



Report of the Task Force

on

Agriculture.

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Chapter-1

Introduction

- 1.1 In light of the letter of the Neeti Aayog, Government of India DO No. O-11013/O/2015-NI dated- 17.03.2015, a Task Force on Agriculture has been constituted in the Chairmanship of Agriculture Production Commissioner, Bihar vide Planning and Development Department, Government of Bihar notification No. 2283 dated- 14.05.2015. A copy of the notification is attached as annexure 1.
- 1.2 The Task Force has been given mandate to formalise suggestions for preparing strategies for development of all aspects of Agriculture. It was also given task to identify strategies of reforms, innovation and technical extension. The Task Force has been asked to identify the success stories in respect of programs and activities.
- 1.3 Fertile Gangetic alluvial soil, abundant water resources, particularly ground water resources, form the basis of agriculture in Bihar. The farmers in Bihar grow a variety of crops. Apart from food-grains, the state produces oilseeds, fibre crops, sugarcane, fruits, vegetables and other crops. Recently, high value horticulture viz floriculture and aromatic plant cultivation has caught the imagination of the farmers because of its increasing demand.
- 1.4 Bihar is considered destination for second Green Revolution in the country. Several reports including the National Farmers Commission have emphasized the need for accelerated development of agriculture in eastern India for securing food security of the country. Dr. A.P.J. Abdul Kalam, the then President of India has described Agriculture as Core Competence of Bihar. The State Government is implementing a Road Map of Agriculture development. The Agriculture Road Map aims at Food and Nutritional Security of state population, increase in farmer's income, gainful employment to agriculturist and check on migration, equitable agricultural growth with focus on gender and human aspects and sustainable use of natural resources for sustainability of production system.

- 1.5 Agriculture Road Map was started in 2008. The first agricultural road map concluded with a Krishi Karman Award to the state for ever highest rice production at 81 lakh MT in 2011-12. This also led to commendable progress in seed sector and agriculture extension. Now the second agricultural road map(2012-2022) is being implemented in the state. It includes programmes of not only the production related departments such as agriculture and animal, dairy and fishery resources department, but also the detailed programmes of Water Resources, Minor water resources, Energy, Land Reforms, Forestry and Environmental protection, Food Processing Industry, Cooperative, Rural Road and Flood and Drought related departments. The agriculture road map gives a holistic approach to agriculture developments and it needs to be implemented at the country level. The second agriculture road map of Bihar envisages an investment of Rs. 1.5 lakh crore in 5 years. Such large amount of investment in agriculture could only come through appropriate central scheme. However, the central scheme should provide adequate flexibility to states for choosing scheme components, its rate of assistance and mode of sanction and implementation. A Cabinet Sub Committee has also been constituted to monitor the preparation and implementation of the Agriculture Road Map.
- 1.6 The Task Force has thoroughly deliberated the existing status of Agricultural development and has prepared a perspective plan for Agricultural Development for the remaining two years of 12th five year plan and for the 13th five year plan. An Interim report has been prepared which may subsequently be further developed. The Interim report includes production related subjects such as Crop, Horticulture, Milk, Meat, Fish, Egg and also the supportive subjects such as irrigation, power, co-operatives, approach road, plantation and green coverage. It envisages an investment of Rs. 2.72 lakh crore from 2015-16 to 2021-22.
- 1.6.1 Green Revolution technologies transformed agriculture in the 60s. However, obvious limitations of this technology have become apparent now. The traditional areas of green revolution such as Punjab, Haryana and Western UP are experiencing productivity fatigue and its soil and water quality is questioned for continuing with the gains. The eastern states particularly Bihar has the large unharnessed potential. Bihar Agriculture Road Map envisages Rainbow Revolution through use of sustainable technologies and the country should also surrogate it.

Chapter-2

Bihar Agriculture: At a glance

2.1 Geographical location

(A) Latitude	24 ⁰ 20' 10" - 27 ⁰ 31' 15" North
(B) Longitude	83 ⁰ 19' 50" - 88 ⁰ 17' 40" East
(C) Height from mean sea level	53 m
(D) Average annual precipitation	1176.4 mm
(E) Major rivers	Ganga,Gandak,Kosi, Bagmati,Mahananda,Sone

2.2 Land Utilization(Lakh Hectare)

Item	Area*
Total geographical area	93.60
Forest	6.22
Land put to non agricultural uses	17.03
Barren & uncultivated land	4.31
Permanent pastures	0.16
Land under miscellaneous trees and groves	2.44
Culturable wasteland	0.45
Current fallow land	7.81
Other fallow land	1.21
Net sown area	53.95
Gross cropped Area	76.46

(* 2011-12,Source-Directorate of statistics)

2.3 Agro Climatic Zones of Bihar

Item	zone & I	zone& II	zone& III (A,B)
• Districts	West champaran, East champaran, Siwan,Saran, Sitamarhi,Sheohar, Muzaffarpur,Vaishali, Madhubani,Darbhanga, Samastipur,Gopalganj, Begusarai.	Khagaria,Purnea, Katihar,Saharsa, Madhepura, Araria, Kisanganj, Supaul	Rohtas,Bhojpur,Buxar, Kaimur,Arwal, Patna Nalanda, Nawada Sheikhpura, Jahanabad, Aurangabad,Gaya, Munger,Bhagalpur, Banka,Jamui, Lakhisarai.
• Soil Texture			
	Sandy loam-Loam	Sandy Loam- Clay loam	Sandy loam-Loam with clay in some regions
pH	6.5-9.5	6.5-7.8	6.5-8.0
Organic matter (%)	0.2-1.0	0.2-1.0	0.5-1.0
Available Nitrogen (Kg/Ha.)	150-350	150-300	200-400
Available Phosphorus (Kg/Ha.)	5-50	10-35	10-100
Available pottash(Kg/Ha.)	100-300	150-250	150-350

2.4 Agriculture and allied sector contributes 18.9 percent of the GSDP. The rate of growth of Agriculture and allied sector has been 5.4 percent during 2005-10 and 3.7 percent during 2010-14.

2.5 Farm holdings are small and scattered. There are about 1.61 crore farm holdings of which 91 percent is marginal.

2.6 The water area of Bihar constitutes about 3.9 percent of the total geographical area. In 2004-05, the production of fish in Bihar was 2.67 lakh tonnes. The production grew continuously thereafter and reached the peak level of 4.32 lakh tonnes in 2013-14.

2.7 Bihar is a major fruit and vegetable growing state. Total vegetable production in Bihar is about 156.29 lakh tonnes. Potato, Onion, Tomato, Brinjal, Okra and

Cauliflower is the major vegetable crop of the state. Bihar is known all over India for its litchi and mango. The four most important fruit crops in Bihar are mango, guava, litchi and banana. In 2013-14, their production levels were mango (12.74 lakh tonnes), guava (2.39 lakh tonnes), litchi (2.34 lakh tonnes) and banana (14.36 lakh tonnes). Flower production in Bihar has increased recently, providing immense opportunity of employment and income in rural areas of Bihar. In 2013-14, about 99 tonnes of rose, 6799 tonnes of marigold, 317 tonnes of jasmine (Bela) and 536 tonnes of the tuberose were produced in Bihar.

