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**Investment in  
Agricultural Marketing  
and Market Infrastructure  
– A Case Study of Bihar**

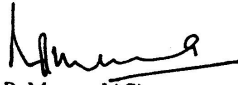
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## FOREWORD

Agricultural growth in the country depends on the efficient functioning of its marketing system. The efficient functioning of the agricultural markets largely depends on the improved physical market infrastructure as well as market information system. While the country has achieved self sufficiency in terms of large agricultural production, the marketing system needs to be improved substantially to sustain the growth in the agricultural sector. The increased marketable surplus of agricultural commodities requires rapid expansion of the markets and its infrastructure in absence of which there have been huge post harvest losses. The huge infrastructural requirement in the sector could only be matched up with the large scale private sector participation in the sector. In order to provide efficiency in the marketing system and creating conducive regulatory and policy environment for private investments, reforms have been initiated by various state governments in the country. While various states have amended the APMC act, the Govt. of Bihar repealed the act. The regulatory regime for the agricultural markets has often been considered as major impediment in the growth of private investment in the sector. In the context, this study analyzes the various issues related to the functioning of markets and agricultural marketing infrastructure in the state of Bihar. The study suggests measures to be adopted to enhance the efficient functioning of the markets in the State with large scale participation of the private sector.

  
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## EXECUTIVE SUMMARY

- I. In order to provide efficiency in the marketing system and creating conducive regulatory and policy environment for private investments, Government of Bihar repealed its APMC Act with effect from 2006. Therefore present study has been undertaken to understand that to what extent reforms measures in terms of repeal of the act has affected investment in agricultural marketing infrastructure. The present study has been undertaken to analyze the investment in the investment in the agriculture marketing infrastructure and the factors which are influencing the investment in the food sector. The repeal of the act has definitely provided a suitable environment for the private investors but the same needs to be supplemented by the basic infrastructure.
  
- II. The agricultural produce markets in the state are not maintained properly and lack basic infrastructural facilities for the smooth functioning of the markets. As is also the case that functioning of the markets during the APMC regime also was not very efficient and therefore trade in no. of markets could not be fully shifted. A significant part of the marketable surplus was traded outside the purview of APMC markets. In the scenario the existing markets may be modernized and developed under public private partnership mode. Considering the highly inefficient functioning of the markets, the private sector participation in management of the markets will bring in much needed efficiency in the functioning of the markets. The markets can be established based on the Built Operate Transfer Model. The equity contribution from the private sector can be worked out based on the potential market size after thorough feasibility study of the market yards in the state. A regulation for

establishing markets in the public private partnership mode can be enacted by the State Government. The implementation of the project can be done through state promoted Special Purpose Vehicle. The private sector will operate and maintain the market. The user charge may be levied for the services provided in the market. To start with the high potential markets as Patna, Muzaffarpur and Gaya may be considered for modernization.

III. Bihar has lowest per capita income amongst the major states of India and high rate of persistent poverty with social structure fragmented based on caste lines. Also the average size of land holding in Bihar is 0.75 hectare in comparison to national average of 1.57 hectare. Small and marginal farms constitute about 91 per cent of the total land holdings which has affected the viability of agriculture. Along with this there are other constraints in terms of high input costs, unavailability of credit and highly inefficient marketing channels. In the scenario farmers are selling produce to the village level intermediaries. A majority of the rural hats in the state are only strips of land where producers and buyers meet for a few hours. In case of trading for fruits and vegetables also there is practically no infrastructure available at majority of the rural hats. It is also observed that major portion of the marketable surplus of fruits & vegetables is traded outside the APMC mandis with substantial domination by intermediaries. In the scenario the farmer's organization in terms of self helps groups/ Farmers' Associations for marketing of fruits & vegetables can be a viable option for enhancing the bargaining power of the producers. Thus aggregation of the produce at the village level would be an important first step for establishing the post harvest management and on farm processing infrastructure at the village level as envisaged in the scheme of state government.

IV. The horticulture marketing federation can be established in the state to promote alternate marketing channel for horticultural crops. The federation can promote primary horticultural cooperative societies at the village level. The model has been successfully implemented in a no. of states of the country as Karnataka and Maharashtra etc. As majority of growers in the state are in small and marginal category the model can be useful for aggregation at the villages level and can be beneficial in terms of providing basic infrastructure, technical guidance & inputs, market information, post harvest training for farmer members and logistic support. The federation can also explore opportunities for export of main horticulture produce of the state. In the state, marketing societies for the litchi growers can be established as existing mechanism of trade is through pre-harvest contractors only. There are ample examples in some of the production cluster that the growers who marketed the litchis on their own ended up getting larger returns. Therefore the marketing societies for litchi growers can help in enhancing the bargaining power of the growers as also mitigate the risk factors.

V. The organized retail sector provides alternate marketing channel for the farmers to market particularly the horticultural produce. The retailers for their fresh produce needs source produce from traders in wholesale markets or directly from the farmers through their collection centers. The shortening of the value chain results in higher price realization to the farmers. The collection centre at the village level also guarantees farmers the assured market and saves on transportation cost.

VI. Spot trading of Agricultural commodities through commodity exchange provide trading platform to the farmers and traders for selling and buying of identified

agricultural commodities. There are no. of agricultural commodities that are traded through this platform including maize and sugar in Bihar. The maize contracts are deliverable at Maheshkhoont in Bihar through National Spot Exchange warehouse. The spot trading platforms has distinct advantages over the traditional APMC markets in terms of better price realization, and access to national market. The platform ensures easier, transparent and quick transaction which not only save time and cost but also reduces cost of intermediation.

VII. The state has existing storage capacity of 13.40 Lakh MT against the required capacity of 28.14 Lakh MT. which means that there is a deficit of around 15 Lakh MT. With the implementation of WDRA act and the warehousing receipt system for pledge financing, the activity needs to be further strengthened with the assistance under the central sector scheme. As the credit is one of the major factors for distress sale, the large scale adoption of the system can make a major economic impact on the farming community. Similarly, the total cold storage capacity in Bihar is 14.40 Lakh MT. Looking at the high horticulture production of around 160 lakhs MT in the state, existing capacity is inadequate and newer capacity needs to be created to cope up with the production levels.

VIII. The contract farming is one of the other areas which need to be focused for the development of efficient markets. The promotion of contract farming for the small and marginal farmers in Bihar can positively impact the incomes of the farmers. It is observed that the farmer in the state have problems in marketing of crops like potato. The Pepsi Corporation is planning to initiate its successful contract farming model in the state for the potato crop. The contract farming helps in reducing the marketing



and transaction costs due to which smallholders can derive significant benefits by adopting contract farming.

IX. As the state of Bihar is the major production center for the litchi fruit in the country, there is high potential for its exports. The arrival of litchi fruit in India starts from mid April and ends in the month of June with arrival time varying in different states of the country. The first arrival in the mid April is from Tripura followed by Assam in first week of May while arrival in Bihar state starts from third week of May and the season ends with the arrival from Punjab. Thus there is availability of fruit for almost 2.5 months. In terms of arrival in some of the international markets, the litchi in India arrives fifteen days earlier than Thailand and one month earlier than China which is advantageous to India for exporting it to European markets. Similarly other countries like Madagascar, South Africa and Australia produce litchi in the months from November to February. India exports around 1300-1400 MT of litchi per annum. To harness the potential of litchi exports from the state, it is pertinent that the pack houses capacity is increased and quality testing laboratories are established in the production belt as Muzaffarpur.

X. The state has no mechanism in place for the collection and dissemination of market information. The market information in terms of market arrivals, prevailing market prices and market intelligence etc is very critical for the planning purpose, designing marketing strategies and business planning, understanding demand & supply pattern of agricultural commodities and exports. Therefore the state must create a mechanism for the collection and dissemination of the information.

## **CHAPTER I**

### **INTRODUCTION**

1.1 Agricultural sector need efficient functioning of its markets to stimulate economic growth and incomes of the large rural population dependent on agriculture. An efficient marketing system is pertinent for optimization of the resource use, output management, improving farm incomes, growth of agro-based industry and enhancing value addition. The efficient markets are also important for the stable consumer prices, higher returns to the farmers and reducing post harvest losses. The efficient agricultural markets ensure remunerative prices to the producers and products are available to the consumers at reasonable price. For markets to work efficiently it is pertinent to link the farm gate with retail outlets so as to reduce losses and marketing costs. However it requires an institutional framework and infrastructure to prepare the produce in the form demanded by the consumers. In order to ensure efficient system of trading agricultural markets in almost all the States were established and regulated under the Agriculture Produce Marketing (Development & Regulation) Act. Although the APMCs were set up to protect farmers from exploitation of intermediaries & traders and to ensure better prices and timely payment for their produce, but these markets have become inefficient over a period of time.

1.2 In order to provide efficiency in the marketing system and creating conducive regulatory and policy environment for private investments, Govt. of India proposed a model act on agricultural marketing, the State Agriculture Produce Marketing (Development & Regulation) Act, 2003 in consultation with State Governments to be adopted by State Governments. The reforms in the act intended to promote

investment in marketing infrastructure and motivate the corporate sector to undertake direct marketing and facilitate a national integrated market. Contract farming, direct marketing and public-private partnership in management and development of agricultural markets were some of the other major instruments of change. Several State Governments have already amended their respective APMC Acts, while the Government of Bihar repealed its APMC Act w.e.f. 1st September, 2006. The repeal of the APMC act by Bihar has opened up space for the new markets and private investment in the agricultural marketing infrastructure so as to improve the efficiency of the system. In fact, if Indian agriculture has to be globally competitive, it needs investment in infrastructure that can promote efficiency by reducing transaction costs and market risks.

- 1.3 It has been estimated that loss of primary produce before reaching the market due to lack of suitable post harvest infrastructure at the production centre is about 7 percent for food grains and 30 percent for fruits and vegetables. The requirement of the infrastructure in the agricultural marketing system is in terms of rural roads, post harvest handling, assembling, sorting, grading, packing, transportation, quality certification, palletization, labelling, pre-cooling, cold-store, ripening chambers and exports. In addition to direct physical infrastructure, there is also a strong need for market intelligence infrastructure and information in terms of prices, farm inputs and weather forecasts. The need for such a large infrastructure investment in the State requires not only the public sector investment but also the private sector investment. It is therefore important that the friendly policy environment exists so as to promote private investment in agricultural marketing, food processing and large integrated agribusinesses. While the act has been repealed in the state in order to improve the

efficiency of the agricultural markets, there are reports that complete privatization of the trade is creating price distortion and has not resulted in moderation of prices for consumers. It is therefore in this context that present study has been undertaken to understand the various aspects of investment in agricultural marketing and marketing infrastructure in the absence of APMC act with the following specific objectives:

- I. To analyze the investment made in agricultural marketing and market related infrastructure in Bihar after repeal of APMC act.
- II. To find out the factors responsible for lack of investment in agricultural marketing and market related infrastructure in Bihar.
- III. To study the perception of different stakeholders for the investment in agricultural marketing infrastructure.
- IV. To suggest ways and means to promote investment in agricultural marketing and market related infrastructure in Bihar.

1.4 The study has been conducted particularly for the State of Bihar where the APMC act has been repealed and it aims to understand the investment trends in agriculture marketing infrastructure in the State in absence of the act. To fulfill the objectives of the study, primary as well as secondary data has been collected. The primary information and perception of the various stakeholders including farmers, marketing officials, traders and processors was elicited through in-depth interviews with them. The plan of the study is as follows: Chapter II describes the general macro economic indicators in the State of Bihar, Chapter III is on agricultural marketing scenario and analysis of investment in agricultural marketing infrastructure and Chapter IV is on conclusions and suggestions.

## **CHAPTER II**

### **MACRO OVERVIEW**

2.1 The state of Bihar had an unprecedented growth rate during the last few years catching up with the all India average. In fact the double digit growth rate of the state between years 2004-05 to 2010-11 has brought up state in the league of fastest growing states in the country. However the state has to sustain this growth rate for a long period of time to catch up with the economic growth in the other major states of the country. In fact the state has lowest per capita income amongst the major states of the country and second largest state in terms of the population below poverty line. In terms of a no of economic indicators the state lags behind the major states of the country. The economy of the state is largely dependent on the agriculture with more than two third of the population dependent on it. The growth of the agricultural sector is thus critical for reducing the poverty level in the state.

2.2 In the changing economic environment the growth in the agricultural sector not only depends on the farm production but to a great extent also depends on the efficient functioning of the agricultural markets. The efficiency of the agricultural markets largely depends on the overall infrastructure level in the economy. The huge investment requirement for the infrastructure requires the active participation of the private sector in the crucial sectors of the economy. Amongst many other social and economic factors that affect investment behavior, the investment to a great extent also depend on the government policies and macro economic situation of the economy. In the present chapter discussion has been done for the economic growth of the state and other macro economic indicators of the state.

### 2.3 Agriculture Production Base in Bihar

The state has fertile gangetic alluvial soil with abundant water resource including ground water resources enabling farmers to produce a variety of crops. The state has a total land area of 9.4 million ha out of which 84 per cent is gross cropped area i.e. approximately 7.9 million ha. The area under food grains is around 85 per cent of the gross cropped area which means that agricultural production is still oriented towards subsistence production as most of the area is under food grains. The area under vegetables crops is around 7 per cent and fruits 3 per cent. The total food grain production in the state was 105 Lakh MT with the rice, wheat and maize are the major cereal crops. Bihar is the third largest producer of vegetables in India after West Bengal and Uttar Pradesh and the seventh largest producer of fruits with fruit production of 13.91 million MT and vegetable production of 3.46 million MT in the year 2009-10. The production for various crops in the state is given in Table 2.1.

