for agricultural development and more particularly for supply of quality seed material, may not get adequate priority III fund allocations

Rice-Wheat cropping system is most predominant. The average rice yield in this region was found between 1,900-2,100 kg/ha and that of wheat between 2,740-2,770 kg/ha. However, according to the projections of Rice-Wheat Consortium, with good management it has a potential of giving more than twice the current yield.	Although there are Directorates of Agriculture, Horticulture, Fisheries and Animal Husbandry, but their extension services in terms of creating awareness about new technologies, conducting field demonstrations, conducting training programmes and providing latest information to farmers are very poor.	The area has good potential of growing good quality fruits and vegetables. The region has also high population density. By adopting scientific methods of production, making best use of agricultural labour force and by using proper Post-Harvest Technology at farm/ village level, the production of horticultural crops can be increased many folds.	The region has good rainfall but also receives floods during monsoon. Unless proper attention is given to proper soil conservation, drainage and water management programmes, the water logging and soil erosion problems may take serious turn in future and it would be difficult to maintain soil fertility.
The region has good climate. Predominantly there are three seasons-hot summer (April-June), hot and humid rainy season (July-October) and cool dry winter (November-March). The growing period ranges from 180-210 days in a year. Two crops are common but with irrigation, third crop can also be taken during summer.	The State does not have a clear-cut policy to encourage and promote use of quality seed of improved varieties in different crops, which is a major drawback of the state agriculture sector.	The region has good opportunity of seed processing activities in the production catchments for increased income and employment and to wipe out hunger and poverty.	In absence of proper storage facilities, heavy losses is being incurred, may continue in future also.
The rainfall in the region is appreciable, ranging between 1,050-1,300 mm	Although about 70% of the villages are electrified, but electricity is not available for more than 10 hours a day. The farmers cannot depend on electric supply for irrigation and other agricultural operations and are dependent on diesel engines.	With proper infrastructural support the region can emerge as a big supplier of agri-products and can supply its produce to big markets of nearby states.	
The region has a number of ICAR Research Institutes and their Regional Stations, Agricultural Universities, Centres of All India Coordinated Research Projects, and Krishi Vigyan Kendras to support the current and ensuing programmes		Availability of high quality planting material will encourage the production of high value crops substantially.	
State has good potential for quality seed production of field crops, fruits and vegetables			
Working force is available at cheaper rate.			

Despite the strength of the agriculture sector, it is a paradox that this sector is much below the potential. Agriculture productivity in Bihar was much better, compared to other states

in fifties, which is now much below the national average. In last two years, there has been an appreciable growth, due to improved seeds, technologies and inputs, but the miles state has to go to achieve responsive agriculture. This would need infrastructure, technology and inputs. R&D has a vital role to play. There is inequitable distribution of water for irrigation, inadequate number of shallow tube-wells, ineffective use of rain water, and lack of conjunctive use of different irrigation waters, which are the issues of concern.

### **Agricultural Productivity: Revitalization Measures**

Agriculture is the single largest private sector occupation in Bihar and can be considered the riskiest business. Hence, the goal of the agricultural production system should be to maximize income of land owning and landless rural populace to improve their livelihoods. The vulnerability to income and consumption shocks makes it imperative to develop formal agricultural insurance mechanisms to cope with such risks. The traditional yield insurance schemes have failed in managing the risks of the poor farmers as evident from their historically high payouts and poor penetration rates. There is a need to develop effective risk management strategies to cover potential losses in yield and hence incomes. To achieve the desired levels of productivity, immediate steps are needed to improve infrastructure - such as power, rural roads and marketing in particular and, arrange for the supply of quality seeds, balanced use of fertilizers, adequate machinery, required changes in land policy, a farmer friendly extension service and an effective credit delivery system in keeping with adequate credit absorptive capacity of the farmers in Bihar. All these could provide a bright future for Bihari farmers.

Gap between the state average productivity and potential is very high owing to technology adoption and inputs. Therefore, bridging the existing yield gaps by making adequate availability of quality seeds and other technical inputs to farmers would be the first and foremost requirement for improvement of crop productivity. Crop specific and zone specific strategies should be adopted at farmer level to derive maximum benefit. Bihar needs specific development strategies for North and South region of the State.