2.8 A comparative account of crop productivity (Kg/Ha) is as below,

Crop/Year	2005-06		2012-13		Best state
	Country	Bihar	Country	Bihar	
Rice	2102	1075	2102	2523	3989(Punjab)
Wheat	2619	1379	2619	2797	4577(Punjab)
Maize	1938	2098	1938	3975	4959 (Andhra Pradesh)
Pulses	598	748	598	1052	1073(Jharkhand)
Foodgrains	2125	1239	1715	2644	4258(Punjab)

2.9 Livestock Production Parameters: The following table shows the Livestock Production (2013-14) in comparison to national scenario:

Sl.	Product	India	Bihar	Highest Producer State
1	Milk (000) Ton	137685.88	7197 (5%)	24193.90 (U.P.)
2	Egg (No. in Lakh)	734378.95	9308(1%)	227874.76 (A.P.)
3	Chevon (000) Ton	959.33	80.69(8%)	245.10 (W.B.)
4	Mutton (000) Ton	418.74	1.47(NS)	205.68 (A.P.)
5	Poultry Meat (000)	2579.26	57.62(2%)	513.41 (A.P.)
6	Pork (000) Ton	485.73	71.99(15%)	173.12 (U.P.)
7	Buffalo Meat (000) Ton	1124.01	60.53(5%)	563.16 (U.P.)
8	Total Meat (000) Ton	6235.48	292.28(4.6%)	1221.25 (U.P.)
9	Wool (000) Kg	47908.88	270.56(5%)	15026.77 (Rajasthan)

- 2.10 Major Challenges:** State agriculture faces multifaceted challenges that emanate both from within the system and also from outside. Low productivity across all the enterprises, crop, horticulture, milk, meat, egg and fishes has traditionally described the state agriculture. The low productivity has consequential effects on low income and high poverty of its population. The major factors contributing to low productivity is described as below,
- 2.10.1 **Technological factors:** There are two agricultural universities, five agricultural colleges, one horticulture college, one agriculture engineering college, one dairy technology college and one veterinary college in the state. All the 38 districts have a functional Krishi Vigyan Kendra (KVK). ICAR has also a presence with eastern states regional headquarter at Patna. Besides, National Research Centre for Litchi and Makhana are established in state. However, State productivity remains low because of the slow adoption of modern technologies by the farmers. Dominance of cereals in cropping pattern reflect on the subsistence nature of state agriculture. Institutional extension system faces the challenge to take latest technologies to farmers field.
- 2.10.2 **Land Issues:** More than 91 percent of all holdings fall in the category of marginal holdings with farm size less than 1 hectare. Each such holding is again fragmented in small parcels. Land records are obsolete, making any institutional investment virtually impossible. Small farm agriculture create serious problems for economy of scale.
- 2.10.3 **Rainfed agriculture:** State agriculture still heavily depends on monsoon. In the last 5 years, there has been drought or drought like situation in four consecutive years. Kharif crops are almost a gamble leaving little prospect for investments in costly inputs. Canal Irrigation is scanty. Irrigation is majorly (70 percent) dependent on diesel based tube wells. High cost of diesel based irrigation make it a very difficult input for even rabi crops.
- 2.10.4 **Lack of Infrastructure:** Road connectivity, storage godown and power availability to agriculture sector is inadequate to usher accelerated agriculture development in the state.
- 2.10.5 **Lack of institutional credit:** slow pace of implementation of kisan credit card leave large number of farmers dependant on high cost non institutional lending sources seriously impeding use of modern agri inputs and adoption of modern technology.
- 2.10.6 **Inadequate Marketing and Processing:** Marketing and processing infrastructure are not adequate affecting farmer's income.
- 2.10.7 **Flood & Drought-**State agriculture is dependent on Monsoon. A heavy rainfall lead to flood and a deficient rainfall could lead to drought. The paradox of flood and drought occur simultaneously almost every year making agriculture highly vulnerable and unstable.

Chapter-3

Crop Production

3.1 Vision & Policy perspective:

- 3.1.1** Qualitative increase in crop productivity may be emphasized as there is limited scope for increase in area. Current fallow and other fallow land may be brought under cultivation with appropriate interventions. Zaid season may be emphasized similar to Kharif and Rabi seasons. Crop and varietal diversification may be introduced. Quality of production and value addition has to be emphasized. The outreach of most modern crop production technology may be facilitated upto the last farmers. Region and Agro Climatic specific crop, variety and technology may be identified and promoted. While increasing crop production and productivity, soil, water, animal and human health may be conserved and protected.
- 3.1.2** Seed is critical for the development of agriculture. The public sector seed companies have become totally inadequate to cater to the needs of the farmer. The private seed business particularly through the multinational seed companies are making farmers entirely dependent on their avarice interest. There is a need to substantially increase investment in public sector seed production, processing and Marketing. Local seed companies may also be promoted to reduce the dependence on multinational seed companies. In addition to the crop seed planting material for horticultural crops are important. Similarly animal breeds and fish fingerlings are important for their productivity and quality. Whereas scientific innovations in seed industry would be helpful in achieving production targets but it would also be important to preserve and promote traditional varieties of crops and indigenous breeds of animals.
- 3.1.3** Sugarcane is the major cash crop in Bihar. In India Sugarcane is a major commercial crop for Sugar industries. In Bihar, it is grown in an area of 2.65 lakhs hectare with an average productivity of 69.72 ton per hectare and sugar recovery of 9.22 % against the national average of 68.8 t/ha and 10.17% respectively. Sugarcane Research Institute, Pusa (Bihar) is the only research institute committed to sugarcane research. It was established in 1936. A proposal to set up a new sugarcane reaserch institute has been sent to ICAR which needs immediate attention. Climate change, declining soil health, emerging new disease and pest, labour scarcity and abiotic stresses are severely affecting cane productivity and sugar recovery. Sugarcane seed

replacement rate is only about 10 % against the desired level of 33 %. Sugar sector needs a revival package.

- 3.1.4** Generation of appropriate agricultural technology and its dissemination to the farmers are becoming more and more challenging in the context of the climate change. Both the numbers and the quality of the technically qualified person in agriculture are grossly inadequate. There is a need to step up investment in agricultural research, education, extension. The whole ICAR system, agricultural universities and the state department of agriculture needs to be revisited for their current strength and weaknesses and every such institution should be strengthened to meet the future demand. New initiatives initiated by Bihar Agricultural University such as Kisan choupal, Kisan Gyan Rath and direct video conferencing with farmers have proved immensely useful. Such experiences may be suitably replicated at the country level.
- 3.1.5** Agricultural planning is much dependent on the statistical input generated through age old system. It needs a relook with appropriate input from remote sensing technologies. Local and decentralised planning can only capture the unique situation and harness the local potential. Reliable information for village agriculture as unit should be promoted and public planning should be based on the village level data.
- 3.1.6** Agriculture marketing will be one area which need focussed attention. The basic infrastructure such as the dry and cold storage are grossly inadequate in states like Bihar. The state took a bold step to abolish APMC Act in 2006. However there are no alternative models in the country. Structural innovations to foster agriculture marketing should be developed.
- 3.1.7** Procurement of food grains must be assured and to make it effective FCI and CWC must create adequate storage infrastructure and FCI should make arrangements to procure food grains including Maize and pulses from the farmers.
- 3.1.8** Small farm agriculture is a compulsive situation and to make it viable is the highest challenge. Integrated farming may be a solution and it needs to be encouraged. Animal husbandry and fisheries are the key sectors besides crops and horticulture. There is a need to focus research on small animals such as rabbit, rat and reptiles to increase the food basket. The importance of small animals has duly been recognized by FAO and a national level perspective will further help the cause of food and nutritional security of the small and marginal farmers. Urban and peri urban

agriculture offer new avenues and a perspective plan should be prepared to encourage urban agriculture.

- 3.1.9** High input cost particularly chemical fertilizers and pesticides would continue to pose challenge for the viability of small farm agriculture. Nutrient based subsidy regime for chemical fertilizers has led to skewed use of NPK fertilizers. Stable price of Urea and ever increasing price of P and K fertilizers are leading to excessive use of urea and frugal use of P & K. There is an urgency to restore the optimum balance. Organic farming technologies may be promoted to utilize the locally available resources. Bihar has a robust vermi compost and bio fertilizer programme which needs to be replicated. Similarly green manure programme has been implemented with much success. Agriculture Road Map aims at reaching vermi compost, bio fertilizer and green manure in every plot in 5 years. Soil test based fertilizer application and soil health card to all eligible farmers be granted in the stipulated time.
- 3.1.10** Farm mechanization saves cost and improves quality. Bihar has unique experience in implementing a massive farm mechanization programme. Mechanization software has been developed for transparency and accountability. All transactions are on line and farmers are benefitting from it.
- 3.1.11** Use of modern Agricultural technology is important for increasing production and productivity. SRI, Zero tillage, high density plantation and other appropriate technologies are promoted under the agricultural road map. Such technologies should constantly be developed and promoted in the farmers field.
- 3.1.12** Eastern states particularly Bihar has large untapped irrigation potential. There should be national policy to help states to harness the irrigation potential and any investment on this count should be supported through a national programme.
- 3.1.13** Flood and drought have become recurrent feature in Bihar. Paradoxically, north Bihar is ravaged by flood and south Bihar by drought in same year. Similarly wild animals such as blue bull are proving a threat to agriculture. In such an unstable situation farmers are hardly able to make an investment and therefore agriculture largely remains traditional and subsistence. There is an urgent need to have a comprehensive policy to mitigate risk of contingent situations in agriculture.
- 3.1.14** The challenges of climate change are becoming more and more apparent. This would pose greater challenges for agriculture. To mitigate the adverse impact we need to

explore more and more crops and animals in the food basket. There is a dangerous trend of shrinking food basket limited to few crops and varieties. Bio diversity within the species and among the species must be restored. Diversification among enterprises and diversification of varieties will have an important role to play in the coming times. Urban and peri urban agriculture would continue to draw attention and subtle planning would be required to foster it.