**Table 2.1: Crop wise production in Bihar (2007-08 to 2009-10)**  
Lakh MT

S.No.	Crop	2007-08	2008-09	2009-2010
1	Rice	44.73	55.90	36.21
2	Wheat	49.75	44.10	46.23
3	Maize	18.57	17.14	17.139
4	Coarse Cereals	18.96	17.51	17.50
5.	Pulses	4.73	4.68	5.14
6	Oilseed	1.44	1.38	1.49
7	Sugarcane	40.27	49.60	50.00

The productivity of food grains in Bihar was 1570 Kg/ha for the year 2009-10 which is lower than the national average of 1798 kg/ ha. The productivity in case of pulses was 858 Kg/ha which is higher than the national average of 625 kg/ha. The productivity of the state in maize is also higher than the national average while it

comparable in case of oilseeds. Mango, guava, litchi and banana are major fruits of Bihar while potato, onion, tomato, cauliflower, okra and brinjal are some of the major vegetables. With around 2 lakh tonnes of litchi production, Bihar accounts for around 45 percent of national production as also its one of the brand Muzaffarpur Litchi is highly demanded in the fresh as well as processed fruit segments. The production of fruits and vegetables in the state of Bihar is given in Table 2.2.

**Table 2.2: Fruits & Vegetables Production in Bihar (2009-10)**  
**Lakh MT**

State	Bihar	India	Percentage of National Production
Fruits			
Banana	14.35	264.7	5
Citrus	1.31	96.38	1
Guava	2.31	25.72	9
Litchi	2.15	4.83	45
Mango	9.96	150.27	7
Papaya	0.36	39.13	1
Pineapple	1.25	13.87	9
Others	2.95	72.01	4
Total	34.65	715.16	5
Vegetables			
Brinjal	11.99	105.63	11
Cabbage	6.9	72.81	9
Cauliflower	10.8	65.69	16
Okra	7.67	48.03	16
Peas	0.63	30.29	2
Tomato	10.44	124.33	8
Onion	9.72	121.59	8
Potato	53.87	365.77	15
Sweet potato	0.07	10.95	1
Others	26.98	311.68	9
Total	139.07	1337.38	10

Source: National Horticulture Board.

There is a high marketable surplus for different fruits and vegetable as shown by various studies which ranges from 80-90%. The marketed surplus of food grains range between 20-30% and around 35-40 per cent in case of pulses. The inadequate post harvest infrastructure in the State results in high post harvest losses of fruits &

vegetables. The losses in mango is estimated as 39%, litchi is estimated as 22% and for banana the losses are in the range of 18%. Similarly the losses for the cauliflower are in the range of 18%, potato 24% and tomato 39%. The losses for food grains are in the range of 3-6 per cent. In the scenario investment in marketing infrastructure and food processing units can minimize the losses.

## 2.4 Economic Growth in Bihar

2.4.1 The income of the State measured in terms of Gross State Domestic Product (GSDP) at 2004-05 prices for the year 2010-11 was Rs 1,35,900.23 crore in comparison to the GSDP of Rs. 1,23,489.40 crore in the year 2009-10. The growth rate for the year 2010-11 was estimated as 10.05 per cent while it was 11.70 in the year 2009-10. For the period of five years since 1999-2000, the economy had grown at an annual rate of 3.50 percent while the growth rate of 10.93 percent at constant prices was observed during the period 2004-05 to 2010-11.

2.4.2 As for the growth in the agricultural sector, there has been wide variation in the growth rates in different years as depicted in the Table 2.3. However the growth rate of 4.76 was achieved during the period 2004-05 to 2009-10 in the agricultural sector. In terms of per capita income Bihar is lagging far behind the national average as per capita income of Bihar was only 36.44 percent of the national average in 2008-09 i.e. per capita income (NSDP at current prices) of Bihar was Rs. 13,663 against the national average of Rs. 37,490.

**Table 2.3: Gross State Domestic Product (GSDP) at Factor Cost (at Constant 2004-05 Prices)** (Rs. crore)

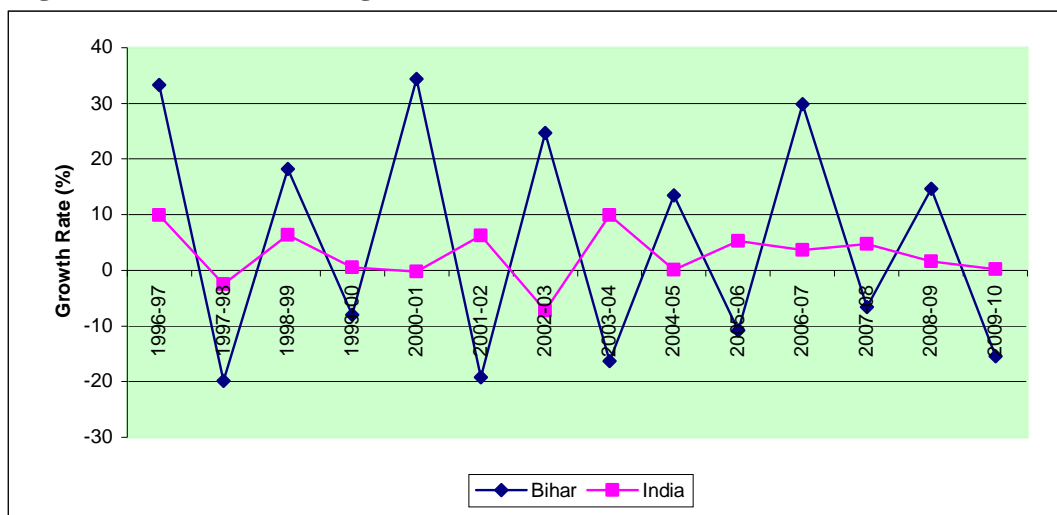
Sector	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Agricult	19747.50	18301.84	23987.29	22353.40	24883.52	23063.08	21375.82



ure/An. Hus.		(-7.32)	(31.06)	(-6.81)	(11.32)	(-7.32)	(-7.32)
Total GSDP	75607.56	76796.37 (0.94)	90988.54 (18.13)	98648.48 (8.48)	110555.4 (13.06)	123489.4 (8.56)	135900.2 (10.05)

\* Figures in parenthesis are Yearly Growth Rate of GSDP (2004-05 Prices). Source: GoB

**Figure 2.1: Growth Rate of Agriculture Sector (1996-97 to 2008-09)**



Source: GoB

2.4.3 The agricultural growth rate of Bihar was not uniform over the years with wide variation in the growth rates from -19.85% in the year 1997-98 to as high as 34.40% in the year 2000-01. In terms of the trend growth rates over the period from 1999-2000 to 2008-09 agriculture sector has recorded a growth rate of 3.4% while the overall GSDP trend growth of 7.5% was noticed for the same period. The trend growth rate for the period 2004-05 to 2008-09 for the agriculture was 6.8% against the GSDP growth rate of 12.8%. (Dasgupta, 2010).

2.4.4 As per the estimates of the 2009-10, the primary sector of the economy contributed 21.74 per cent in the State domestic product while the secondary and tertiary sector accounted for the 16.61 and 61.65 per cent respectively. The contribution of agriculture sector to the overall GSDP has declined over the years due to higher growth rate of secondary & tertiary sectors. However agriculture still remains the mainstay of the

State economy as agriculture provides employment for the three quarters of the workforce and is the main source of income for the majority of the rural population. In fact the bifurcation of the State in 2000 had an adverse impact on the structure of the economy as its manufacturing base has remained in Jharkhand. The mineral rich part got shifted to Jharkhand and the state was left with fertile land and abundant water resources. In spite of the recent surge in economic growth rates, the State lags behind the other Indian states in economic development terms and has to sustain the present momentum of growth to catch up with the other States. The low economic growth in Bihar can be attributed to the low accumulation of physical capital and lack of efficiency in the use of capital. Therefore the high economic growth in the State hinges on huge public and private investment in the sector.

2.4.5 The public investment in agriculture as a ratio of the Agricultural GDP in Bihar has been much lower than that in most of the states in the country. In the present state of agricultural development and in the context of predominance of small holders, the impetus will be provided by government investment. Also the fact that the state government expenditure alone constitutes more than a quarter of the GSDP of Bihar, it is all the more pertinent that the government expenditure is made on the creation of infrastructure for the agriculture and other economic services for the overall growth of the economy.

## **2.5 Basic Infrastructure in Bihar**

2.5.1 The road infrastructure is particularly important for the efficient functioning of the markets. In terms of availability of roads in the state, it has a road density of 90 Kms

for one lakh of population as compared to the country figure of 257 kms. The state has 51 kms of road for every 100 sq. km as compared to 75 kms of road for the country as a whole. The total road length in Bihar was 94009.42 kms till Oct. 2010 which comprise 74 per cent of link routes, national highways 4%, state highways 4%, major district roads 10% per cent and through route comprise remaining 8 per cent. Around 86 per cent of the link routes are unpaved which means that these become unusable during the monsoon. About half of the villages lack all weather road connectivity. During the last four years around 14,106 kms. of rural roads have been constructed at an expenditure of Rs. 6750 crore. The availability of road infrastructure is one of the major factors for enhancing the investment in the agricultural marketing, distribution and processing sector as poor rural roads limit farmers' access to markets, increase time and cost of transport which result in deterioration of produce quality.

2.5.2 Supply of reliable and quality power at competitive rate is critical for the development of industries and transforming the agricultural sector in the state. However the present status of power availability in the state is dismal with total installed capacity including hydel is about 600 MW against the peak demand of 3000 MW. The power deficit in the State has shown an increasing trend as the same was around 17% in 2006-07 which increased to 40% in 2009-10. The per capita power consumption in the state is around 100 units against the all India average of 717 units. The power sector in the country is undergoing major changes providing favorable policy environment for private sector participation. The electricity act of 2003 provides an enabling legal framework for development of power sector which provides for unbundling of State electricity boards and seeks to encourage competition. There have also been efforts to introduce public private partnership in transmission and distribution system, private participation in

nuclear power generation projects, demand side management, renewable energy etc. As power is the basic prerequisite for enhancing the industrial activity in State, the installed capacity in the state needs to be increased substantially. The state largely depends on central sector to meet its power requirements i.e. about 1746-1791 MW is supplied from central sector. As per the consumption pattern in the year 2009, around 33 per cent are domestic consumers, 27% is supplied to industries and 15 percent to irrigation consumers. Due to heavy scarcity of power, there is a severe rationing of power in the state which is a major impediment in the enhancing the investment level in the state.

2.5.3 The telecommunication infrastructure has a major role in overall economic growth. It can be potentially used in disseminating knowledge and awareness of the rural and farm sector. The information relating to better farm practices, market intelligence including price information etc can all be disseminated through telecommunication network. In terms of telecommunication network which is measured by teledensity, Bihar is lagging behind other states with a teledensity of around 33 up to June 2010. The rural teledensity was only 16 while urban teledensity was around 139 in the state. Although the teledensity is low but with the huge private sector interest in the business it is bound to grow at a rapid pace.

## **2.6 Policy Initiatives & Schemes**

2.6.1 The huge investment requirement in the state for the development of markets, post harvest infrastructure & cool chain and processing units it is pertinent that the private sector investment is enhanced substantially in the sector. In order to create suitable investment climate for the private sector the state govt. has taken a number of policy

initiatives. The major reform is off course the repeal of agricultural produce marketing act in the state. Similarly there is a removal or reduction of licensing requirements, stocking limits, and movement restrictions on agricultural commodities. The state government has taken a no of initiatives in terms of eliminating or reducing taxes for different food items, relaxation in the regulations under shops & establishment act, weights & measures act etc.

2.6.2 The state government has also come up with a new Bihar Industrial Incentive Policy – 2011 for the accelerated industrial development of the state. Under this policy various provisions has been granted for industrial sector and the food processing sector has been identified under thrust area. Along with the various state government initiatives there are a no. of central government schemes which can be utilized for attracting private sector investment in agricultural marketing and processing.

2.6.3 Various Government of India schemes provide for financial assistance in the form of back-ended credit linked subsidy for establishment of pack houses, cold storages, controlled atmosphere storage, refrigerated vans, mobile processing units, wholesale markets & rural markets, post harvest infrastructure through the schemes of the NHM, NHB, DMI and APEDA. However it has been suggested by various stakeholders and also mentioned by the working group of the XI plan that the level of subsidy of 25 per cent only covers the interest cost and hence does not subsidize the capital cost of the project. It is therefore envisaged that the level of subsidy may be enhanced to attract private investment.

2.6.4 The stage of underdevelopment in Bihar for decades and loss of confidence the private investment in the state is difficult to attract and the state government due to its own budgetary constraints find it difficult to undertake large-scale investment in the state. The per capita development expenditure is very low in the state of Bihar as compared to the other states. However in the last few years the development expenditure including the expenditure under the economic services which includes agriculture has improved. The state government has increased the development expenditure in the last few years by generating revenue from its own resources but it needs to supplement the investment through assistance under various central sector schemes to enhance the agricultural marketing infrastructure in the State.

## **CHAPTER III**

### **AGRICULTURAL MARKETS & INVESTMENT IN AGRICULTURAL MARKETING INFRASTRUCTURE**

- 3.1 The overall growth of the agricultural sector and its output has a close relationship with the level of investment made in agricultural infrastructure. In fact empirical research has shown that there is a strong positive correlation between the level of infrastructure and the economic development. Investments made in the infrastructure results in a comparative advantage for the region, which results in a higher agricultural output and productivity. Studies have shown that expansion in infrastructure has increased the horizontal and vertical integration of agricultural markets, which improved the process of price discovery and transmission of price signals from deficit to surplus area. However, the present agricultural infrastructure and marketing infrastructure is far from adequate in the country including the State of Bihar. The policy framework in the country along with weak infrastructure and limited institutional support for agricultural markets have been considered as a major factors for low agricultural investment, particularly in large vertically integrated agribusinesses.
- 3.2 Bihar has a significant growth rate in the agricultural sector as compared with the other progressive states in the country. However the state has inadequate marketing infrastructure to handle the agricultural commodities efficiently. In fact a World Bank Study (2005) ranked Bihar third from bottom amongst states in the level and quality of its regulated marketing infrastructure. The state was also ranked fourth to the last in the level of farmers' satisfaction with existing market conditions. The inadequate and

poor infrastructure in the regulated markets along with high transportation costs discourage farmers going to the markets.