An efficient and optimum use of modern inputs like quality seeds, chemical fertilizers and other macro and micro nutrients, is the key to productivity improvement on a sustainable basis. Therefore, farmers should be enabled to access and use modern farm inputs in an optimal and efficient manner. Large scale demonstration, use of nutrient and water based soil and tissue test should receive major emphasis. There are soil testing technology but do not have capacity to function. Revamping the laboratory for efficient delivery system is essential. Efforts should be made to promote organic production technology including use of bio-fertilizers & bio-pesticides.

Rural connectivity is the key to raise farmers' productivity and income. Therefore, utmost priority should be given to improve infrastructure in various aspects. Aim should be to target the key constraints like poor water management, rural power supply, easy credit availability, and market access. Steps should also be taken to encourage renewable sources of energy. The State has highest potential for small hydropower projects, wind energy, bagasse based co-generation power from the existing and proposed sugar factories, Jatropa



on waste lands, and rice husk based biomass gasification, biogas and solar energy.

Lack of efficient on-farm water management is considered as one of the major constraints for low productivity and poor economic status of the farmers of Bihar. About forty one percent of the total cropped area in the state is flood prone and there is not much scope for improvement in yield due to water logging, poor drainage and water management. In such areas, it would be absolutely essential for the state to make large scale investment in drainage and also utilization for fisheries. Flood control will also need attention for de-silting of rivers, and strengthening of embankment. As far as the drought prone areas are concerned, there is a need for water conservation and improving water use efficiency through rainwater harvesting, education of farmers and use of modern methods of irrigation. Rainwater harvesting should be a major strategy to meet irrigation needs of the crops. However, the State has abundant groundwater resource which could optimize the potentiality. Shallow tube wells are the quickest means of tapping the groundwater. This is now possible by Government's dynamic efforts on village electrification.

Twenty-first century agriculture is knowledge and technology based and human capital development is a must. Approaches to knowledge and technology adoption by the farmers are directly related to the level of their education. Dilapidated condition of human development institutions and weak institutional structure are a road block in the overall development of Bihar. Education and health should, therefore, be given the first priority for Bihar's farm population. Besides, strengthening of agricultural research & development, appropriate to Bihar's topology and crop profile should be an integral part of agriculture development strategy. There should be proper coordination among different agriculture extension institutions like Krishi Vigyan Kendra, Agriculture Technology Management Agency (ATMA), Rajendra Agriculture University, Kisan Call Centres, State government, financial institutions, farming community at large. Training programmes for farmers at panchayat and block levels should be organized on a regular basis for adopting modern technologies more effectively.

Efficient R & D is a building block for responsive agriculture. It has been experienced that investment on agricultural education and research has been most productive. The state has one Agricultural University with 5 major campuses and has done excellently well in last few years in terms of human resource development and research output. However, the University has not got the focus it deserves. Headquarters of the University, Pusa, is a heritage for agriculture research and education. Therefore, this University should get the status of National University, which should not only meet the needs of the state but also contribute to national agriculture. The University needs support for modernization of its infrastructure as well as research facilitation for scientists. Considering the size of the State's agriculture, consideration is given for opening one or two more agricultural universities in Bihar. Sabour Agricultural College meets all the basic prerequisites for conversion into a university.

Bihar produces large quantities of fruits, vegetables and livestock products, but does not have appropriate infrastructure for value addition and marketing. The state should develop

commodity specific agro-export zones and give necessary support to their marketization. As a matter of fact, with proper development of markets, cooling arrangements in storage and transportation, processing and maintenance of quality, through grading, standardization, packaging, etc., products like litchi, mango, makhana and banana and a few vegetables can be exported to other states and even beyond the country, which will help improve farmers' income. In order to provide a level playing field for private participation in marketing, infrastructure and policy support be provided.