3.1.15 Quality control of the agri inputs would continue to be important. Therefore a strong network of analytical lab of soil, seed fertilizers pesticide, residue analysis would be very important.

3.2 Crop production Strategy:

3.2.1 Inputs: Production, availability at farmers' accessible places, timeliness, cost and quality.

3.2.2 Minimizing cost and maximising return: Promotion of technologies and management practices which tend to decrease cost of cultivation and maximize return.

3.2.3 Sustainable production system: Utilization of land, water and labour resources for best possible crop mix to suit to the conditions arising out of the global climate change. Crop and Enterprise diversification will be key to the sustainable production system. Recycling of organic wastes for use as organic fertilizers.

3.2.4 Extension: Transformation of agriculture information to knowledge and science into technology for agriculture scientists, students, farmers and extension workers. Reorganisation of extension to make it efficient, accountable and transparent.

3.2.5 Special attention to difficult physiographic situations viz. Tal, Diara, Saline, Acidic soils.

3.2.6 Respect & Reward: Restoring respect to the agriculture as profession for farmers, students, scientists and extension workers.

3.3 Success Stories:

3.3.1 Mushroom Cultivation for Nutritional & Livelihood Security

Realizing the vast potential of mushroom for nutritional and economic security for the state, the efforts of the Govt. of Bihar and the Agricultural Universities have resulted into cultivation of mushroom by more than 20000 families resulting in production of more than 2000 tonnes per annum. Five Units of button mushroom are functional round the year with a capacity 0.5 to 2 tonnes

per day in Purnia, Samastipur, Gaya, Patna and Vaishali districts. Mushroom cultivation technology is now available in all the 38 districts of Bihar. As a result, landless and weaker section (Maha Dalits) are earning Rs. 5,000/- to Rs. 10,000/- per month in a small hut of 1200 sq ft. and the small farmers are earning Rs. 15,000/- to 20,000/- per month by mushroom cultivation. The spent compost is also an excellent source of organic manure, which is being used by farmers resulting in higher production of different crops. Thus, mushroom cultivation has ensured income generation for un-employed rural youth, landless labourers, women and weaker section of the society besides providing additional income to the farmers engaged in land based crop production activities.

The Rajendra Agricultural University, Pusa has been pioneer in developing the technology for through out the year cultivation of mushrooms such as *Pleurotus* spp. (Oyster mushroom), *Agaricus* spp. (Button mushroom) and *Calocybe indica* (Milky white mushroom). A new variety of mushroom Rajendra Mushroom Dudhia-1 for summer season has been released recently by the University.

The University has trained 14000 farmers including 6000 women of different districts of Bihar, 2000 undergraduate students from different Universities of Bihar and other states in mushroom production technology and about 350 farmers for spawn production technology. It has facilitated establishment of 25 spawn production laboratories in the state by private entrepreneurs to meet the demand of spawn.

Thus, mushroom cultivation is an activity which may be taken up by farmers and rural youth to augment their income with little investment and efforts besides having availability of nutritional food for their families.

3.3.2 Transfer of Technology to farmers: The extension activities can be strengthened by adopting some of the innovative examples as mentioned in brief below which can be taken up as a policy initiative:

- **Kisan Choupal** is organized regularly on every Saturday by KVKs and colleges under the jurisdiction of Bihar Agricultural University, Sabour. In this programme, over 5 lakh farmers were benefitted during the last two years. It is another innovative experiment which can be conducted in the identified village helping farmers to solve their problems related to

cropping practices and agriculture along with the dissemination of scientific know-how from the university on their doorsteps in the villages by the agricultural universities.

- **Community Radio Station** It is currently running successfully in KVK Patna and has developed good rapport among farmers.
- **Kisan Gyan Rath** can be an important medium offering mobile multidimensional knowledge resource center to be availed by the farmers at their field and doorsteps. It can be equipped with inbuilt soil laboratory, demonstration unit, and video capabilities of different agricultural practices accompanied by the team of scientist in each KVK of the country. It is also running successfully in villages through KVKs under the jurisdiction of the university.
- **Video Conferencing** with the KVKs and the headquarters of the university is serving as an important tool to benefit the farmers with saving of resources. Each day, the farmers situated in different KVKs are trained through experts located at university headquarters. It can provide emerging opportunities for two-way interaction among the scientists, extension workers and farming community of the state helping in saving necessary resources and gaining expertise from the experts. It also helps to get the queries resolved regarding insect-pest infestation through video enabled feature of video conferencing.
- **Video Production Programme** through the production of video content on important cropping practices and farmers' participatory videos on a range of cereal, fruit, flowers and plantation crops can be helpful to generate added interest and motivation. The video content could also be displayed on YouTube links and other video sharing platforms. The YouTube channel of the university www.youtube.com/bausabour is very popular featuring videos on agricultural practices.

These innovative successful experiments if taken on a large scale have the capability to bring major reforms in the extension scenario of the country. The use of Information and Communication Technologies (ICTs) can be a game changer in this direction.

3.4 Financial outlay for major programme:

Rs. In crore

	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2011-22	Total
Seed Plan	183	191	214	231	243	255	272	1590
Horticulture	352	377	403	428	453	478	504	2995
Soil Fertility Management	564	645	725	805	886	966	1047	5638
Quality control	38	40	39	40	41	43	53	294
Mechanization	601	652	753	854	955	1056	1157	6028
Extension	410	525	590	655	720	785	850	4535
Soil & water conservation	80	105	130	155	180	205	230	1085
Application of remote sensing in agriculture	1	2	3	3	3	3	3	18
Agriculture Research & Education	574	685	532	512	492	472	482	3749
Total	2803	3222	3388	3683	3973	4263	4598	25931

3.5 Production Milestones: (Unit production in Lakh MT)

Year/Item	2017	2022
Rice	93.63	126
Wheat	65.75	72
Maize & Coarse Cereals	63.43	90.65
Pulses	29.2	36
Food grains	252.01	324.65
Oilseeds	3.14	4.5
Fruits	60.37	80
Vegetables	186.11	225

Chapter-4

Animal Husbandry, Dairy and Fisheries

4.1 Animal Husbandry is one of the key sectors which is very important from the point of view of income and employment in the rural areas. Animal Husbandry sector plays a very important role in the economy of the state. One third of the rural economy is dependent on this sector. Animal Husbandry gives an opportunity for poverty eradication, development of rural economy & alleviation of unemployment. Moreover availability of protein for human need, sufficient and incessant economic gain for rural people and employment for unemployed youths depend upon the multifaceted programmes of Animal Husbandry. There is a yawning gap between scientific recommendation and availability of major Livestock Products in the state:

Sl.	Product	ICMR recommendation	Availability in Bihar
1	Milk	220 gm /capita/day	185 gm /capita/day
2	Egg	180 /capita/annum	11 /capita/ annum
3	Meat	10.95 Kg /capita/ annum	2.11 Kg /capita/ annum

The vision for animal husbandry sector is to bring reforms in policies to create an enabling environment for sustainable Animal Husbandry and Institutional strengthening through organisational restructuring and capacity development of the personnel by enhancing their technical, extension, managerial, social mobilisation and leadership skills and bringing sharp attitudinal changes. with this vision a qualitative increase in production of animal products is targeted. The Present milk production of the state is 7774.933 thousand MT per year. It has been targeted to take this production level up to 10035 Thousand MT per year by 2017 and to 14867 Thousand MT per year by 2022. The milk processing capacity is presently 2060 thousand litres per day which has been targeted to 8260 (thousand Litres) per day by the year 2017 & 13160 Thousand Litres by the year 2022. Presently the egg production in the state is 9835.485 Lakhs per annum which has been targeted to reach 216000 Lakhs per annum by the year 2017 & 234000 Lakhs per annum by the year 2022. The present meat production of the state is 218

thousand ton per annum which has been targeted to increase to 1314 thousand tonnes by the year 2017 & 1423.5 thousand tonnes per annum by the year 2022. The present fish production of 2.88 lakh MT is targeted to increase to 8.86 lakh MT in 2017 and 10.25 lakh MT in 2022.