- 3.3 The number of wholesale markets in the state is also not adequate as around 400 sq. km area in the state is served by each wholesale market against 156 sq. km. in Punjab and 318 sq. km. in West Bengal. As discussed in earlier sections, the state government has made a comprehensive scheme for the development of agricultural marketing infrastructure including terminal market complexes, post harvest infrastructural facilities and on farm processing centers etc. The huge investment requirements for such projects need private sector participation to help in development of marketing infrastructure. At the same time Government of India has also launched a no. of capital subsidy schemes to boost the marketing infrastructure. The state of Bihar has taken advantage of the rural godown and cold storage schemes however the capital subsidy scheme for development of agricultural marketing infrastructure has not picked up in the state.

### **3.4 Establishment and Development of Agricultural Produce Markets**

- 3.4.1 The growth of physical infrastructure for the agricultural markets is pertinent as the State has a large production of fruits and vegetables. The huge amount of post harvest losses of the agricultural commodities particularly for the perishable commodities shows the inadequacy of the marketing infrastructure in the State. Even the existence of large number of agriculture produce markets could not ensure reasonable returns to the farmers for their surplus produce. The inability of the farmers to store the produce for a long duration often results in distress sales. In an attempt to enhance the



efficiency of the market the Government of Bihar repealed the Agricultural Produce Marketing Act of 1960. Accordingly all the APMCs across the state were abolished in order to have free market operations in the trading of agricultural commodities. The step to move towards the free market regime from that of regulatory mechanism has been taken in a right spirit to make the system more efficient and congenial to the farmers. However the same has created a vacuum in terms of institutional mechanism for administering the functioning of markets. The small scale farmers have no alternate channels of marketing except to use the current trader dominated system.

3.4.2 Bihar State Agriculture Produce Marketing Act was introduced in the year 1960 to improve the efficiency and performance of agricultural markets in the state so as to reduce the marketing cost and maximize gains to the producers. The Bihar State Agricultural Marketing Board was subsequently established in the year 1972 within the Ministry of Agriculture, Bihar. The board had general supervising powers over the market committees and also had power to fix market fees which was fixed as 1% of the value of agricultural produce marketed.

3.4.3 The board was also the key agency for the planning of development of markets and their proper operation. It had powers to take over the operations of market committees in case of financial default or failing to regulate market operations properly. The market committees contributed 25% of the market fees collected by them to the Board's funds, a major part of which is spent on the developmental work of the market yards. A total number of 325 wholesale markets and 1469 rural primary markets are in operation across the state. The total no. of regulated markets in the state included 95 principal markets and 431 sub market yards.

3.4.4 In 1972 a large-scale plan of construction of market yards was undertaken with an assistance of International Development Agency. The state marketing board developed 40 market yards with the assistance from IDA, 12 with assistance from NABARD and one market yard with assistance from other sources. In all 53 market yards were constructed with the external assistance of Rs. 23.41 crores. IDA assistance for the market yards was US \$14 million for the total estimated cost of project of US \$ 23.3 million. The state government also provided loans to the marketing board for the construction of market yards in the state. The major facilities provided in the markets included auction platform, trader shop, godown, necessary infrastructure as fencing, storage facility and rest house etc. The detail of the infrastructure developed in 95 market yards of the state is given in Table 3.1.

3.3.5 As given in Table 3.1, 48 market yards are having covered platforms with total no. of 179 covered platforms. Similarly 125 godowns existed in 47 market yards of the state. Shops cum godown are available in 32 market yards with total no. being 915 in all the market yards together. Also 53 market yards have administrative building in place. Similarly 26 markets have the open platforms and same no. of market yards have the grading rooms. Only 3 market yards have the cold storage facility as given in Table 3.1. Out of 95 market yards, computers are available in 58 markets. As revealed from the Table 3.1, basic infrastructure for trading of commodities is available in a no. of market yards across the state. However the facilities for post harvest handling, cleaning & grading, packing, cold store, ripening chambers etc are minimal or non-existent.

Table 3.1: Infrastructure of Constructed Market Yards in Bihar

S.No	Infrastructure Particulars	No. of Market Yards in which infrastructure is available
1	Administrative Building	53
2	Fruits & Vegetable Shops	7 (283)
3	Trader shop/ Godown	16 (354)
4	Shops & Godown with smoke house	2 (32)
5	Shops	11 (306)
6	Potato shops & onion	3 (53)
7	Fish shop	2 (30)
8	Smoke House	1 (20)
9	Sundry Shop	42 (720)
10	Godown	47 (125)
11	Covered Platform	48 (179)
12	Canteen	20 (23)
13	Bank Building	19
14	Post Office	14
15	Officer and Staff Residence	34 (206)
16	Grading Room	26 (28)
17	Water Tower / Tank	28
18	Pump Houses	11
19	Check Post	38
20	Open Platform	26 (80)
21	Water Boring	2
22	Cold Storage	3
23	Banana Shop	1
24	Toilet	25 (33)
25	Generator Room	2
26	Transformer House	2 (5)
27	Shops cum Godown	32 (915)
28	Police Station	7
29	Check post guard quarter	1
30	Tub for cattle	1 (7)
31	Cattle shed / shop	13 (31)
32	Weigh bridge	2
33	Compound Wall	2
34	Hand pump	1
35	Gate cabin	1
36	Farmer's rest house	5
37	Chaukidar Shed	4
38	Jute Complex / Mini complex	3 (7)
39	Bailing Press	1 (2)
40	Jute complex office	1
41	Jute complex godown	3
42	Jute assorting Bhawan	1
43	Jute walling house	1
44	Assorting room	1
45	Fertilizer godown	1
46	Well	1
47	Computers	58

\* Figures in parenthesis are total no. of respective infrastructure. Source: BSAMB.

3.3.6 The state had 95 regulated APMC markets out of which 54 markets had basic marketing infrastructure in place. These 54 markets have been established in total land of around 1595 acres out of which around 813 acres of land is vacant. Therefore the market yards have substantial basic infrastructure in place which can be further improved for providing better facilities to the producers so as to increase the no. of producers going to the markets. After the repeal of the APMC act all assets including moveable and immovable belonging to market committees or state agricultural marketing board has been vested in the state government. 'Administrator' or the special officer as the case may has taken over the custody of all such assets of the committees. State government has accordingly given charge of the market committees to the concern sub divisional officers in the area of the agricultural produce markets. However, the system has not worked efficiently for the proper functioning of the markets. There is continuous decline in the facilities provided by these markets inspite of the availability of basic infrastructure in these markets. As also there is no revenue collection in terms of market fees, there are visible problems in the proper maintenance of the market yards including the cleanliness of the markets, provision of security and developmental work.

3.3.7 During the regime of APMCs, fees collection in some of the areas of APMCs was given to outside private agencies through bidding process. This resulted in a major problem for the farmers and market functionaries as contractors started collecting high charges in violation of the norms to maximize their collection. Due to these elements in the market area, farmers and traders / wholesalers had a major problem in effectively working and trading in the markets. The repeal of the act in such a situation

is major relief for the market functionaries to get rid of these elements from the market and doing business in a congenial environment.

3.3.8 The infrastructure in the existing Mandis of the state is highly inadequate and the facilities & functioning has further deteriorated in the absence of an institutional body. The existing infrastructure in the market yards can be strengthened utilizing the subsidy under the scheme for development/strengthening of agricultural marketing infrastructure, grading and standardization. The funds under the scheme cannot be utilized inspite of the requirement of much needed capital in the state as there has not been any private sector investment under the scheme. A no. of other states have availed subsidy under the scheme. The private investment in the agricultural marketing infrastructure is still not coming up due to various reasons as lack of capital, high risk in the agri related business, lack of substantial government incentives for the projects and lack of technical knowledge. As the market of fruits and vegetables is highly fragmented, there is also risk of getting sufficient arrivals in the market to ensure the project viability.

3.3.9 Bihar State Agricultural Marketing Board has made a comprehensive review of the available assets in the selected 54 markets where basic infrastructure existed to assess the maintenance requirements and repairing cost for the purpose in each of these markets. Based on the review it has been assessed that the total estimated repairing cost in the 54 markets would be around Rs. 12492.17 lakhs. Therefore it is pertinent that such available infrastructure is maintained to administer markets in an efficient and professional manner and also making available the required funds for repairing and strengthening of available infrastructure through various state and central

government schemes. The subsidy and assistance can be availed from a no. of central government schemes for strengthening of infrastructure in the market yards.

3.3.10 The creation of physical infrastructure for agricultural marketing has largely being dependent on the government expenditure. The capital outlay under the expenditure on agriculture and allied activities has declined during the last few years. Also the capital outlay in agricultural marketing infrastructure has been minimal. Although the state government has initiated reform measures by repealing the APMC act and other reforms for attracting the private investment. However, repeal of the act has not resulted in massive participation of the private sector in creation of marketing infrastructure as it depends on a combination of a no. of issues critical for the financial viability of the investments. In the scenario government expenditure is still critical for the creation of marketing infrastructure. It may be emphasized that the objective of the public investment is not just to induce or attract private complementary private investment but to enhance social welfare as Indian agriculture is still dominated by small and marginal farmers. Its objective is to enhance the productive capacity of the available resources. The availability of marketing infrastructure also helps in enhancing the terms of trade in favour of small and marginal farmers so as to accrue larger benefits to the farmers.

3.3.11 As for the marketing channels for the agricultural commodities majority of the farmers sell their produce at the village level. In case of fruits it is mostly sold to the pre-harvest contractors. This is mainly followed by the producers to mitigate the risk. The other common channel for fruits particularly for banana is producer- wholesaler / commission agent- retailer-consumer. It is observed that there is no fix strategy being

followed in the adoption of marketing channels but it varies from place to place and commodity to commodity. However there is multiple level of intermediation in the supply chain increasing the cost and deteriorating the quality of the produce. In case of vegetables also, there is a dominance of chain of village level intermediaries agents to whom major proportion of the produce is sold. In majority of the cases the producers sell the vegetables at the village level rural primary markets where there is hardly any marketing infrastructure is in place. Farmers also do not have any access to the price information in the nearby centers. Also a large portion of the state's production is sold outside the state particularly in case of fruits as mango, litchi and banana. Bihar has a largest production of litchi which has a short shelf life of 2-3 days under ambient conditions. The fruit is available only for a short period of time in the month of May-June. The shelf life of the fruit can be extended by proper post harvest treatment up to 2-3 weeks. The enhance activity in the area of litchi pack houses and processing in the state will substantially increase farmers' realization.

3.3.12 In the state of Bihar only a small share of marketable surplus is marketed through regulated markets. This is mainly due to the fact that quality of market infrastructure and support services are poor and the transportation and informal transaction costs discourage farmers from going to the markets. A no. of research studies have shown that market facilities and the distance of the market are the major factors which influence farmer's decision to sell at the markets. It has been revealed through empirical research that the probability of selling at the market increases with an improvement of market facilities or due to a decrease in distance to markets. In the state of Bihar too the poor state of market facilities and poor rural road infrastructure deters farmers to travel long distances to sell their produce resulting in majority of the

sell by the farmers at the village level. There is practically no infrastructure for cleaning, grading and standardization, SPS measures and quality certification, labeling, packaging and ripening chambers etc. The market yards are highly congested during the peak hours with highly unhygienic conditions. Also there is no centralized auction system and the auctions are organized by the traders in an unprofessional and non-transparent manner discouraging the fair and transparent trade. The closed auctioning in the form of hand gestures and covered under handkerchief is prevalent in the markets. The provision of transparent transactions through electronic auction can be a critical factor of enhancing market efficiencies and bringing a large proportion of the produce to the markets.

3.3.13 The APMC act in the state has been repealed in order to attract investment in the agricultural marketing infrastructure and food processing sector. A no. of other reforms measures has also been taken by the government to boost the investment in the sector. However it is observed the abolishment of APMCs in the state has created a vacuum in terms of proper administration of the markets and maintenance of the existing infrastructure of the APMCs. It may also be noted that reform in the existing policies of the government is key for the infrastructure development but the inflow of investment also depends on a no. of other factors including viability of the projects, basic infrastructure, tax structure and government incentives etc.

#### **3.4 Development works by State Agricultural Marketing Board**

3.4.1 Bihar State Agriculture Marketing Board has undertaken a no. of developmental works in the various agriculture produce markets. The detail of the receipts and



expenditure of board from 1995-96 to 2005-06 is given in Table 3.2. As given in Table 3.2, the state agricultural marketing board had made an expenditure of 109.2 crore from 1995-96 to 2005-06 on various developmental activities in the market yards. These developmental works were carried out at market yards, sub market yards, rural primary markets, rural godowns, approach roads and bridges etc. The percentage of developmental expenditure to total expenditure has varied from 19 to 34 percent from 1995-96 to 2005-06.

**Table 3.2: Income, Expenditure & Surplus of BSAMB (1995-96 to 2005-06)**

(Rs. Lakhs)

S.No	Year	Income	Expenditure	Development Expenditure	% Dev Exp	Surplus
1	1995-96	3149.88	2823.14	971.27	34	326.74
2	1996-97	3564.35	3044.01	735.40	24	520.34
3	1997-98	4560.17	3409.89	819.79	24	1150.28
4	1998-99	5062.59	3583.57	715.86	20	1479.02
5	1999-00	4488.93	3622.61	683.06	19	866.32
6	2000-01	4566.87	3935.58	766.56	19	631.29
7	2001-02	5110.16	4448.28	1098.34	25	661.88
8	2002-03	5635.58	4678.49	1126.53	24	957.09
9	2003-04	5619.22	5247.12	1346.49	26	372.10
10	2004-05	5996.14	5191.78	1628.97	31	804.36
11	2005-06	6310.54	4806.2	1028.13	21	1504.3

Source: BSAMB.