Traditional crop farming alone cannot provide adequate employment and income to a growing rural population. Already the pressure of population on land is quite high. Therefore, the state should develop location specific plans for accelerated and diversified growth. Diversification could be for crop varieties as well as other produce. More areas could be brought under pulses, oilseeds, maize and diversification to horticulture, livestock and fisheries should find greater role.

Horticultural diversification should cover fruits, vegetable, mushroom, flower, medicinal and aromatic plants. There is a scope for coconut, oil palm and cashew in the state. This would involve not only proper planning activities, but also the creation of necessary infrastructure, institution and policy support.

Fisheries and poultry, the two most important areas having a high potential, need special attention. Districts with high productivity of gram and oilseeds call for urgent action to increase the area under these crops. Government can provide support either directly or indirectly through incentives to the private sector for supply of seed/planting material, marketing, processing, etc. This is one area which is most suitable for contract farming. The contract farming is now a well accepted institutional arrangement to realize economies of scale, promote technology adoption, and supply of needed quality inputs. The establishment of a Horticulture College at Nalanda in this respect is a welcome decision.

Sugarcane is an important cash crop for farmers in North Bihar. In addition to providing additional employment, they are an important source of surplus power. Of the 27 mills established, only a few are in operation. Most sugar mills in the state are almost sick and, therefore, the farmers do not get a fair deal from them. With proper policy support, these mills can be revitalized to provide the necessary linkages for the growth of sugarcane in the state. The state has nearly 103 thousand hectares of sugarcane area which produces about 4249 thousand tonnes of Sugar cane. In recent months, the Govt. of Bihar has held several rounds of meetings with major players in sugar industry in the country for revival of sugar mills with private sector participation. But not much headway has been made, due to land policy and incentive related issues. Kamataka model can help to solve the problem where under Contract Farming, Shri Renuka Sugar Mills have entered into an agreement with the farmers as shareholders based on the land owned by them. This sector needs urgent policy attention towards the rehabilitation of existing old sugar factories and opening of new sugar factories under the PP mode. This would open new opportunities for North Bihar farmers.

Poor rural infrastructure, outdated farm level delivery mechanism and lack of implementation capacity, and a very low level of financial allocations through Five Year Plans have been

the main reasons for low farm productivity and general poverty and unemployment in rural Bihar. If Bihar has to prosper, it is only by means of sustained agricultural growth. Therefore, in order to implement the thrust of the proposed strategies and policies, Bihar would require a substantially higher level of financial outlays during next 5-6 years (2008-09 to 2012-13). This is estimated at Rs.27,055 crores. The current plan (11th Five Year) outlays for Bihar's agriculture is Rs.1,698 crores, which is very meager. This would not only help Bihar in emerging a food surplus state but also help India from the emerging crisis of food insecurity. It would then be possible for India to realize its goal of 9-10% annual GDP. Thus, both Bihar and India would move towards the path of sustained economic development.

### **Conclusion**

If proper thrust is placed on technologies, institutional direction, farm level support services, and all delivery mechanisms, following improved farm infrastructure including rural connectivity, Bihar can definitely emerge as the 'Granary' for India. It can also provide the major hubs on fruits, vegetables, and fisheries for both national and global markets. The entire economic growth processes in Bihar depends on the dynamics of agriculture. There are successful experiments in different parts of the country, which if adopted, can provide an answer to various problems which Bihar is facing in its race to higher productivity levels. It would be better to avail of the readily available experience with a view to adapt that in keeping with the ground situation in Bihar. If above points are addressed, there is no reason for Bihar not to be able to condense the 30 years of development activity of Punjab to 10 years. It can then surely catch up with the present productivity levels of rice and wheat in Punjab and other cherished goals in maize, pulses, oilseeds, horticulture and livestock production in the next two five year Plans. Fortunately for Bihar, the State has trained agricultural labour from Punjab. The Bihari labour which was responsible for the first Green Revolution of Punjab will now provide the momentum for the Second Green Revolution in their home State. Thus, there is a need for awakening with commitment to convert the weaknesses into opportunities and revamp agriculture which is a sole source of economic development. Bihar also needs to put a special focus on system of organic farming in the light of experiences available in India. This would bring faster results for increased productivity.

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