4.2 Strategy for animal husbandry:

4.2.1 Bihar Livestock Breeding Policy, 2011 has been formulated with a view to enhance milk production as well as to conserve the indigenous germplasm. Special attention is being given on Artificial Insemination, Vaccination and Livestock Nutrition as well as poultry farming and goat husbandry. There has been a great emphasis of the State on assuring last mile reach into the villages through Mobile Ambulatory Services and construction of newer hospitals and dispensaries.

4.2.2 Veterinary services: Preventive, diagnostic, therapeutic animal health services and disease surveillance

- The preventive veterinary services include production/ procurement of vaccine. Preventive vaccination of animals against major diseases as well as zoonotic diseases (communicable to man).
- Diagnosis of the animal disease is done through various diagnostic labs in the state.
- Animal disease surveillance programme is implemented for forecasting and thereby preventing and eradicating the diseases.
- Therapeutic veterinary service provides primary and professional cure/aid to ailing animals through the network of 2553 veterinary institutions in the state. These institutions provide need based veterinary services at the institutions and at farmers doorstep both as routine and in emergencies. The state has been vaccinating its livestock population from time to time as a preventive measure against diseases like Haemorrhagic Septicaemia, Black Quarter and Foot and mouth disease.

4.2.3 Animal breeding Services for breed improvement

- Animal breeding service aims at breed improvement for augmenting productivity and is done by conservation and development of native draft breeds and crossbreeding/upgrading of milch animals (cattle and buffaloes).
- Organized animal breeding service is primarily (now) providing artificial insemination service. This involves production/procurement of pedigreed bulls (of higher genetic potential)

- Production, processing, storage, distribution of frozen semen and actual AI work by field workers.
- Animal breeding service is provided by institutions through BLDA (Bihar Livestocks Development Agency), Bihar State Milk Cooperative Federation Limited (COMPFED) & NGO's.
- Encouragement of breeding activity by giving training to the youths.
- The State has well defined livestock breeding policy and is being implemented for breed improvement in cattle and buffaloes.

4.2.4 Extension Education and Training

The state provides extension services for augmenting livestock production besides training farmers, officers and supporting staff of the department.

Regulatory functions

State is implementing prevention of cruelty to animals, animal disease prevention, prevention of cow slaughter & conservation of cattle and buffaloes through Bihar preservation and improvement of animal's act 1955. The State has also been strictly implementing the Prevention of Animal Cruelty Act, 1960.

4.2.5 Feed and Fodder Resources Development

Fodder is the main and important component of livestock production. Feed and fodder resource development is done mainly through providing inputs and extension services. The state has established 10 fodder block making units as Fodder Bank to help the farmers by providing fodder blocks to their animals during crisis period e.g. drought and flood. Moreover, Fodder seed minikits distribution programme at the tune of 90000 minikits in 2009 - 10 (kharif and Rabi) and 170000 fodder seed minikit (Kharif and Rabi) in 2010 -11 for fodder production was implemented to nurture the need of animals of the state.

4.2.6 Livestock Census & statistical services

The department conducts household wise survey of livestock (livestock census) once in five years as per guidelines of the central government. The integrated sample survey is done regularly for 3 seasons to estimate the annual production of milk, meat, eggs and wool in the state as per the guidelines issued by the central government.

4.2.7 Poultry Development

Poultry development aims at providing extension training services and providing financial support for augmenting egg and meat production. The state is

implementing programmes aimed at development of backyard poultry (low input systems) Low input improved birds viz Vanraja, Cari, Nirvik and Grampriya are supplied on subsidized cost besides carrying out vaccination programmes for control of Raniket disease (fowl plague) in desi birds.

4.2.8 Animal Welfare Activities

- Animal welfare activities viz caring for unproductive old animals are supported through department programme like assistance to Goshalas in the state.
- subsidy on establishment of commercial layer farms in private sector
- requirement of funds per layer poultry farm
- subsidy on establishment of goat breeding farms in private sector

4.3 Technical intervention

- Transforming traditional livestock farming to modern husbandry techniques by mainstreaming best practices based on sound scientific principles and visible farmers participated result demonstrations
- Diversification of livestock farming with due consideration to farmers' capacity, needs and local conditions
- Bringing non-productive livestock resources into the fold of priority development initiative.

4.4 Reliable database, M & E system

- Establishment of robust and reliable database encompassing resources, outputs and field practices to support quality of planning and implementation.
- Introduction of monitoring, evaluation and technical backstopping system to ensure quality implementation of state and centrally sponsored schemes and programmes.

4.5 Empowerment of livestock farming communities

- Empowerment through on-site training and exposure visits to develop their technical, managerial and participatory skills.
- Conducting farmers' led result demonstrations at Panchayat level on modern animal husbandry practices.
- Grooming result demonstration farmers as extension volunteers through training, technical and extension support and involving them in the development programme and building of animal husbandry database.
- Creating a participatory learning environment and putting farmers on innovative mode.

- Creating a participatory learning environment and putting farmers on innovative mode.

4.6 Creating opportunities for poultry entrepreneurs

- Establishing network of professionally managed hygienic and modern retail outlets at district headquarters and state capital by involving poultry professionals and developing their entrepreneurship skills.
- Ensuring year round availability of quality day-old-chicks at local level by establishing hatcheries in potential areas and promotion of layer poultry farms in the vicinity.

4.7 Programmes

- Strengthening financial institutions for timely and adequate credit facilities
- Promoting insurance coverage for livestock and livestock farmers.
- Strengthening institutions for artificial insemination, quality semen production, cattle and poultry feed mill and feed testing labs.
- Training of livestock farmers.
- Establishing cooperative structure for cattle, goater and poultry products.
- Establishing Veterinary University for diverse development of all sectors of animal husbandry.
- Establishment and strengthening of extension system upto village level.
- Encouraging public private partnership
- Institutional strengthening through organizational restructure and capacity building of personnel/staff by enhancing technical , extension , managerial , social mobilization and leadership skills.
- Socio-economic uplift of poor livestock and poultry farmers.
- Improving database systems on resources, output, field practices and income/livelihood benefits.
- Improving, monitoring and evaluation for tracking implementation of schemes.
- Programmes for women empowerment.
- Programmes on farming of low input varieties of poultry.
- Use of Information Technology through 'mKisan Postal' and other extension sites.
- Training and promotion of Small Ruminants Resource Persons.

4.8 Dairy vision : Bihar is agriculturally rich and conditions are conducive for the milch animal rearing and dairy development. Agriculture road map for dairy development give thrust on expansion of cooperative society network so as to

make available an avenue for surplus milk disposal in maximum number of villages, human capital development so that farmers can understand the improved animal upkeep practices, breed improvement, infrastructure development for processing and preservation of milk and market development so that all the milk produced is sold at remunerative rate to the urban consumers.

4.9 Bihar's livestock wealth is around 6.60 percent of total livestock population in the country. In 2012-13, total milk production of the State was estimated to be 6845 thousand tons, which amounted to 5.17% of the national milk production. Per capita availability of milk in Bihar during 2011-12 was 175 gms, as compared to 147 gms in 2004-05. During this period the all India average increased from 233 gms to 290 gms. The Indian Council of Medical Research has, however, recommended the minimum requirement of 220 gms of milk per person per day indicating a shortage of 45 gms. During 2012-13, in total milk production of 187.53 lakh kgs per day, the co-operative sector handled about 13.61% of the total marketable surplus by procuring 12.46 lakh kgs of milk per day. During 2014-15, till feb, 2015 the average collection was 16.55 lakh kgs per day registering a CAGR of 12% since 1987.

4.10 As per growth rate of population in the State the requirement of milk by 2021-22 at the rate of 220 gms per person day as per recommendations of Indian Council of Medical Research, the total requirement of milk will be 292.53 lakh kgs per day. Keeping in view the above mentioned milk production requirement, the cooperative sector in the State will have to gear up its activities in all the spheres of dairy development so as to match with the National obligations. Bihar is located very strategically with having enormous market potential both nationally and internationally. On one side we have Nepal and on the other side we have Bangladesh. Both the countries are milk deficit. Within the country, the complete North-East is vast market which at present is being served by the milk surplus States in the North and West. Again Sikkim, West Bengal, a part of the Eastern U.P. and Orissa are other milk deficit States. We have started capturing markets in the eastern U.P. and West Bengal towns which are contiguous to our borders. The future plan has also to keep this in mind.