A summary of major investment done by the State Agricultural Marketing Board is given in Table 3.3.

**Table 3.3: Developmental Work implemented by State Marketing Board**

S.No.	Particular	Total Number
1	Establishment of Rural Primary Markets through assistance of Govt. of India	287
2	Establishment of Rural Primary Markets through assistance of Govt. of Bihar	43
3	Construction of Rural Godowns with assistance of GoI, GoB and respective APMCs (25:25:50)	92
4	Developmental Works in Market Yards with assistance from Government of India	44
5	Developmental Works in Market Yards with assistance from Government of Bihar	37
6	Approach Road	604 Km
7	Cold Storages in APMCs of Patna District (8000 MT)	2

Source: BSAMB.

### **3.5 State Government Plans for the development of Marketing Infrastructure**

3.5.1 It has been observed that there has been no major capital expenditure by the state government on expansion of infrastructure in the agricultural produce markets after the repeal of the act in 2006. However the state government has designed a comprehensive plan for the agricultural marketing system in the state which includes setting up modern terminal markets in public private partnership (PPP) mode, agribusiness centers, renovation of rural haats and on farm primary processing centers. For this the state estimated an amount of Rs. 1272.00 crore. The clearance has been given for terminal market to be set up at Potari with total financial outlay of Rs. 129.70 crore with 17 collection centers for fruits and vegetables from 14 districts. Besides Patna it is proposed to set up modern terminal markets in Muzaffarpur, Purnia, Bhagalpur and Gaya Divisions. The proposed investment in each terminal market would be around Rs. 100 crore. The total government equity in the project will be capped at 49%. The terminal market project to be established under public private partnership model has been sanctioned to Temptation Foods Ltd, Mumbai through bidding process. It is pertinent that the implementation of the project is expedited to fill the infrastructural gaps in the state and boost further investment.

3.5.2 The terminal markets would be linked with the agribusiness centers, rural haats and on farm primary processing centers (OFPPCs). The infrastructure in the terminal markets will have cool chain, electronic grading, electronic auction, ripening chambers, color vision system, quality station, spot commodity trading, laboratory for testing and certification, banking support, cash spot payment through ATMs to the growers, information kiosk and one-stop shopping for inputs, agri-clinic and

extension services. Similarly the state government envisages developing agribusiness centers in the important production belts of the state to facilitate backward and forward linkages. These centers will also be equipped with the infrastructure according to the produce in its area of operation.

3.5.3 The proposed market infrastructure scheme will make optimum utilization of the existing assets of the state marketing board including 324 acres of land in 95 markets. Out of 95 market yards, 54 have developed infrastructure which can be extensively used. The estimate cost of developing market yard as agribusiness centers would be around Rs. 5.7 crores. The total cost for the proposed 40 agribusiness centers thus would be Rs. 228 crores. The rural haats will be provided with the infrastructure as market shed, storage facilities, covered auction platform, open drying platform and drinking water facilities. The estimated cost of developing one rural haat will be Rs. 35 lakhs.

3.5.4 The state government has further planned to set up On farm primary processing centers (OFPPCs) for the horticulture produce so as to restrict the post harvest losses. The interventions that could be taken up by the OFPPCs include scientific harvesting, washing, sorting and grading, curing in case of some vegetables, special post harvest treatments like fumigation / sulphitation etc. A total of 10,000 On Farm Processing Centres are proposed to be set up at a total investment of Rs.120 crores. Besides, 7000 OFPPCs are also being planned to be set up under ADB sponsored project for agricultural marketing infrastructure. The main source of funding for development of agricultural marketing infrastructure will be subsidy under various Government of India scheme as also the private investment. The state government will also leverage

its fixed assets including land, building and market yards etc. for financing the scheme.

### **3.6 Godowns and Storage Capacity created under Rural Godown Scheme**

3.6.1 The Government of India has enacted Warehousing (Development & Regulation) Act, 2007 which has become effective from 25<sup>th</sup> October 2010. Accordingly the government has introduced a negotiable warehouse receipt system in the country to make the warehouse receipts a fully negotiable instrument. The system will be highly beneficial for the farmers as warehouse receipts can now be used for getting the loans from the banks against the agricultural commodities deposited in the warehouses. The warehouse receipts have a large impact on the rural economy in terms of increased liquidity in rural areas, lower cost of financing for the farmers and better price risk management.

3.6.2 Access to the storage facility to the farmers in nearby areas ensures that the farmers do not have to go for distress sales and thus helps them in realizing better price for the agricultural commodities. It is therefore essential that the right type of product specific and scientific storage space is developed. Similarly large production of horticultural crops and its marketable surplus requires cold storage infrastructure so as reduce post harvest losses.

3.6.3 To increase the storage capacity in the country Ministry of Agriculture, Government of India has formulated various capital investment subsidy schemes which can be gainfully utilized by the states to enhance the storage capacity. As per the estimates of the Bihar State Warehousing Corporation existing storage capacity available with the

public sector units in the state is 11.88 Lakh MT against the required capacity of 28.14 Lakh MT. The total available capacity in Bihar is 13.40 Lakh MT which means that there is a deficit of around 15 Lakh MT. It is estimated that in order to create storage capacity of 17 Lakh MT an investment of around Rs. 1000 Crore is required. Under the Government of India scheme of Grameen Bhandaran Yojana, Credit linked back-ended subsidy is provided for creation of rural godowns for scientific storage of agricultural commodities, processed farm produce, farm inputs, etc. Under the scheme subsidy @ 25% of the capital cost of each project to a maximum of Rs 46.87 lakhs is given. For NE states, hilly areas above 1000 mts and for entrepreneurs belonging to SC / ST - @ 33.33 % of the capital cost to a maximum of Rs 62.50 lakhs can be provided. The progress of scheme and subsidy released by NABARD in the state of Bihar is given in Table 3.4.

**Table 3.4: Capacity created and subsidy released by NABARD under Rural Godown Scheme in Bihar (2003-04 to 2011-12 till Aug)**

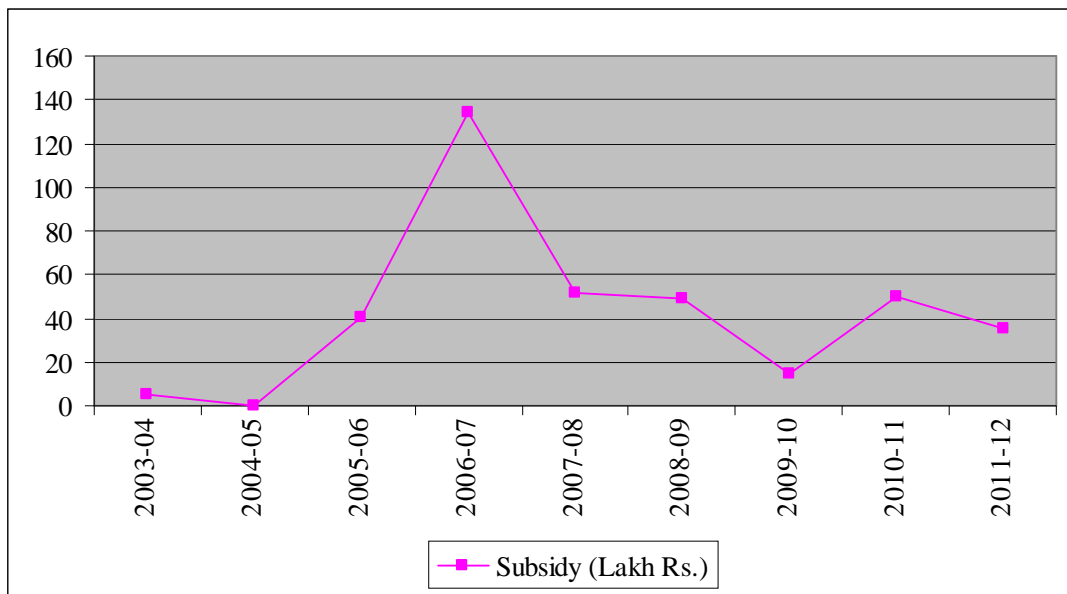
S.No.	Year of Sanction of Refinance/ Subsidy	Capacity (MT)	Total Investment (Rs. Lakh)	Private Sector Investment (Rs. Lakh)	Total Subsidy Released (Rs. Lakh)
1	2003-04	1000.00	20.5	20.5	5.000
2	2004-05	0	0	0	0
3	2005-06	10641.60	246.16	246.16	40.708
4	2006-07	36052.13	733.04	197.17	134.336
5	2007-08	15506.5	451.21	90.36	51.241
6	2008-09	18214.27	357.83	357.83	48.836
7	2009-10	3739.08	112.22	112.22	14.209
8	2010-11	17376.40	387.50	387.50	49.570
9	2011-12	18840.89	348.33	348.33	35.546
<b>10</b>	<b>Total</b>	<b>121370.87</b>	<b>2656.79</b>	<b>1760.07</b>	<b>379.45</b>

Source: NABARD.

As shown in Table 3.4, maximum capacity of 36.05 thousand MT was created in the year 2006-07 with a subsidy of Rs. 134.34 Lakh being released by NABARD. During the period of 2003-04 to 31 August 2011, NABARD has released total subsidy of

379.45 Lakhs under the scheme for creating a capacity of 1.21 Lakhs MT. The figure shows the trends in the release of subsidy by NABARD for rural godowns. The capacity created in the year 2009-10 came down substantially to 4 thousand MT from 18 thousand MT in 2008-09. As revealed from the data, the public sector investment has only being made in the two years i.e. 2006-07 and 2007-08 during which Bihar State Warehousing Corporation created capacity of 35 thousand MT with a total investment of Rs. 896.71 Lakhs.

**Figure 3.1: Subsidy released by NABARD for Rural Godowns in Bihar.**



Out of the total investment of Rs. 26.57 crore under the scheme Rs. 17.60 crore of investment has come from the private sector.

Similarly State-wise status of the number of projects and capacity sanctioned by National Bank for Agriculture and Rural Development (NABARD) and National Cooperative Development Corporation (NCDC) is given in Table 3.5.

Table 3.5: Selected State-wise Number of Projects and Capacity Sanctioned by National Bank for Agriculture and Rural Development (NABARD) and National Cooperative Development Corporation (NCDC) under Rural Godown Scheme in India. Capacity in Lakh MT (As on 31.01.2010)

States	Sanctioned by NABARD		Sanctioned by NCDC (New)		Sanctioned by NCDC (Renovation)		Total	
	No.	Capacity	No.	Capacity	No.	Capacity	No.	Capacity
Andhra Pradesh	810	31.85	16	0.02	8	0.01	834	31.87
Bihar	44	0.83	807	0.82	121	0.12	972	1.77
Chhattisgarh	246	6.83	77	2.58	0	0.00	323	9.41
Gujarat	4923	13.87	51	1.57	19	0.20	4993	15.64
Haryana	312	18.67	323	1.15	243	2.45	878	22.26
Jharkhand	6	0.09	0	0.00	0	0.00	6	0.09
Karnataka	1994	14.47	122	0.90	2	0.00	2118	15.37
Kerala	36	0.34	94	0.23	21	0.04	151	0.60
Maharashtra	1994	24.16	30	1.65	17	0.61	2041	26.42
Orissa	275	5.21	0	0.00	4	0.12	279	5.33
Punjab	1216	27.30	0	0.00	210	3.86	1426	31.16
Rajasthan	652	5.00	154	0.68	1	0.01	807	5.68
Uttar Pradesh	224	12.35	14	1.16	693	9.55	931	23.06
<b>India</b>	<b>17449</b>	<b>216.50</b>	<b>2152</b>	<b>12.94</b>	<b>1741</b>	<b>18.26</b>	<b>21342</b>	<b>247.70</b>

As given in Table 3.5, in Bihar through both these agencies capacity of 1.77 Lakh MT has been created under the scheme while in the state of Andhra Pradesh and Maharashtra capacity of 31.87 Lakh MT and 26.42 Lakh MT was created under the scheme till January 2010. In case of States including Rajasthan and Odisha also capacity of 5.68 and 5.33 Lakh MT has been created under the capital subsidy of the Government of India. In this context, it can be observed that the state has made a low progress on account of fully utilizing the benefits of the scheme inspite of huge deficit of capacity. The trend shows that activity has picked up since year 2006-07 barring the year 2009-10 but this needs to be further improved to fill in the deficit.

### 3.7 Cold Storage Infrastructure

3.7.1 Bihar government through its comprehensive scheme for development of agricultural marketing infrastructure has planned to develop facilities for post harvest management including packaging, grading, transportation, curing, ripening and storage. Under the National Horticulture Mission also capital subsidy is provided for construction/ modernization/ expansion of cold storages of horticultural produce. The assistance under the scheme is credit linked back-ended subsidy @ 25% of the total project cost in general areas and 33.33% in case of Hilly & Tribal Areas. The back ended subsidy is provided under the scheme by NABARD and NCDC. The progress of scheme and subsidy released by NABARD in the state of Bihar is given in Table 3.6.

**Table 3.6: Capacity created and subsidy released by NABARD under Cold Storage Scheme in Bihar (2003-04 to 2010-11)**

S.No.	Year of Sanction of Refinance/ Subsidy	Capacity (MT)	Total Investment (Rs. Lakh)	Total Subsidy Released (Rs. Lakh)
1	2003-04	31230.97	1188.10	266.84
2	2004-05	88194.74	3532.74	609.02
3	2005-06	22001.82	943.36	197.77
4	2006-07	74591.06	3100.39	572.34
5	2007-08	36464.3	1619.42	292.49
6	2008-09	5280	285.32	50.00
7	2009-10	9159.76	548.32	89.03
8	2010-11	4615.98	330.71	46.16
<b>10</b>	<b>Total</b>	<b>271538.6</b>	<b>11548.37</b>	<b>2123.636</b>

As given in Table 3.6, under the scheme of capital subsidy for cold storage total investment of Rs. 115.48 crore has been made in the private sector for which back ended subsidy of Rs. 21.24 crore has been released by NABARD during the period 2003-04 to 2010-11. Under the scheme total capacity of 2.72 Lakh MT has been created through the capital subsidy by NABARD. The data for investment in cold



storage infrastructure suggests that the repeal of the APMC act doesn't seem to have any correlation with the investment. However, the trends in the investment show that capital subsidy scheme has encouraged private sector to make investment in the cold storage infrastructure.

3.7.2 There is gradual decline in the progress of the scheme since year 2008-09. As the scheme has been transferred under National Horticultural Mission, it needs to be implemented at a greater pace for creating the infrastructure in the state. A number of other projects of agriculture marketing infrastructure have been planned but there has been delay in the implementation of the projects. As for the existing capacity of cold storages in Bihar vis a vis other progressive states of the country has been given in Table 3.7.

**Table 3.7: State-wise Number and Capacity of Cold Storages Functioning in India (2003 to 2008)**

State	Number		Capacity (Lakh MT)					
	2003	2008	2003	2004	2005	2006	2007	2008
Andhra Pradesh	234	286	5.67	6.63	7.14	8.21	8.46	8.76
Bihar	237	260	9.05	9.11	9.11	9.11	13.10	14.40
Gujarat	351	377	8.75	8.75	9.49	9.74	11.12	11.12
Haryana	233	243	3.73	3.80	3.80	3.92	3.92	3.92
Himachal Pradesh	17	18	0.18	0.18	0.18	0.18	0.18	0.20
Jharkhand	25	45	0.81	0.81	0.81	0.81	1.70	1.70
Kerala	150	187	0.30	0.36	0.40	0.47	0.57	0.57
Karnataka	114	161	1.39	1.49	1.50	2.53	3.97	4.22
Maharashtra	414	460	4.24	4.48	4.59	5.11	5.28	5.64
Punjab	378	420	12.22	12.32	12.32	13.38	13.38	13.38
Rajasthan	92	107	2.67	2.73	2.73	3.12	3.15	3.15
Tamil Nadu	113	139	1.61	1.62	1.78	2.27	2.37	2.37
Uttar Pradesh & Uttaranchal	1277	1591	75.14	82.59	82.59	89.32	90.39	90.60
<b>India</b>	<b>4541</b>	<b>5386</b>	<b>182.09</b>	<b>195.52</b>	<b>196.25</b>	<b>216.94</b>	<b>233.34</b>	<b>236.63</b>

3.7.3 As shown in Table 3.7, total capacity in Bihar is 14.40 Lakh MT. The figure for Bihar is comparable with most of the major states including Andhra Pradesh, Punjab and

Gujarat. In fact the state has a higher capacity than a no. of other major states. Most of the cold storage capacity in the state is being used for the storage of potato. Looking at the high horticulture production in the state, existing capacity is inadequate and newer capacity needs to be created to cope up with the production levels. As discussed in foregoing analysis it has been observed that there has been investment made under the two capital subsidy schemes i.e. rural godown and cold storages. However the other scheme of Government of India for development / strengthening of agricultural marketing infrastructure, grading and standardization has not picked up in the state. The scheme is linked to the reforms and as the act has been repealed the state is eligible for the subsidy under the scheme. The government has planned a comprehensive scheme for development of marketing infrastructure in terms of terminal markets linked to the agribusiness centers and on farm primary processing centers. The delay in the implementation of the project and absence of alternative institutional mechanism for administering the marketing system has resulted in lack of investment in the sector.

### **3.8 Status and Growth of Food Processing Sector**

3.8.1 Food processing sector is a key factor for the overall economic growth of the state particularly after the bifurcation of the State as majority of the mineral resources are left to the Jharkhand state. The state has a huge raw material base for the food processing industry as it is a major producer of rice, maize, pulses and variety of fruits & vegetables. Litchi processing is one of the potential areas as the state has a largest production of litchi predominantly grown in the area around Muzaffarpur

district. In spite of the huge potential for the sector, the processing activity in the state is minimal as investment depends on combination of many other factors as well.

3.8.2 The state has four large scale units in food & beverage category including one refined oil unit, two units in fruits & vegetable category and one distillery. There are 45 licensed fruit and vegetable processing units. The value addition of fruits is mainly up to the stage of primary processing i.e. processing into pulps. In case of litchi, processing is up to the extent of 2 per cent of the total production. Most of the marketable surplus of the state goes out of the state for table consumption or processing. Besides there are around 5000 rice mills out of which only 5% are the modern rice mills and the others are simply hullers and shellers. Also majority of the agro based units are in unorganized sector including bakers and confectioners, flour mills etc.

3.8.3 The agro based companies in the state are in mostly in the category of Micro, Small and Medium Enterprises (MSME) sector. As per the ASI report 2007-08, the agro based industries accounted for 88% of the total value addition of Rs. 1159 crore in the state of Bihar as shown in Table 3.8. In the category of food products/ beverages/tobacco the net value added was to the extent of Rs. 884.19 crore which was 2.15 per cent of the figure for the country.

**Table 3.8: Value of Output & Net Value Added in Bihar (2007-08) (Rs. Crore)**

	Value of Output			Net Value Added		
	All India	Bihar	Bihar's Share	All India	Bihar	Bihar's Share
Food products / Beverages / Tobacco	351,820.93	2,865.34	0.81	41101.13	884.19	2.15
Grand Total	2,519,117.97	21,873.61	0.87	442308.87	1159.5	0.26

3.8.4 As the state has an enormous potential of the food processing industry, the existing investment in the sector is quite low. To boost the sector, the state has prepared food processing policy 2008 and created a separate food processing directorate in the state apart from the schemes in the sector of the Government of India. The state investment promotion board has approved total no. of 398 project proposals upto October, 2010 with proposed investment of Rs. 1.81 lakh crore. Out of these, 180 proposals are for food processing. Of the total 398 proposals, 45 have started working, 104 are at advanced stage and 249 at different stages of implementation, involving an investment of Rs. 1102.5 crore so far. In the food processing sector, 41 projects involving an investment of Rs. 473.83 crore are at various stages of implementation.

**Table 3.9: Proposals Approved by State Investment Promotion Board (up to October 2010)**

Items	2008-09	2009-10	2010-11 (up to Oct 2010)	Total
No. of Proposals Approved	173	127	98	398
Proposed Investment (Rs. Crore)	110369	30577	40472	181418
Proposed Employment	124954	18776	10962	154692
<b>Sector Wise</b>				
i. New Sugar Mill	23	3	1	27
ii. Expansion of working sugar mills	7	0	1	8
iii. New Ethanol Plant of working sugar mill.	2	0	0	2
iv. Ethanol cum sugarcane juice	5	0	0	5
v. Food Processing	26	85	69	180

Source: Govt. of Bihar.

The state government has also approved two food parks in Muzaffarpur-Vaishali and Bhagalpur-Katihar regions. These parks will be set up by a special purpose vehicle (SPV), preferably registered as a corporate body with at least 51 percent equity of the private entrepreneurs, the rest from the centre and the state government. The extent of

assistance has been fixed at 20 percent of the project cost or Rs. 15 Crore whichever is lower.

### **3.9 Sugar Industry**

The state of Bihar has enormous potential for investment in sugar industry as it has a high production of around 50 lakhs MT. The total sugar production in the state was 2.20 MT in 2008-09. To attract investment in the sector state government has a declared scheme in 2006 having provision of various concessions and subsidies. Presently there are 28 sugar mills in the state out of which 15 public sector units are closed. Out of 10 private sector units 2 are sick. Of the 18 public sector units 15 are under Bihar State Sugar Corporation and 3 are under central PSUs. The efforts are made to revive the closed units through lease agreements with the investors including HPCL and Reliance etc. Also 27 new proposals relating to sugar industry have been approved of which 27 are for new sugar mills and 8 are for expansion of working mills and 2 for new ethanol plants.

### **3.10 Makhana Processing in Bihar**

Makhana (Gorgon nut) is also a high potential commercial crop in Bihar. In India the total production of makhana is about 50,000 MT out of which the state of Bihar contributes about 80 per cent of the production. The makhana market is of about 400-500 crores in the state which has a high export potential and can be exported to Middle East countries. A modernized processing plant has already been established in Patna for which procurement of Makhana is done from around eight districts in Bihar.

- 3.11 The food processing sector is a major potential area in the state for growth of industries in the small and medium sector. However, uncertainty and the risk attached with the agriculture based industries require larger incentives and sops in terms of tax incentives by the government to encourage private sector to make investments in the sector. One of the major constraints for the food processing sector is the high working capital requirement due to seasonal availability of the raw material. As the capital ended subsidy schemes of the government are also in the form of back ended subsidy, these scheme do not help in overcoming the crunch of funds during the implementation stage of the projects.
- 3.12 The other major constraint for these small scale enterprises is the lack of scale which does not facilitate product innovation, up gradation of skill sets, quality improvement and brand building. In the scenario strategic alliances and networking with the large food companies is pertinent. In fact a no. of litchi processors is supplying frozen pulp to companies like ITC and Dabur which is used for packaged fruit drinks as juices etc. However, the companies need to supply consistent quality of product as per the international quality norms. The food park scheme promoted by the government is suited for the investment by small and medium scale companies as the food parks provide a no. of common facilities which can be shared to reduce costs.
- 3.13 A cluster based approach for development of marketing and processing infrastructure will be helpful in optimum utilization of resources. The cluster based approach can be useful for creating common infrastructure as per the requirements of specific commodity. The production clusters of fruits in the state of Bihar are given in Table. 3.10.

**Table 3.10: Fruit Clusters in Bihar**

<b>Fruit</b>	<b>Cluster</b>	<b>Districts</b>	<b>Total Production (MT)</b>
Mango	Cluster-I	Muzzafarpur , Vaishali Darbhanga, Samastipur E. Champaran ,W. Champaran	534160
	Cluster-II	Banka, Munger, Bhagalpur	137143
Litchi	Cluster	Muzzafarpur, Vaishali, W. Champaran, E. Champaran	109352
Banana	Concentrated Pockets	Vaishali, Samastipur, Purnia, Katihar	733158
Guvava	Concentrated Pockets	E. Champaran, W. Champaran Vaishali, Darbhanga, Bhagalpur	64489
Pineapple	Cluster	Araria, Kishanganj, Purnia Katihar	125000

Based on this approach integrated food parks can be developed providing infrastructure for sorting / grading facilities, controlled atmosphere chambers, modified atmosphere chains, cold chain infrastructure, pre coolers and refer vans etc. Approval has been given to establish two food parks, one in Muzaffarpur-Vaishali region and the other in Bhagalpur-Katihar region. The cluster based interventions would be highly useful for the litchi and makhana processing in the state. As majority of the investment is in small and medium scale sector the common infrastructure provided by the food parks will help companies in reducing on the costs and increase profitability.

- 3.14 Inadequacy of skilled manpower at various levels from farm to processing is hampering the growth of agribusiness sector in the country and the same is true for state of Bihar also. There is shortage of skilled manpower for food technology companies in terms of food technologist as well as other professional. At farm level also the knowledge of the farmers about the modern post harvest management techniques especially for the perishables is limited. In the scenario it is pertinent to provide skill based training to grass root level functionaries and farmers for the

modern farming practices as well as post harvest management including primary processing and value addition. The skill based vocational education programmes will help in altering the employment structure from primary agricultural production to more profitable marketing, distribution and processing sector. The skill based programmes will also help in promoting entrepreneurial ventures by the rural youth at the village level and thus arresting the migration to the urban centers.

- 3.15 The state should also emphasize on development of appropriate product and process technology for the various horticultural crops of the state including litchi, Makhana etc through networking and research projects with ICAR centers in Bihar, Central Post Harvest Technology, Food Technology and Crop Processing institutes across the country. The products may be developed for the large scale commercial production for the domestic and international markets.



## **CHAPTER IV**

### **AGRICULTURAL MARKETING INFRASTRUCTURE REQUIREMENT AND SOURCE OF FUNDS**

#### **1.0 Introduction**

Agricultural Marketing Infrastructure is a prerequisite for the efficient agricultural marketing system and to ensure that larger share of the final price goes to the farmer in the State. The State Government in Bihar repealed its Agricultural Produce Marketing Act, 1960 to improve its agricultural marketing efficiency by development of marketing infrastructure through increased public and private investment in the sector. Subsequently, the State Government has drawn up a comprehensive market infrastructure scheme which would involve establishment of modern terminal markets, agri-business centres, rural hats and on farm primary processing centres. The plan also envisages the optimum utilization of the assets and resources of the existing 95 markets of Bihar, out of which 54 have developed infrastructure on them.

In the present chapter, discussion has been made on the requirements of agricultural marketing infrastructure in the State and various sources of funding the marketing infrastructure. The State government can adopt a two pronged strategy for the development of marketing infrastructure in the state. One is establishment of state of the art, terminal markets in the major cities and linking them to the various production centers as envisaged. Secondly, the existing 54 markets which have developed infrastructure can be renovated with necessary repair and maintenance requirements and other marketing infrastructure required by them.

#### **2.0 Market Infrastructure Requirement**

The state of Bihar has 95 regulated APMC markets out of which 54 markets had basic marketing infrastructure in place. These 54 markets have been established

in total land of around 1595 acres out of which around 813 acres of land is vacant. Therefore the market yards have substantial basic infrastructure in place which can be further improved for providing better facilities to the producers so as to increase the no. of producers going to the markets.

The infrastructure available in the market yards includes: covered platforms in 48 market yards and godowns existed in 47 market yards. Similarly shops cum godown are available in 32 market yards with total no. being 915 in all the market yards together. Also 53 market yards have administrative building in place. Similarly 26 markets have the open platforms and same no. of market yards have the grading rooms. Only 3 market yards have the cold storage facility and computers are available in 58 markets. Therefore 54 markets have some minimal infrastructure in place which can be further strengthened to improve the efficient functioning of the markets. The existing infrastructure in 54 markets has been enlisted in the Table 1.