4.11 Dairy development Strategy and programmes

4.11.1 Expansion of Dairy Co-operative Network The existing co-operative network is covering about 45.5% of the inhabited villages of Bihar i.e. 55.5% of the State is still uncovered. By 2021-22 this number will grow to 30500 covering 80% of

the villages in all districts. The thrust will be on organisation of all women dairy co-operative societies. The number of new DCS will be 12500 and of member in these DCS will be 19.15 lakh at the end of 2021-22.

4.11.2 Increasing the productivity of Milch Animals The productivity of milch animals is proposed to be increased through dairy farming. In order to mitigate the shortage of good crossbreds as a short term measure to increase the milk production induction of heifers / milch animals of Shahiwal, Red Sindhi, Gir, Murrah breeds is proposed to be done under Mini dairy and Small dairy units which will be linked with commercial baskets backed by subsidy component from the State Plan schemes. It is proposed to establish 22500 units of Small dairy, Mini dairy, Midi dairy and commercial dairy by 2021-22.

4.11.3 Skill Development Capacity building of farmers in latest techniques of animal husbandry and animal health, nutrition etc. helps them manage these animals better and get better output. It has been proposed to enhance the capacity of training centres. These centres will provide training on society organisation, artificial insemination and to the management committee members. It has also been proposed to arrange study tour of farmers to other States like Punjab and Gujarat to acquaint them with improved practices so as to replicate them. Besides this, training on specialised programmes will be arranged at other specialised training centres DNS, Patna, COMFED and out of state the centres are NDRI, Karnal and NDDDB, Anand. A total of 70500 farmers will participate under various training programmes.

4.12 Fisheries Vision: Bihar is bestowed with vast and varied inland aquatic resources. The paradox of fisheries development in Bihar is that while it has large, untapped and underutilized water resources for aquaculture. Despite being the fourth highest inland producing state in the country, it has to depend on Andhra Pradesh for the supply of about 1.5 lakh tonnes of fish. The annual domestic demand of fish within the state is nearly 5.82 lakh tonnes, against the present annual production of around 4.32 lakh tones only. The annual per capita fish availability of the state is 7.56 kg per head while the national average is 9 kg per head. The average fish production from the available water resources of the state is 2600 kg / ha. per year against the national average of 2900 kg/ ha./year. The underutilization of aquaculture resources, unscientific management of water bodies and lack of entrepreneurship are some of the most obvious reasons for the substantial gap between demand and supply. The major challenge therefore, is to develop aquatic resources for maximum sustainable fish yield to bridge the gap of

demand and supply and to enhance the nutritive and livelihood security of fish farmers. Bihar is a land-locked state with an agrarian economy. It is endowed with vast and varied fisheries and aquaculture resources viz rivers, canal, reservoirs, ox-bow-lakes, flood plains (chaurs) and ponds. Fisheries is an age-old traditional occupation deeply associated with the economical and rural socio-cultural system of the state. Fish surplus state where fisheries contribute in rural livelihood, food security and integrated economy development. Development and management of fisheries and aquaculture resources for three fold increase in fish production. Creating additional livelihoods to fishers and farming households, ensuring nutritional security and economic growth of the state with due considerations to environmental well-beings and gender concerns.

4.13 Strategy

- Transforming traditional aquaculture to modern aquaculture by mainstreaming best practices based on sound scientific principles and visible farmers participated result demonstrations
- Diversification of aquaculture with due consideration to farmers' capacity, needs and local conditions
- Initiation of ornamental fish culture and recreational fisheries.
- Development of ox-bow lake fisheries through enhancement and better management practices.
- Bringing unutilised fisheries resources, such as chaurs (flood- plain fisheries) into the fold of priority development initiative.
- Establishment of robust and reliable database encompassing resources, outputs and field practices to support quality of planning and implementation.
- Introduction of monitoring, evaluation and technical backstopping system to ensure transparent implementation of state and centrally sponsored schemes/ programmes.

- Empowerment through on-site training and exposure visits to develop their technical, managerial and participatory skills.
- Conducting farmers' led result demonstrations at Panchayat level on aquaculture practices / ox-bow lake fisheries / chaur fisheries.
- Grooming result demonstration farmers / fishers as extension volunteers through training, technical and extension support and involving them in the development programme and building of fisheries database.
- Creating a participatory learning environment and motivating farmers to work on innovative mode.
- Establishing network of professionally managed hygienic and modern retail outlets at district headquarters and state capital by involving fisheries professionals and developing their entrepreneurship skills.
- Ensuring round the year availability of quality seed at local level by establishing hatcheries in potential areas and promotion of in-situ seed rearing by farmers in their vicinity. Encouraging fisheries professional graduates to participate in this developmental programs.

4.28 Schemes

- Construction of fish seed hatchery.
- Construction of Pens .
- Construction of new ponds.
- Establishment of Fish Feed Mills.
- Fish feed distribution scheme.
- Establishment of Market Outlet (Wholesale and Retail fish sale markets)
- Cold storage -cum ice plant at District level.

- Establishment cold chain (Procurement of live fish carriers, refrigerated vans and refrigerated - van-cum-cash counter)
- Strengthening of database or system
- Mobile extension van equipped with audio visual aid at Divisional level .
- Publication of training / extension manuals, bulletins and audio visual materials .
- Assured solar water pump with borewell.
- Establishment of Disease diagnostic lab.

4.29 Financial outlay: Rs in crore

Year	Animal husbandry	Dairy	Fishery	Total
2015-16	162	598	52.48	812.48
2016-17	178	658	52.48	888.48
2017-18	196	724	53.05	973.05
2018-19	216	796	52.87	1064.87
2019-20	237	876	52.12	1165.12
2020-21	261	963	56.80	1280.8
2021-22	287	1059	56.81	1402.81
Total	1537	5674	376.61	7587.61

Chapter-5

Water resources

1. Introduction: The river Ganga divides the State into two parts. The land on the Northern Bank of the river, North Bihar lies at the foothills of Himalaya and has border with Nepal. The rivers namely Kosi, Gandak, Bagmati & Kamala originate in Nepal and flow through North Bihar before draining into river Ganga which acts as a master drain for these tributaries. During monsoons when the drainage capacity of Ganga is reduced due to its being in spate, North Bihar faces severe natural disaster in the form of floods, water logging & erosion. As a result the state's economy is thrown out of gear.

5.1 Vision:

5.1.1 Vision: In order to achieve the targets set for crop production and productivity in Agriculture Road Map, harnessing of irrigation potential to hilt is important. Present irrigation intensity has to be increased from 83% to 158% by year 2017 and 209% by year 2022. In the table 1, this status has been clarified. The standards decided in this regard is quite challenging . Therefore, concerted effort will have to be made to achieve the prescribed targets for 12th five year plan period (2012-17) in the Agriculture Road Map and if there remains any short fall, it will be completed during the 13th five year plan period (2017-22).

Table-1 Crop Season Wise Irrigation Requirement

(Area in Lakh Ha.)

Particulars/Year	Kharif	Rabi	Summer	Total	Irrigation/ Crop intensity (%)
Present Irrigated Area	20.20	23.11	3.3	46.61	83%
Irrigation Requirement (2017)	31.00	38.00	30.00	99.00	158%
Irrigation Requirement (2022)	35.00	51.00	44.90	130.90	209%

5.1.2 For achievement of targets of Agriculture Road Map (2012-22) as irrigation requirement shown in 1, the ultimate, created and achieved irrigation potential of the state is presented in 2. It is clear that proposed irrigated agriculture intensity of 209% can be achieved from net sown area of 56.19 lakh ha by taking three irrigated crops from most of the agricultural land.

2-Ultimate, Created and Achieved Irrigation Potential of the State.

(Area in Lakh Ha.)

Type of Irrigation Potential	Ultimate Potential	Created Potential	Utilised Potential
(a) Major-Medium Irrigation	53.53	28.86	16.36
(b) Minor Irrigation			
(i) Surface Irrigation (Including Ahars & Pynes)	15.44	5.191	2.358
(ii) Ground Water Schemes (mostly private shallow tube well)	48.57	28.99	26.75
Total:-	117.54	63.041	45.468

It is clear from the above table that against the up to date created potential of 63.041 lakh ha, through the major, medium and minor water resources schemes annually 45.468 lakh ha irrigation is achieved and irrigation potential of about 17.573 lakh ha area has been lost which need to be restored. In the Agriculture Road Map for the proposed agricultural production, 158% irrigation intensity by year 2017 and 209% irrigation intensity by year 2022 is required and thereby, irrigation will have to be provided in 99.00 lakh ha area by 2017 and 130.90 lakh ha by 2022. Even if, it is proposed to develop the entire ultimate irrigation potential of 117.54 lakh ha by year 2022, requirement will be to create irrigation potential for an additional about 13.36 lakh ha (approx) of land by that period. There are the following alternatives for this:-

- (i) Integrated development of the entire potential of major, medium and minor water resources.
- (ii) Conjunctive use of surface and ground water.
- (iii) Channel storage of surface water resources in rivers /pynes bed during rainy season and their use in non-monsoon months.
- (iv) Enhancement of ground water availability (especially in hilly regions of South Bihar) through rain water harvesting and ground water recharge techniques.
- (v) Increase in ultimate irrigation potential of the state by enhancing the water use efficiency by adopting participatory irrigation management and other techniques.
- (vi) Efforts to achieve irrigation in larger areas with lesser water by covering extensive area under sprinkler and drip irrigation system.
- (vii) Establishing about 8 lakh additional deep private tube wells to utilize very small fraction (about 0.30%) of the huge static ground water resources of about 2550 Billion Cubic Metre (BCM) stored in deep aquifers in North Bihar.

This deep aquifer need not be tapped during 12th five year plan period (2012-17). Very small fraction of ground water resources stored in deep aquifer will be tapped during 13th five year plan period (2017-22) by installing 8 lakh additional private tube wells in North Bihar. Otherwise, there will be shortfall of about 16 lakh ha of projected irrigation during the period.

5.1.3 Qualitative improvement in irrigation along with its horizontal capacity expansion.

Under capacity building programme of major, medium and Minor Water Resources programme. Organizational expansion, proposals for farmers' organizations and participatory irrigation management have also been given included. Adequate provisions have been made for required monitoring, evaluation, research, documentation and technical manpower support. This provision is about 10% of the cost incurred on water resources development/irrigation components of the programmes. The capacity building provision will also cover the cost of infrastructure for quality control, third party inspection, non-government supporting individuals and organizations as well as water user's associations.

5.2 Strategy of Water Management & Irrigation:-

The following main strategies of water management and irrigation should be adopted:

5.2.1 Conservation of surplus monsoon water for utilization during lean flow period is most imperative need of the irrigated agriculture sector. Due to non-availability of suitable dam sites within the state, the storage, conservation and development of water resources is constrained. However, this constraint may be overcome to some extent by adopting the traditional indigenous technology / methodology of diverting water in Pynes by constructing barriers like barrages / weirs / sluice gates on streams and storing them in Ahars. This methodology is ideally suitable and time tested for all districts of South Bihar.

5.2.2 Restoration of lost potential: Irrigation schemes having culturable command area (CCA) more than 2000 Ha and up to 10,000 Ha come under medium irrigation and those above, 10,000 Ha come under major irrigation. Existing created potential is 29.25 LHa under major and medium irrigation scheme in the state. This lost potential is being restored through schemes under Accelerated Irrigation Benefit Programme (AIBP), State plan, NABARD and extension renovation and modernization (ERM) of the existing schemes.

5.2.3 Drainage: About 9.41 lakh ha. of land has drainage congestion and water logging problem in the State. Till date above 1.80 lakh ha. has been made free from drainage congestion. Out of balance 7.61 lakh ha., 2.50 lakh ha. cannot be

economically drained out. Aqua-culture & pisciculture should be encouraged in this area.

5.2.4 Command Area Development and Water Management(CADWM)

Programme issued by the Ministry of Water Resources, GoI for 12th Plan, the CADWM Programme has to be implemented in a holistic manner pari-passu with Irrigation Project under Accelerated Irrigation Benefits Programme(AIBP) under which CADWM Programme is being funded. This ensures that Irrigation Potential created (IPC) with hydraulic connectivity gets utilized soon after its creation, improves water use efficiency, increases agricultural productivity and production and brings sustainability in the irrigated agriculture in a participatory environment. All aspects of CADWM Programme need be taken up in an integrated and coordinated manner so as to achieve the envisaged objectives of raising food grains production to meet the increasing need for growing population.

5.2.5 Performance Evaluation & On Course Correction Mechanism: Periodically performance evaluation will be carried out to ascertain how far the irrigation schemes are able to meet their planned objectives. This evaluation of performance will also suggest the on course correction and remedial measures in case of deviation/failure in achieving the projected targets. Project Benefit Monitoring and Evaluation (PBME) will be required to be undertaken for establishing bench marks which will help in comparing the various indices of development in future.

5.2.6 Cross Cutting Issues : It has been observed that interaction between agriculture and irrigation is actually lacking. As a result, the desired benefit of irrigation is not achieved. Even if the scheme is able to provide irrigation service, it lacks reliability, timeliness and adequacy. Even if timely and adequate irrigation is provided, the agricultural productivity remains low. This calls for effective interaction between officials of water resources department (service provider) beneficiary farmers (stake holders) and consumers and officials of agriculture department (facilitators) for achieving the optimum agricultural productivity and production. Institutional mechanism for thorough discussion on these cross-cutting issues in irrigated agriculture need to be developed.

5.2.7 Long term solution of Flood Problem: Bihar faces the severe damages due to flood caused by the rivers originating from Nepal and Tibet every year. Therefore, the entire cost incurred on flood protection schemes of trans-border districts of Bihar must be borne by GoI under River Management Activities & Works related to Border Area (RMAWBA). Re-identification of Flood Prone

Districts should be carried out at earliest on the basis of Highest Flood Level (HFL) and actual inundated area. For permanent solution of flood problem in Bihar under long term measures the construction of Sapta Kosi High Dam-Sun Kosi Diversion scheme on Kosi river, the Multi Purpose High Dam at Noonthore on Bagmati river and at Chisapani on Kamla river is necessary. For this purpose the preparation of DPR of these three projects should be completed at the earliest and concerning Joint Project Office(JPO) at Viratnagar, Nepal should be strengthened.

5.2.8 Simplification in rules for AIBP(FMP) Schemes. Process for sanctioning the scheme under FMP(AIBP) is at present very cumbersome so it should be relaxed by merging the TAC stage and SRC stage at state level and Advisory committee as well as Investment Clearance stage should be abolished. GFCC should be empowered to approve scheme costing up to Rs100.00 Crores. The central share (CS) under FMP (AIBP) should be 90% but if it is not possible then the central share for old and damaged project under FMP should be kept at 90% instead of 50% and for new projects it should be kept 75% instead of 50%. Reimbursement mechanism of central share for previous year should be adopted and it should be reimbursed during next succeeding year. Eligibility criteria of 50% physical and financial progress should be modified to 10% for inclusion of more new schemes under AIBP. Under AIBP irrigation sector provision of central share should be enhanced from 25% to 50% for Projects of normal areas and provision of CS should be enhanced from 75% to 90% for Projects of flood and drought prone areas,

5.2.9 Silt Management and Linking of Rivers : The construction of barrages on Ganga river for the purpose of National Water Way seems not to be better option but the deepening and dredging of Ganga river for the development of National Water Way would be a better option. Rivers originating from Nepal and Tibet bring huge quantity of silt with its water flow. Siltation of river bed causes havoc during flood and so scientific and technical management of silt is crying need of present time. Therefore, it is needed that an effective Silt Management Policy should be framed by Government of India. Linking of river basins projects should be declared as National Projects.

5.2.10 Interstate Dispute Resolution Authority: It should be constituted immediately to resolve Inter-State issues pertaining to Tilaiya- Dhadhar Diversion Scheme, North Koel Reservoir Scheme, Batane Reservoir Scheme, Upper Mahananda Irrigation Scheme and Indrapuri Reservoir Scheme.