**Table 1: Infrastructure of Constructed Market Yards in Bihar**

S.No	Infrastructure Particulars	No. of Market Yards in which infrastructure is available
1	Administrative Building	53
2	Fruits & Vegetable Shops	7 (283)
3	Trader shop/ Godown	16 (354)
4	Shops & Godown with smoke house	2 (32)
5	Shops	11 (306)
6	Potato shops & onion	3 (53)
7	Fish shop	2 (30)
8	Smoke House	1 (20)
9	Sundry Shop	42 (720)
10	Godown	47 (125)
11	Covered Platform	48 (179)
12	Canteen	20 (23)
13	Bank Building	19
14	Post Office	14
15	Officer and Staff Residence	34 (206)
16	Grading Room	26 (28)
17	Water Tower / Tank	28
18	Pump Houses	11
19	Check Post	38
20	Open Platform	26 (80)
21	Water Boring	2
22	Cold Storage	3

S.No	Infrastructure Particulars	No. of Market Yards in which infrastructure is available
23	Banana Shop	1
24	Toilet	25 (33)
25	Generator Room	2
26	Transformer House	2 (5)
27	Shops cum Godown	32 (915)
28	Police Station	7
29	Check post guard quarter	1
30	Tub for cattle	1 (7)
31	Cattle shed / shop	13 (31)
32	Weigh bridge	2
33	Compound Wall	2
34	Hand pump	1
35	Gate cabin	1
36	Farmer's rest house	5
37	Chaukidar Shed	4
38	Jute Complex / Mini complex	3 (7)
39	Bailing Press	1 (2)
40	Jute complex office	1
41	Jute complex godown	3
42	Jute assorting Bhawan	1
43	Jute walling house	1
44	Assorting room	1
45	Fertilizer godown	1
46	Well	1
47	Computers	58
48	Banana Ripening Chambers	4 (59)

\* Figures in parenthesis are total no. of respective infrastructure. Source: BSAMB.

It can be emphasized that the strategy for improving the market infrastructure will involve establishment of modern terminal markets in the Patna to start with which be subsequently be established in Muzaffarpur, Purnia, Bhagalpur and Gaya Divisions. Secondly the infrastructure in the existing 54 markets is improved substantially for the efficient functioning of the marketing system in the state which can be linked with the proposed terminal markets.

The major infrastructure facilities to be upgraded in these 54 markets include: Administrative Building, Godowns, Shops, Covered Platform, Cattle Shed, Pump house & water tower, Generator room, Residential quarter, rest house, check post, Banana ripening chamber, bank, boundary wall, internal road, Executive Engineer

office, post office, cold storage, canteen, drainage, map eye, grading room, toilet, Street light etc. Besides up gradation of existing infrastructure in the market yards it is pertinent to provide facilities as transparent auction system, public address system, marketing intelligence, electronic display boards, storage including pre-cooling and cold store facilities; sorting, grading and ripening chambers etc. The detailed list of the infrastructure required in the ideal market is also placed as Annexure.

As per the review of Bihar State Agricultural Marketing Board to assess the maintenance requirements and repairing cost for the purpose in each of these 54 markets it has been estimated that the total estimated repairing cost in the 54 markets would be around Rs. 125 crores. As revealed from the Table, an investment of around 125 crores is required for the repair & maintenance and up gradation of the existing 54 market yards in 29 districts of the state which means that average investment per market would be about 5 crores. The market yard wise estimated infrastructure and investment requirement is given in Table 2.

The state has also designed a comprehensive plan for the agricultural marketing system in the state which includes setting up modern terminal markets in public private partnership (PPP) mode, agribusiness centers, renovation of rural haats and establishment of on farm primary processing centers. The existing market yards are proposed to be converted into agribusiness centers. The estimate cost of developing market yard as agribusiness centers has been estimated as Rs. 5.7 crores. The total cost for the proposed 40 agribusiness centers thus would be Rs. 228 crores. For the comprehensive market infrastructure plan the state has estimated an amount of Rs. 1272.00 crore.

The state government has further planned to set up on farm primary processing centers (OFPPCs) for the horticulture produce so as to restrict the post harvest losses. The interventions that could be taken up by the OFPPCs include scientific harvesting, washing, sorting and grading, curing in case of some vegetables, special post harvest treatments like fumigation / sulphitation etc. A total of 10,000 On Farm Processing Centers are proposed to be set up at a total investment of Rs.120 crores

**Table 2: Estimated expenditure requirement for Market Yards.**

S.No.	Districts	Market Yards to be upgraded	Infrastructure Facilities to be renovated/created	Estimated Investment Requirement (in lakhs)
1	Patna	Musallahpur, Patna City, Fatuha, Danapur, Bihta, Barh, Mokama	<ul style="list-style-type: none"> <li>• Administrative Building</li> <li>• Godowns</li> <li>• Shops</li> <li>• Covered Platform</li> <li>• Cattle Shed</li> <li>• Pump house</li> <li>• Water tower</li> <li>• Generator room</li> <li>• Rest house</li> <li>• Banana ripening chamber</li> <li>• Internal road</li> <li>• Canteen</li> <li>• Drainage</li> <li>• Grading room</li> <li>• Toilet</li> <li>• Street light</li> <li>• Open Auction system</li> <li>• Public address system</li> <li>• Electronic display boards</li> <li>• Storage including pre-cooling and cold store</li> <li>• Facilities for sorting, grading</li> <li>• Ripening chambers etc.</li> </ul>	1372
2	Nalanda	Biharsharif		213
3	Jehanabad	Jehanabad		118
4	Gaya	Gaya		209
5	Aurangabad	Daudnagar		115
6	Bhojpur	Ara, Bihia, Natwar		824
7	Buxer	Buxer		206
8	Rohtas	Sasaram, Nokha		426
9	Kaimur	Mohania		103
10	Chapra	Chapra		184
11	Vaishali	Hajipur		71
12	Darbhanga	Darbhanga		262
13	Samastipur	Dalsinghsrai, Samastipur		1078
14	Madhubani	Jhanjharpur, Ghoghardiha, Jainagar		904
15	Begusarai	Begusarai		106
16	Muzaffarpur	Muzaffarpur		307
17	Sitamarhi	Sitamarhi, Bairstonia, Pupari		350
18	East Champaran	Chakia, Motihari, Betia, Chanpatia		580
19	West Champaran	Narkatiaganj,		81
20	Purnia	Gulababagh, Kasba, Banmankhi		1472
21	Araria	Forbishganj, Araria		670
22	Katihar	Katihar		152
23	Kishanganj	Kishanganj, Bahadurganj, Thakurganj		375
24	Khagaria	Khagaria		92
25	Bhagalpur	Bhagalpur, Naugachhia		467
26	Munger	Munger		228
27	Lakhisarai	Lakhisarai		195
28	Madhepura	Sinheshawarsthan, Bihariganj, Murliganj		787
29	Supaul	Supaul		543
<b>Total</b>		<b>54</b>		<b>12491</b>

As for the establishment of terminal market, the clearance has been given for the same to be set up at Potari with total financial outlay of Rs. 129.70 crore with 17 collection centers for fruits and vegetables from 14 districts. The total government equity in the project will be capped at 49%. The terminal market project to be established under public private partnership model has been sanctioned to Temptation Foods Ltd, Mumbai through bidding process. It is pertinent that the implementation of the project is expedited to fill the infrastructural gaps in the state and boost further investment.

The infrastructural facilities to be developed at terminal market would include central electronic auction system, pre cooling units, ripening chambers, cold storages, electronic grading lines, vegetable washing, grading and packing units, automatic Lychee treatment system & pulp making unit, cash spot payment through ATMs to the farmers, spot commodity trading, color vision system, quality station, banking facility and electronic display boards, one-stop shopping for inputs. The terminal market will also include establishment of testing and certification laboratory.

It is envisaged that the terminal markets are linked with the agribusiness centers, rural haats and on farm primary processing centers (OFPPCs). The agribusiness centers in the important production belts of the state can facilitate backward and forward linkages. These centers can be equipped with the infrastructure according to the produce in its area of operation. The rural haats can be provided with the infrastructure as market shed, storage facilities, covered auction platform, open drying platform and drinking water facilities. The estimated cost of developing one rural haat will be Rs. 30 lakhs.

Based on the foregoing analysis, the agricultural marketing infrastructure requirement for the State is summarized as under:

**Table 3: Investment Requirement for Agricultural Marketing Infrastructure**

S.No	Infrastructure Particulars	Required Investment (Rs. Crores)
1	Modernization and Renovation of existing market yards / Establishing Agribusiness centres. Agribusiness centres. (54 market yards have minimum infrastructure which can be renovated) (@ Rs. 5 crores per market)	270
2	Renovation of rural haats (Infrastructure as storage facilities, covered auction platform, open drying platform and drinking water facilities, primary processing facility etc (around 1500 rural haats)	450
3	Establishment of Modern Terminal Markets in Patna	130
4	Cold Storages in the 4-5 production clusters of fruits including litchi and mango etc/ Pre-cooling/Cold chain facility (Cold Storages, Refrigerated Vans etc)	100
5	Warehousing Infrastructure	100
6	Establishment of Agri-export Zone for litchi (covering districts of Muzzafarpur, Samastipur, Hazipur, Vaishali, East & west Champaran, Bhagalpr, Begusarai, Khagria, Sitamarhi, Saran and Gopalganj).	20
7	Primary Processing and Value addition infrastructure/ Pack Houses	120
8	Establishment of Integrated Food Park (controlled atmosphere chambers, modified atmosphere chains, cold chain infrastructure with mobile pre-coolers, reefer vans, processing & value addition etc.)	125
9	Promotion of Farmers organization (100 no. @ 5 lakhs per organization)	5
10	Other Infrastructure as Marketing Intelligence and Network, Testing laboratories, development of packaging standards & design, quality management systems & certification, research & development, export specific infrastructure, market led extension and training.	20
<b>Total</b>		<b>1340</b>

### 3. Financing the Infrastructure Requirements

The infrastructure development requirements for agricultural marketing as discussed in the previous section can largely be met by the public sector investment along with the private sector investment. To meet the requirements of the public sector

investment the state depends on the higher allocation of funds / special package by central government for agricultural sector. The infrastructural investment requirement of around Rs. 1340 crores can be met through central sponsored programmes, central sector schemes and private sector investment through public private partnership and multilateral international financial agencies. As per the present analysis there is an investment requirement of Rs 1340 crores initially in next seven years. The year-wise physical targets for creating the infrastructure and requirements for the funds in phased manner during the next seven years are given as under:

S.No	Particulars	Physical Targets							
		2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Total
1.	Market Yards	7	8	8	8	8	8	7	54
2.	Rural Haats	100	250	250	250	250	200	200	1500
3.	Terminal Market	1			-	-	-	-	1
		<b>Financial Requirement (Rs. Crores)</b>							
1.	Market Yards	35	40	40	40	40	40	35	270
2.	Rural Haats	30	75	75	75	75	60	60	450
3.	Terminal Market	30	30	40	30	-	-	-	130
4.	Marketing Infrastructure including warehouses, post harvest infrastructure, cold chain, agri-export zone, market intelligence etc.	40	75	75	80	80	80	60	490
<b>5.</b>	<b>Total Investment Requirement</b>	<b>135</b>	<b>220</b>	<b>230</b>	<b>225</b>	<b>195</b>	<b>180</b>	<b>155</b>	<b>1340</b>

The major source of funding for the development of agricultural marketing infrastructure is given as under:

1. The National Horticulture Mission will be the key programme through which requirements of the funds for establishment of terminal markets, cold chain development, post harvest infrastructure and modernization of wholesale markets will be met. The horticulture mission envisages the development of horticulture sector involving establishment of forward and backward linkages by adopting cluster approach.



2. Rashtriya Krishi Vikas Yojana (RKVY): The scheme launched in 2007- 08 aims to boost agricultural growth rate and to incentivize the states to increase public investment in agriculture and allied sectors. The scheme provides flexibility and autonomy to States in the process of planning and execution of agriculture and allied sector schemes. The funds under the scheme can also be utilized for agricultural marketing infrastructure development besides other agricultural interventions.
3. The subsidy provided under the central sector schemes including Development/ Strengthening of Agricultural Marketing Infrastructure, Grading & Standardization, Rural Godown scheme and Construction/ modernization/ expansion of cold storages etc can be utilized for the funding of agricultural market infrastructure. The infrastructure development programme can also be financed through state plan schemes and besides schemes private sector participation can be promoted for which funding can be done through equity & loans. Viability gap funding for projects in public private partnership can also be availed.
4. Rural Infrastructure Development Fund: The Fund is maintained by the National Bank for Agriculture and Rural Development (NABARD). The domestic commercial banks contribute to the Fund to the extent of their shortfall in stipulated priority sector lending to agriculture. The main objective of the Fund is to provide loans to State Governments and State-owned corporations to enable them to complete ongoing rural infrastructure projects. The loans under the scheme can be availed by the state government to finance a no. of infrastructure projects.
5. Loan from Asian Development Bank: The state government has availed a loan of \$ 67.6 million (Rs. 373 crores) from Asian Development Bank to boost investment for agribusiness infrastructure in Bihar. Asian Development Bank (ADB) and the Government of India have signed a \$67.6 million loan that will help improve physical and institutional links to support agriculture in the state of Bihar. The loan will help expand agricultural value chains and facilitate better linkages for small scale farmers with processors, agribusiness entrepreneurs, and service providers in Muzaffarpur and Patna-Nalanda regions of Bihar. The loan is

the first phase of a \$170 million financing facility under the Agribusiness Infrastructure Development Investment Program, for states of Bihar and Maharashtra. The programme will build physical and institutional links along horticulture integrated value chains, which include farmers, processors, agribusiness entrepreneurs, and service providers. Public-private partnerships (PPP) to design, build, finance and operate the integrated value chains are a key component of the project. Private investors will provide collection services, grading, packaging, storing, processing and cold-storage facilities to a range of high value chains. The Department of Agriculture, Government of Bihar, is the implementing agency of the project, which is expected to be implemented over a period of six years to be completed in 2017.