- 5.2.11** Almost every year Bihar faces vagaries of flood. About 68.80 lakh ha land is flood prone in the state. The recurring floods cause heavy loss to standing crops, lives and properties. Managing flood is imperative for intensive irrigated agriculture. As a short term measure, the state has constructed 3745.65 KM length of embankment to protect 36.46 lakh ha area from flood upto 2014-15. There is a programme to protect another 3.36 lakh ha of additional land from flood by constructing 344.74 KM of embankment in a time frame of 2015-17 and the remaining 28.98 lakh ha will be made flood free by constructing 2969 KM of Embankment during 2017-22.
- 5.2.12** Programme of enhancement of presently utilized irrigation potential of 45.468 lakh ha to 101.09 lakh ha by March, 2017 and 130.90 lakh ha by March, 2022.
- 5.2.13** Programme of enhancement of present summer irrigation of 3.3 lakh ha to 30 lakh ha by March, 2017 and 44.90 lakh ha by March, 2022.
- 5.2.14** Establishment of 14.64 lakh private shallows tube wells by March, 2022.
- 5.2.15** Establishment of 25,400 deep private tube wells (6" dia) in South Bihar and sugarcane plantation areas (both South and North Bihar) by March, 2022.
- 5.2.16** Establishment of 50 thousand irrigation dug wells(big dia) for hilly region of South Bihar.
- 5.2.17** Artificial ground water recharge and ground water monitoring after construction of 6700 check dams-cum-water harvesting-cum irrigation structure in South Bihar plateau regions.
- 5.2.18** Extensive renovation of about 1770 Ahar-pyne irrigation systems by March, 2017.
- 5.2.19** Restoration of lost potential of 17.57 lakh ha of existing major, medium and minor schemes by March, 2017.
- 5.2.20** Proposal of interlinking of river schemes and transfer of surplus water of North Bihar rivers to South Bihar by pumping through the Ganga during 2017-22.
- 5.2.21** Selective lining and extension of canals during 2012-22.
- 5.2.22** Proposals of water logging removal by providing adequate drainage to 2.11 lakh ha land by year 2017 and 5.11 lakh ha land by year 2022 mostly in North Bihar.
- 5.2.23** Flood protection measures for 26.68 lakh ha by year 2017 and additional 12.45 lakh ha by year 2022.
- 5.2.24** **Setting Physical Targets for Major & Medium Irrigation Schemes Schemes:** Targets will be related to creation of irrigation potential through implementation

of various schemes under the sphere of major and medium Irrigation schemes as follows: **(Figures in lakh ha.)**

Ultimate irrigation potential	Irrigation Potential Created as on 31.03.15	Irrigation Potential to be developed during (2015-17)		Irrigation Potential to be developed during (2017-22)	
		Restoration of lost Irrigation Potential	Additional Irrigation Potential to be created	Restoration of lost Irrigation Potential	Additional Irrigation Potential to be created
53.53	29.25	1.36	2.62	2.17	20.65

5.3 Financial outlay for major programme:

(Figure in Rs.Crore)

SN	Sectors	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	<i>Major & Medium Irrigation Sector</i>								
A	Additional Creation of Irrigation Potential.	2241.415	2241.415	7664.688	7664.688	7664.688	7664.688	7664.688	42806.27
B	Restoration of lost Irrigation Potential	809.195	809.195	302.918	302.918	302.918	302.918	302.918	3132.98
	Sub Total	3050.61	3050.61	7967.606	7967.606	7967.606	7967.606	7967.606	45939.25
2	<i>Drainage Schemes & Removal of Water logging</i>	190	190	567	567	567	567	567	3215
3	<i>Command Area Development & Water Mangement (CADWM)</i>	675	675	605.4	605.4	605.4	605.4	605.4	4377
4	Flood Control & Management	505.045	505.045	1739.834	1739.834	1739.834	1739.834	1739.834	9709.26
5	Minor irrigation resources	5000	5500	6050	6655	7321	8053	8858	47437
	Grand Total	9421	9921	16930	17535	18200	18932	19738	110677.5

5.4 Water Resources Milestones:

Agriculture Production & Irrigation Indicators after implementation of Road Map for Irrigated Agriculture through Development of Water Resources (2015-22)

Sr No	Year/ Item	Required gross Irrigated area (lakh ha)	Required Irrigation Intensity (%)
1.	Existing	65.12	120%
2.	2017	99.00	158%
3.	2022	130.90	209%

Chapter-6

Energy

6.1 Vision: To energize irrigation pump sets (Govt. and Private) and cater to the requirement of Agro-based Industries by providing adequate conventional and non-conventional energy by optimization of the resources for meeting the Agricultural requirement in a time bound manner to achieve agriculture growth and enhancement in agro-based rural economy. Presently, through the rural feeders (mixed feeders), 5.83% of total energy is provided to Irrigation Agriculture Services (IAS-I Private & IAS-II, State Govt.) only against all India Average of 20.30% while for Haryana it is 38% (Highest). Detailed Power requirement for proposed Tube Wells (Both Govt. and Private), agro-based Industries, Food Processing Industries, Animal Husbandry and Fisheries etc. under two five year plans (2012-17) & (2017-22) has been worked out. The total connected load of Private Tube Wells numbering 22.14 lacs will be 5860 MW, and the total connected load of Govt. Tube Wells will be 832 MW by 2021-22. Allowing for the diversity factor the demand of power for Tube Wells (Govt. & Private) by 2021-22 works out to 4120 MW. Over and above, there will be requirement of power for Agro-based Industries, Food Processing Industries, Animal Husbandry and Fisheries etc. is estimated to be 160 MW. Total projected demand of power for Agriculture Sector due to Rainbow Revolution works out to be 4280 MW by 2021-22. 10% of this demand i.e., 428 MW is proposed to be met through non-conventional energy sources by installing 285000 solar pump sets of 2 HP each and balance 90% requirement i.e., 3852 MW will be met through conventional energy sources. The major demand of conventional energy will be due to demand of Pvt. Tube Wells numbering 1929000 having demand of 3065 MW. The total projected power requirement for Agriculture purposes to be met through **conventional sources of energy** works out as follows :-

(Figures in MW)

Year	Power requirement for State Tube Wells				Power requirement for Private Tube Wells		Total Power requirement for the Tubewells (Govt.+ Pvt.)	Power requirement for Agro based industries, Food Processing Industries, Animal Husbandry & Fisheries etc. taking diversity factor into account	Projected total Power requirement for Agriculture Sector
	Minor Irrigation (Connected Load)	Irrigation (Connected Load)	Total (Connected Load)	Power requirement taking diversity factor into account	Number of Pvt. Tube Well (cumulative)	Power requirement taking diversity factor into account			
1	2	3	4	5	6	7	8 (5+7)	9	10 (8+9)
Existing	83	9.73	92.73	70	51663	82	152	0	152
2015-16	195	115	310	233	431665	686	919	76	995
2016-17	242	292	534	400	616663	980	1380	95	1475
2017-18	252	492	744	558	747897	1189	1747	108	1855
2018-19	267	492	759	569	944747	1501	2070	121	2191
2019-20	287	492	779	584	1207214	1919	2503	134	2637
2020-21	312	492	804	603	1535298	2440	3043	147	3190
2021-22	340	492	832	627	1929000	3065	3692	160	3852

Remarks : The steep rise in power requirement for medium and major Irrigation Schemes during 2012-17 is due to proposed drainage improvement and scheme for economic use of water in Mokama Taal having projection of 20,000 tube wells requiring 10 KW each (200 MW) and during 2017-22, due to scheme of Intra River Basin Transfer of North Bihar rivers to South Bihar requiring pumping through Ganga (227 MW). The scenario of Total demand of power for Agriculture Sector and modified projected demand of power (as per 17th EPSC report) of Bihar, owing to Rainbow Revolution alongwith projected power availability is tabulated below :-

(Figures in MW)

Year	Projected requirement of Power due to Rainbow Revolution				Modified Projected requirement of Power (Demand) for Bihar in view of Rainbow Revolution	Projected availability of Power in Bihar
	Govt. Tubewells	Private Tubewells	Requirement of power due to Agro based Industries, Food Processing Industries, Animal Husbandry and Fisheries etc. taking diversity factor into account	Projected Total Power requirement for Agriculture Sector		
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
Existing	70	82	0	152	3000	1500
2015-16	233	686	76	995	5957	5314
2016-17	401	980	95	1476	6750	8032
2017-18	558	1189	108	1855	7597	8935
2018-19	569	1501	121	2191	8385	9314
2019-20	584	1919	134	2637	9181	9314
2020-21	603	2440	147	3190	9982	9314
2021-22	627	3065	160	3852	10760	9314

Note : Against the total projected requirement of power of 3852 MW due to Rainbow Revolution, the major power requirement is due to tube wells (both Govt. & Pvt.) and it is proposed to meet this requirement through dedicated feeder. Taking 10 to 12 hrs. power supply to dedicated feeders, the actual power requirement during any point of time will not be more than 60% of the projected requirement of power of 3852 MW and accordingly, the modified projected power requirement for Bihar has been worked out.