## CHAPTER V

### CONCLUSIONS & SUGGESTIONS

- 4.1 The agricultural economy in the Bihar is dominated by the small and marginal farmers having subsistence farming and around two third of the work force in the state is dependent of the agriculture. Therefore the overall economic growth in the state is largely dependent of the agricultural economy particularly after the bifurcation of the state of Jharkhand where majority of the mineral based industries exist. One of the major constraints for the rural poor in the highly unpredictable economic environment is the access to the markets. The markets offer highly unfavorable terms of trade for the rural poor as they are often compelled to sell low and buy high.
- 4.2 With the limited resources and trade practices highly monopolized and cartelized the farmers have little choice to market the agricultural produce. In the changing economic environment the marketing system in the purview of agricultural produce marketing act has been criticized for distorting competition in the agricultural markets and thus providing inequitable terms of trade for the farmers. In order to make system more market friendly various state governments in the country have introduced reforms. The state government of Bihar has gone a step ahead and scrapped the act altogether to introduce free market regime in the agricultural sector and private sector participation in agricultural marketing can be enhanced. However there has not been any rapid transition from state regulated regime to large investment by the private sector. The transmission is generally faster in the economies having well established & organized private sector and entrepreneur culture. The present study has been undertaken to analyze the investment in the investment in the agriculture marketing

infrastructure and the factors which are influencing the investment in the food sector. The repeal of the act has definitely provided a suitable environment for the private investors but the same needs to be supplemented by the basic infrastructure. Based on the analysis of the various issues and existing market structure in the state, following suggestions are summarized for improving the marketing infrastructure in the state:

#### **4.3 Modernization of Existing markets through Public Private Partnership Mode**

4.3.1 As per the Bihar Agriculture Produce Market (Repeal) Act, 2006, all the assets and liabilities of the Bihar State Agricultural Marketing Board, market committees have been vested in the State Government. Accordingly Sub Divisional Officer has been administering the functioning of the agricultural produce markets. This system has resulted into deterioration of the facilities and poor functioning of the markets. As is also the case that functioning of the markets during the APMC regime also was not very efficient and therefore trade in no. of markets could not be fully shifted. A significant part of the marketable surplus was traded outside the purview of APMC markets. Presently 53 markets have basic infrastructure as open / covered platform, shops, godowns, weighbridge, administrative building, internal roads, toilets, banana ripening chamber and cold storage in some of them. But the above mentioned infrastructure is not maintained properly affecting the functioning of the markets. In these markets also there is no provision of transparent auction process. It is therefore pertinent that the Mandis needs to be modernized with creation of basic infrastructure as infrastructure for transparent auction process including public address system & ticker system / Auction master, electronic weighing scales, sorting and cleaning equipments etc. In the scenario the existing markets may be modernized and

developed under public private partnership mode. Considering the highly inefficient functioning of the markets, the private sector participation in management of the markets will bring in much needed efficiency in the functioning of the markets. The markets can be established based on the Built Operate Transfer Model. The equity contribution from the private sector can be worked out based on the potential market size after thorough feasibility study of the market yards in the state. A regulation for establishing markets in the public private partnership mode can be enacted by the State Government. The implementation of the project can be done through state promoted Special Purpose Vehicle. The private sector will operate and maintain the market. The user charge may be levied for the services provided in the market. To start with the high potential markets as Patna, Muzaffarpur and Gaya may be considered for modernization.

4.3.2 It is pertinent that the forward and backward linkages are established in the value chain and infrastructure based on the requirements of target produce is created based on the cluster wise approach for commodities. For the integrated value chain it is pertinent that facilities for perishables as pre-cooling, sorting, grading, cleaning, washing, packing and minimal processing are provided near the production clusters. Similarly rural hats in the state are provided with minimum infrastructure as market shed, storage facility, covered auction platform, drying platform and drinking water facilities etc.

4.3.3 The subsidy under the scheme for development/strengthening of agricultural marketing infrastructure, grading and standardization can also be utilized for development and strengthening of infrastructure in the market yards. A no. of other

states have availed subsidy under the scheme to create market infrastructure. It is suggested that subsidy under the scheme may be increased from existing level to attract private investment. In addition to this interest subsidy can also be given on bank loans.

#### **4.4 Promotion of Farmers Association / Organization for Fruits & Vegetables Marketing**

4.4.1 Bihar has lowest per capita income amongst the major states of India and high rate of persistent poverty with social structure fragmented based on caste lines. Also the average size of land holding in Bihar is 0.75 hectare in comparison to national average of 1.57 hectare. Small and marginal farms constitute about 91 per cent of the total land holdings which has affected the viability of agriculture. Along with this there are other constraints in terms of high input costs, unavailability of credit and highly inefficient marketing channels. In the scenario farmers are selling produce to the village level intermediaries. A majority of the rural hats in the state are only strips of land where producers and buyers meet for a few hours. In case of trading for fruits and vegetables also there is practically no infrastructure available at majority of the rural hats. It is also observed that major portion of the marketable surplus of fruits & vegetables is traded outside the APMC mandis with substantial domination by intermediaries. In the scenario the farmer's organization in terms of self helps groups/ Farmers' Associations for marketing of fruits & vegetables can be a viable option for enhancing the bargaining power of the producers. Thus aggregation of the produce at the village level would be an important first step for establishing the post harvest management and on farm processing infrastructure at the village level as envisaged in the scheme of state government. The farmers association / organization will benefit the farmers to receive greater share of consumer prices with assured payments. The

farmer's organization can be linked to organized retail chains or other institutional buyers. The aggregation at the village level will also encourage such institutional buyers to procure produce at the village level and thus farmers can save on the logistic cost of transporting the produce.

4.4.2 The cooperatives societies/ farmer organizations can be federated into a producer company model as has been successfully implemented in other states for organic and horticultural produce marketing. The producer company concept governed by Companies Act 1956 has distinct advantages over traditional cooperative model where greater emphasis is given on running the organization as a business enterprise with a profit motive. The promotion of Producer Company would enable farmer to aggregate their products so as to provide volumes that will interest buyers, and to jointly purchase inputs in lower prices and obtain better quality. The successful implementation of the model will provide opportunities for farmers to supply some of the more profitable markets outside the traditional trading system.

4.4.3 One of the successful examples of farmers' collective action is that of vegetable marketing by Kaushalya foundation in Bihar involving 3000 farmers and 600 vegetable vendors. The vegetables are collected at the village level from small and marginal farmers at the collection centers and are graded and sorted before being transported to the distribution centre. The vegetables are further sorted and graded at the distribution centers and are dispatched to city centers established at demand points. The organization has successful in implementing an effective supply chain of vegetables and created value for each of the participating stakeholder in the venture. The annual turnover of the venture was Rs. 2.09 crores in the year 2009-10. Such

initiatives are small in nature looking at the broad state level picture but these micro level initiatives are particularly important in the context that majority of the farmers are in the small and marginal category having low risk bearing capacity. The model can be replicated on a larger scale to provide the alternate marketing channels to the farmers.

#### **4.4 Establishing Cooperative Marketing Structure for Horticulture Produce**

The horticulture marketing federation can be established in the state to promote alternate marketing channel for horticultural crops. The federation can promote primary horticultural cooperative societies at the village level. The model has been successfully implemented in a no. of states of the country as Karnataka and Maharashtra etc. As majority of growers in the state are in small and marginal category the model can be useful for aggregation at the villages level and can be beneficial in terms of providing basic infrastructure, technical guidance & inputs, market information, post harvest training for farmer members and logistic support. The federation can also explore opportunities for export of main horticulture produce of the state. In the state, marketing societies for the litchi growers can be established as existing mechanism of trade is through pre-harvest contractors only. There are ample examples in some of the production cluster that the growers who marketed the litchis on their own ended up getting larger returns. Therefore the marketing societies for litchi growers can help in enhancing the bargaining power of the growers as also mitigate the risk factors. The apex body can also carry out generic promotion for the benefit of the local fruit like litchi for creating brand for the product originating from Bihar. For example the litchi from Bihar can be branded as a niche product as it is



done for grapes as Maha Grapes in Maharashtra, Kinnaur apples from Himachal Pradesh and alphonso mangoes from Ratnagiri. The generic branding will also result in price premium for the produce.

#### **4.5 Promotion of Organised Retail**

The organized retail sector provides alternate marketing channel for the farmers to market particularly the horticultural produce. The retailers for their fresh produce needs, source produce from traders in wholesale markets or directly from the farmers through their collection centers. The shortening of the value chain results in higher price realization to the farmers. The collection centre at the village level also guarantees farmers the assured market and saves on transportation cost. The organized retail will also be beneficial for the marketing of value added & semi processed products of the cooperatives societies / self help groups etc as retailer through its super markets can expand the market for the products.

#### **4.6 Spot Trading of Agricultural Commodities**

Spot trading of Agricultural commodities through commodity exchange provide trading platform to the farmers and traders for selling and buying of identified agricultural commodities. There are no. of agricultural commodities that are traded through this platform including maize and sugar in Bihar. The maize contracts are deliverable at Maheshkhoont in Bihar through National Spot Exchange warehouse. The spot trading platforms has distinct advantages over the traditional APMC markets in terms of better price realization, and access to national market. The platform ensures easier, transparent and quick transaction which not only save time and cost

but also reduces cost of intermediation. The farmers can be benefited through this medium of trade as large number of investors from all across the country are available at the spot exchange platform, due to which better price at the time of sale are realized. For the agro processors also it is beneficial to procure commodities through this medium as huge quantity of uniform quality can be procured. Therefore the spot markets help in enhancing the market efficiency of the agricultural markets and increasing further investment in the sector. The awareness for the spot trading should be extensively created amongst the farmers so as to maximize the returns to the farmers. NCDEX Spot Exchange Ltd (NSPOT) has also taken initiative to modernize Mandis across the country as a key marketing infrastructure project as also integrating these markets to the online electronic markets which can also be leveraged by the state to promote and expand e-trading in the state.

- 4.7 The state has existing storage capacity of 13.40 Lakh MT against the required capacity of 28.14 Lakh MT. which means that there is a deficit of around 15 Lakh MT. With the implementation of WDRA act and the warehousing receipt system for pledge financing, the activity needs to be further strengthened with the assistance under the central sector scheme. As the credit is one of the major factors for distress sale, the large scale adoption of the system can make a major economic impact on the farming community. Similarly, the total cold storage capacity in Bihar is 14.40 Lakh MT. The figure for Bihar is comparable with most of the major states including Andhra Pradesh, Punjab and Gujarat. Looking at the high horticulture production of around 160 lakhs MT in the state, existing capacity is inadequate and newer capacity needs to be created to cope up with the production levels.

4.8 The contract farming is one of the other areas which need to be focused for the development of efficient markets. The promotion of contract farming for the small and marginal farmers in Bihar can positively impact the incomes of the farmers. It is observed that the farmer in the state have problems in marketing of crops like potato. The Pepsi Corporation is planning to initiate its successful contract farming model in the state for the potato crop. The contract farming helps in reducing the marketing and transaction costs due to which smallholders can derive significant benefits by adopting contract farming. The contract with a no. of small land holders raises transaction cost to the firm but the same can be reduced by organizing farmers into groups or associations. Price is an important factor for contract farming as also the non price factors as regularity in procurement, payment disbursement, inputs, technical advice and services, and incentives for efficiency and quality are some of the important factors for success of the contract farming model. As both the parties of contract i.e. firm and the farmers have substantial investment, it is important to have long-term commitment and mutual trust. The extension machinery can promote contract farming model by strengthening communication channels between various stakeholders of the value chain as farmers, farmer organizations and food processing companies.

#### **4.9 Dissemination of Market Information**

The state has no mechanism in place for the collection and dissemination of market information. The market information in terms of market arrivals, prevailing market prices and market intelligence etc is very critical for the planning purpose, designing marketing strategies and business planning, understanding demand & supply pattern

of agricultural commodities and exports. Therefore the state must create a mechanism for the collection and dissemination of the information. A no. of organizations including IFFCO Kisan Sanchar Ltd in collaboration with mobile phone service provider AIRTEL is providing services to farmers for critical farming & marketing information and inputs from experts. The availability of such services can further be strengthened in the state for the benefit of the farmers.

#### **4.10 Promoting Export Marketing of Litchi**

The arrival of litchi fruit in India starts from mid of April and ends in the month of June with arrival time varying in different states of the country. The first arrival in the mid April is from Tripura followed by Assam in first week of May while arrival in Bihar state starts from third week of May and the season ends with arrival from Punjab. Thus there is availability of fruit for almost 2.5 months. In terms of arrival in some of the international markets, the litchi in India arrives fifteen days earlier than Thailand and one month earlier than China which is advantageous to India for exporting it to European markets. Similarly other countries like Madagascar, South Africa and Australia produce litchi in the months from November to February. India exports around 1300-1400 MT of litchi per annum. To harness the potential of litchi exports from the state, it is pertinent that the pack houses capacity is increased and quality testing laboratories are established in the production belt as Muzaffarpur.

4.11 The constraints in the agricultural marketing system is reflected in the level of integration of markets i.e. integration of the agricultural markets in the state of Bihar with the other marketing centers of the country like Delhi, Mumbai and Kolkata etc.

As revealed by a no. of research studies based on the market prices the spatial integration of the Indian markets is very low and same is true for the markets in Bihar also. The existing infrastructure is highly inadequate, outdated and inefficient which results in delays and transit losses. The improvement in spatial market integration with the other markets in the country will help in better return to the farmers of the state. Therefore a combination of various measures including supporting policy framework, institutional support, well functioning markets, market access and capacity building etc are some of the pertinent factors for the rapid growth of the agricultural sector in the state. The creation of such an infrastructure will have a multiplier effect on the overall growth of the economy resulting in improving the livelihood of the rural poor.

- 4.12 The state of Bihar has a hue production base in cereal crops, oilseeds and horticultural produce. The establishment of common agricultural marketing infrastructure in the state will provide impetus to the whole agricultural value chain. The much needed infrastructure will not only help state in realizing comparative advantage in production and marketing of a no. of agricultural commodities but also improving terms of trade in favor of the small and marginal farmers of the state. It is therefore pertinent that modernization of existing facilities, post harvest infrastructure, collection centers, mobile processing units, cold chain, controlled atmospheric storage, modified atmospheric storage, grading & packing halls, pack houses, refrigerated transport, warehouses, primary processing centers, processing hubs, value addition centers, certification centers, perishable air cargo complex, modern terminal markets, retail outlets for perishable & non-perishable products etc are pertinent for the efficient functioning of the value chain. The requirement of funds can be met through

public and private investment though bulk of it would have to be through public investment only. Various central sector schemes, central allocation and multilateral financial institutions will be the major source of funding for the comprehensive infrastructure development programme in the State.

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### MATRIX FOR STRATEGIC INTERVENTIONS FOR IMPROVING AGRICULTURAL MARKETING EFFICIENCY

Particulars	Interventions	Action Plan	
		Short Term	Long Term
<b>1. Modernization of Existing Markets and Establishing New Markets through Public Private Partnership</b>			
<ul style="list-style-type: none"> <li>• The poor infrastructure in the markets is a major impediment for the smooth functioning of the markets.</li> <li>• Regulatory regime for a no. of decades has not provided efficient functional markets with trade being highly unorganized &amp; fragmented.</li> <li>• Trade has not been fully shifted in no. of markets due to inefficient functioning of the markets.</li> <li>• Non transparent methods of auction.</li> <li>• Large no. of intermediaries in the value chain.</li> <li>• Major portion of the trade had been outside the purview of APMC markets.</li> <li>• Absence of rural roads and lack of market infrastructure discourages farmers to go to the markets.</li> <li>• Lack of minimum infrastructural facilities in the market.</li> <li>• Lack of proper maintenance of the markets having highly unhygienic conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Existing markets may be modernized and developed under public private partnership mode.</li> <li>• Minimum infrastructure for the market can be provided as transparent auction process, cleaning &amp; grading facilities, cold storages, access roads, water supply, drainage system and waste management etc.</li> <li>• User charges from the traders.</li> <li>• Markets to be operated and maintained by private sector.</li> </ul>	<ul style="list-style-type: none"> <li>• A suitable regulatory mechanism to needs to be enacted for modernization and establishing new markets under PPP mode.</li> <li>• Conducting Feasibility Studies of markets for ascertaining financial viability.</li> <li>• Modernization of selected markets likes Patna, Gaya etc to start with.</li> <li>• Establishing Special purpose vehicle for implementation of project.</li> <li>• Forming project management authority to monitor the progress of the projects.</li> <li>• Capacity building programmes for the farmers and traders for improving marketing practices and handling of perishable commodities.</li> </ul>	<ul style="list-style-type: none"> <li>• Establish modern terminal market at Patna. Approval has already been given to Temptation Food Ltd. The project implementation may be initiated.</li> <li>• Improving existing condition of link roads and power.</li> <li>• Establishing backward integration.</li> <li>• Developing value chain linkages from wholesale markets to rural hats &amp; on farm primary processing centers.</li> <li>• Utilizing subsidy under central sector schemes for developing &amp; strengthening market infrastructure.</li> <li>• Strengthening Value Chain through strategic interventions and investments in the backend.</li> <li>• Promoting contract farming and developing grades and standards.</li> <li>• Electronic Integration of Markets.</li> <li>• Establishing e-marketing of agricultural produce.</li> </ul>



## MATRIX FOR STRATEGIC INTERVENTIONS FOR IMPROVING AGRICULTURAL MARKETING EFFICIENCY

Particulars	Interventions	Action Plan	
		Short Term	Long Term
<b>2. Promotion of Farmers Association / Organization for Fruits &amp; Vegetables Marketing</b>			
<ul style="list-style-type: none"> <li>• Small and marginal farms constitute about 91 per cent of the total land holdings.</li> <li>• There is practically no infrastructure available at majority of the rural hats.</li> <li>• It is also observed that major portion of the marketable surplus of fruits &amp; vegetables is traded outside the APMC Mandis with substantial domination by intermediaries.</li> <li>• Low bargaining power of farmers due to unavailability of alternate marketing channels and farmers have little choice but to sale to the intermediaries.</li> <li>• Marketing channels for fruits like litchi is mainly through pre-harvest contractors.</li> </ul>	<ul style="list-style-type: none"> <li>• Farmer's organization in terms of self helps groups/ Farmers' Associations for marketing of fruits &amp; vegetables can be a viable option for aggregation of the produce at the village level..</li> <li>• Credit requirements of the farmers can be facilitated through farmers associations.</li> <li>• Facilitate input requirements and technical guidance.</li> </ul>	<ul style="list-style-type: none"> <li>• Sensitization programmes to introduce the concept and value of collective action</li> <li>• Promotion and establishing marketing groups in production clusters.</li> <li>• Groups are encouraged to develop micro plans and save for creating equity base.</li> <li>• Training &amp; Exposure visits to successful models.</li> <li>• Providing linkages to the organized retailers and institutional buyers.</li> </ul>	<ul style="list-style-type: none"> <li>• Creating minimum level of infrastructure at village level.</li> <li>• Federating groups into Producer Company.</li> <li>• Linking farmers associations to on farm primary processing centers.</li> <li>• Capacity building of groups on grading &amp; packaging.</li> <li>• Replication of successful model in a wider area.</li> <li>• Entrepreneurship development and marketing related training programmes for farmers' groups / associations.</li> <li>• Establishing long term business networking with the large scale buyers.</li> <li>• Establishing efficient value chain from farm to urban markets and processors.</li> <li>• Documentation system being established.</li> <li>• Establishing system of analyzing market intelligence.</li> </ul>
<b>3. Promotion of Organized Retail</b>			
<ul style="list-style-type: none"> <li>• Farmers in the state have limited access to the markets and there are no alternative channels of marketing available to the farmers.</li> <li>• Farmers largely depend on the intermediaries and pre harvest contractors for the sale of their produce.</li> <li>• With growing demand and economic growth in the state organized retail is expanding.</li> </ul>	<ul style="list-style-type: none"> <li>• Organized retail provides an alternate channel for the farmers to sell their produce. Retailers also procure through their collection centers which facilitate farmers in reducing transaction cost as also the higher prices are realized.</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitating linkages of farmers' groups with the retailers.</li> <li>• Congenial policy framework for encouraging organized retail in the state.</li> </ul>	<ul style="list-style-type: none"> <li>• Encouraging investment in the agricultural supply chain in terms of creating infrastructure in the back end.</li> <li>• Establishing collection centers of the retailers at the village level.</li> <li>• Creating brand for the value added products of the groups/ farmers associations so as to link with retailers.</li> <li>• Capacity building for modern retail management.</li> </ul>

## MATRIX FOR STRATEGIC INTERVENTIONS FOR IMPROVING AGRICULTURAL MARKETING EFFICIENCY

Particulars	Interventions	Action Plan	
		Short Term	Long Term
<b>4. Spot Trading of Agricultural Commodities</b>			
<ul style="list-style-type: none"> <li>Farmers have little avenue other than agriculture produce markets where high intermediation cost is involved.</li> </ul>	<ul style="list-style-type: none"> <li>Spot trading provides online platform to the farmers with access to large no. of buyers. Due to shortening of chain higher benefits are realized by the farmers.</li> </ul>	<ul style="list-style-type: none"> <li>Awareness creation for the spot trading amongst farmers.</li> <li>Aggregation of the produce at the village level.</li> <li>Presently maize contracts are available by National Spot Exchange at Maheshkhoont., Bihar</li> </ul>	<ul style="list-style-type: none"> <li>New delivery centers across the maize growing clusters.</li> <li>Volumes may be increased through this channel for larger benefits to the farmers.</li> </ul>
<b>5. Dissemination of Market Information</b>			
<ul style="list-style-type: none"> <li>The state has no mechanism in place for the collection and dissemination of market information.</li> </ul>	<ul style="list-style-type: none"> <li>The market information in terms of market arrivals, prevailing market prices and market intelligence etc is very critical for the planning purpose, designing marketing strategies and business planning, understanding demand &amp; supply pattern of agricultural commodities and exports. Therefore the state must create a mechanism for the collection and dissemination of the information.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of price displays in the wholesale markets.</li> <li>Creating structure for collection, analysis, storage and dissemination of marketing data</li> <li>Identification of manpower for the marketing information collection and dissemination.</li> <li>Linking with national information network as agmarknet, agriculture marketing atlas.</li> </ul>	<ul style="list-style-type: none"> <li>Dissemination of market intelligence to the farmers through SMS services as implemented by IFFCO Kisan Sanchar Ltd and Reuters Market Light.</li> <li>Capacity building of the manpower for management information system &amp; Information &amp; Communication Technology applications.</li> </ul>

## ANNEXURE II

### INFRASTRUCTURE NEEDED IN AN IDEAL MARKET

<p><b>Core Facilities</b></p> <p>Platforms for Automatic weighing</p> <p>Auction Platforms</p> <p>Packaging &amp; Labeling Equipments</p> <p>Drying Yards</p> <p>Loading, Unloading &amp; Dispatch facilities</p> <p>Grading facilities</p> <p>Standardization facilities</p> <p>Price Display Mechanism</p> <p>Information Centres</p> <p>Storage / Cold Rooms</p> <p>Ripening Chambers</p> <p>Public Address System</p> <p>Extension and Training to Fanners</p>	<p><b>Support Infrastructure</b></p> <p>Water Supply</p> <p><i>Power</i></p> <p>Veterinary Services</p> <p>Sanitary Facilities</p> <p>Posts &amp; Telephones</p> <p>Banking</p> <p>Input supply und Necessity Outlets</p> <p>POL</p> <p>Repair / Maintenance Service</p> <p>Office</p> <p>Computerized systems</p> <p>Rain Proofing</p>
<p><b>Service Infrastructure</b></p> <p>Rest Rooms</p> <p>Parking</p> <p>Sheds for Animals</p> <p>Market Education</p> <p>Soil Testing Facilities</p> <p>Drainage</p>	<p><b>Maintenance Infrastructure</b></p> <p>Cleaning and Sanitation</p> <p>Garbage Collection &amp; Disposal</p> <p>Waste Utilization</p> <p>Vermi Composting</p> <p>Bio-gas Production / Power</p>

Source: GOI (2007). "Report of the Working Group on Agricultural Marketing Infrastructure and Policies Required for Internal and External Trade", for the 11<sup>th</sup> Five Year Plan 2007-12, Agriculture Division, Planning Commission, Govt. of India, pp-114

## ANNEXURE III

### AGROCLIMATIC ZONES OF BIHAR

Agroclimatic Zone	Districts	Area (000 ha)	Average Rainfall (mm)	Main Crops
Zone I North West Alluvial Planes	Bettiah, Motihari, Gopalganj, Siwan, Vaishali, Seohar, Muzaffarpur, Samastipur, Sitamarhi, Madhubani, Darbhanga, West & East Champaran	Net Cultivated – 2281  Gross Cultivated – 3260	1234.7	Rice, Wheat, Maize, Arhar  Horticulture Crop Litchi, Mango, Makhana, Chestnut
Zone II North East Alluvial Planes	Purnia, Katihar, Saharsa, Madhepura, Araria, Kishanganj, Supaul, Khagaria, Begusarai	Net Cultivated – 2281  Gross Cultivated – 3260	1382.2	Maize, Mustard, Jute, Sugarcane Horticulture Crop Mango, Bael, Banana, Papaya, Cucurbits, Chilly, Turmeric, Potato
Zone III South Bihar Alluvial Planes	Patna, Gaya, Buxar, Jahanabad, Nawada, Nalanda, Rohtas, Bhojpur, Aurangabad, Kaimpur, Banka, Munger, Jammui, Lakhisarai, Shekhpura, Bhagalpur	Net Cultivated – 241  Gross Cultivated – 3408	1102.1	Rice, Gram, Wheat Horticulture Crop Mango, Guvava, Banana, Bael, Jackfruit, Onion, Potato, Chillies, Marigold

Source: Government of Bihar.

## ANNEXURE IV

### LAND UTILIZATION PATTERN IN BIHAR (2005-06 TO 2007-08)

(Area in '000 hectares)

Land use	2005-06	2006-07	2007-08
Geographical area	9359.57	9359.57	9359.57
Forests	621.64 (6.6)	621.64 (6.6)	621.64 (6.6)
Barren and Unculturable Land	436.13 (4.7)	436.06 (4.7)	432.09 (4.6)
Land put to Non-agricultural use	1646.63 (17.6)	1646.89 (17.6)	1652.66 (17.7)
Land Area	1285.65 (13.7)	1285.98 (13.7)	1292.11 (13.8)
Water Area	360.98 (3.9)	360.91 (3.9)	360.55 (3.9)
Culturable Waste	45.71 (0.5)	45.65 (0.5)	45.59 (0.5)
Permanent Pastures	17.4 (0.2)	17.33 (0.2)	16.47 (0.2)
Land Under Tree Crops	240.28 (2.6)	240.52 (2.6)	240.96 (2.6)
Fallow Land (excluding current fallow)	129.41 (1.4)	119.97 (1.3)	119.35 (1.3)
Current Fallow	666.18 (7.1)	566.39 (6.1)	568.61 (6.1)
Total Unculturable Land (1 to 8)	3803.38 (40.6)	3694.45 (39.5)	3697.36 (39.5)
Net Sown Area	5556.19 (59.4)	5665.12 (60.5)	5662.20 (60.5)
Gross Sown Area	7396.49 (79.0)	7718.95 (82.5)	7764.65 (83.0)
Cropping Intensity	1.33	1.36	1.37

Source: Directorate of Statistics & Evaluation, GOB