6.2 Strategy : For meeting the projected power requirement for Agriculture Sector inclusive of Agro-Industries, Food Processing Industries, Animal Husbandry, Fisheries & Seed Production etc. due to Rainbow Revolution, the total requirement of the energy has been worked out under two broad categories, viz. :-

- Conventional Energy
- Non- conventional Energy

The primarily conventional energy will cater to major energy requirements for Agriculture purposes except for such locations where either due to economic considerations or physical inaccessibility etc., it will not be viable to provide grid-connected electrical energy at the site. Keeping these aspects in view, it was decided that 90% of the total requirement of the energy for the purposes will be met through conventional sources whereas balance 10% will be met through non conventional

sources. It has been decided to provide dedicated feeder for meeting the requirement of electrical power for Agriculture.

- ❖ The modified demand of power for Bihar is inclusive of power requirement due to increased demand of Industrial / Allied activities owing to Rainbow Revolution.
- ❖ To have dedicated power for agriculture which will improve quality of supply, permits rotation of load between agriculture and other rural requirements during scarcity of power, allow HVDS system improving HT to LT ratio and assured power to agriculture during specified period of time.
- ❖ The requirement of Power for **Fisheries** will occur during the month of April, May & June and during this period the requirement of power for irrigational purposes will be only 30% of its load. However, the requirement of power for breeding the fish will be throughout the year, though in small quantity.
- ❖ Taking the diversity factor into account against requirement of power to the different segments and category of consumers the increased requirement of energy and its demand can be well catered through the integrated distribution network.
- ❖ It has been proposed that requirement of power in North Bihar with **High Water Table having the bulk of private Shallow Tube Wells**, will be met through solar pump sets in large numbers.
- ❖ Biomass Energy can also supplement the power requirement in Rural Areas.
- ❖ **Staggering of Load:** Irrigational requirement to be met during non-peak period.
- ❖ **Demand side management:** Energy efficient motors as prescribed by Bureau of Energy Efficiency (BEE) to be used for agriculture pump sets with power factor correction capacitors which will reduce the demand.
- ❖ **Through tariff mechanism:** Application of Time Of Day (TOD) tariff to agriculture sector will flatten the demand.
- ❖ Mechanism for increased Subsidy Burden on Govt. due to High Line Losses in Rural Areas to be developed.
- ❖ **Annual Appraisals:** For ensuring required availability of power, the actual requirement of power for Agriculture Sector will be reviewed annually.

- ❖ **The Captive Generation** of power through Sugar Mills, which will be fed to BSEB Transmission system can be gainfully utilized for meeting the Irrigational requirement of cane crops in the associated areas. These areas will be provided stable power supply for minimum period as per requirement to promote yield of cane as a boost to Sugarcane Industries.
- ❖ **Simplified Procedure** for releasing service connection for Agriculture Pump Sets to farmers by organizing camps in villages / Block Headquarters on fixed date with wide publicity.

6.3 Financial requirement Rs. In crore

1	2015-16	942
2	2016-17	1130
3	2017-18	1243
4	2018-19	1367
5	2019-20	1504
6	2020-21	1654
7	2021-22	1820
	Total	9660

Chapter-7

Land Resource Management

7.1 Vision: The preparation and maintenance of to-date record of rights is the basic plank on which land resource management and administration rests. The same has, in turn, clear bearings on the following:-

- Land Possession Certificates
- Institutional Credit/ agricultural productivity
- Consolidation of fragmented land holdings/ agricultural productivity
- Identification and preservation of Public and Community lands including Common Property Resources
- Land reforms through re-distributive justice and other measures.
- Execution of various development & welfare schemes

With the use of modern technology RoR will be continuously updated once a base is created. No Revisional survey and settlement since Cadastral Survey could be conducted in some areas of the State. Experience shows that Revisional survey and settlement operations, following conventional methods, in some parts of the State, have proved to be long drawn out and cumbersome. In such circumstances, the very purpose of survey and settlement is defeated, as by the time records are finally published, they become out-dated.

In the context as explained above, it is proposed to cover the entire State by special survey and settlement, in one go. A distinct legal base has been created to support the operations. A distinct set of Rules, Technical Rules and Settlement Manual accordingly will lay down practices and procedures in this regard.

7.2 Strategy:

- 7.2.1** Modern technology is available to minimize time spent on survey part, while the settlement aspect may be judiciously squeezed without sacrificing quality, transparency and grievance redressal.
- 7.2.2** It is proposed that base mapping, demarcation and ground truthing be carried out by modern technology in preliminary and subsequent stages. Active

participation of Panchayati Raj institutions and people will be ensured. Certain services will be outsourced to save on time and ensure technical proficiency. Claims and objections will be invited and the same will be duly disposed off at various stages of the drive. While services of experienced officers available in various districts will be taken, staff requirements for the drive will be met by available staff and, additionally, staff taken on contract.

- 7.2.3** Special focus will be made on the empowerment of the rank and file associated with the special drive. This will ensure quality as well as technical proficiency. The proposed system will be marked by people's participation and accessibility to information and data. Transparency at all levels will be the hallmark of new practices and procedures.
- 7.2.4** Consolidation of fragmented land holdings will be carried out and completed in a period of 5 years after the conclusion of the 3-year special survey/settlement drive. This will call for certain corollary legal and administrative exercises.
- 7.2.5** Mutation Act 2011 and Mutation Rules 2012 is already in force. In the above Mutation Law also provides for the preparation of Khata-Pustika for all Raiyats. This would be effectively enforced in next three years.
- 7.2.6** There is a serious concern about the absenteeism in agricultural sector. This hampers investment by tillers. As a result crop productivity remains low. If the leasing process of land is facilitated through empowering legal provisions, optimal utilisation of resources and increase in agricultural productivity may be assured.
- 7.2.7** There is also a move towards a land titling system. Efforts will be made to move from presumptive to conclusive titles and from a registration of deeds to the registration of titles.

7.2.8 The existing Directorate of Land Records & Survey, Bihar/Bihar Survey Office, Gulzarbagh, Patna and Revenue (Survey) Training Institute, Bodhgaya will be modernized and suitably reoriented.

Financial outlay Rs in crore

S.N	Year	Outlay (Rs. In crore)
1	2015-16	158
2	2016-17	174
3	2017-18	191
4	2018-19	210
5	2019-20	231
6	2020-21	254
7	2021-22	280
	Total	1499

Chapter-8

Plantation & Green coverage

8.1 Introduction

- 8.1.1 Bihar is a forest deficit state. There is immense pressure on land due to dense population and the pre-eminence of agriculture in the economy of the people. Since there is no scope to expand forest area, the only way for increasing tree cover is by bringing more non-forest land under tree cover. It is aimed to raise the tree cover in Bihar to 15% by the end of 2017.
- 8.1.2 More than 50% of the forest area is classified as open forest area, with a crown density between 10% to 40% according to the State of The Forests Report -2013 published by the Forest Survey of India.
- 8.1.3 One of the major challenges is to improve the quality of forests in the notified forest areas. Most of the forests are situated in the southern part of the state (barring forests in West Champaran District) which is prone to drought. The site quality of these areas is low which does not support very rich forests. All the forests are being maintained for environmental conservation purposes. The current working plans of the forests do not prescribe any commercial exploitation.
- 8.1.4 As the area under natural forests cannot be increased the only way of increasing the tree cover is its enhancement in non forest areas. The area outside forest is very densely populated and extremely fertile. Agriculture takes the pre-eminent land use. Increase of tree cover can only be achieved if the economic returns from tree planting are better than those accruing from agricultural activities.

8.2 Strategy

- 8.2.1 The Forest Policy prescribes a tree cover of 33% at the national level. The prescribed tree cover for hilly areas is 60% and for plain areas it is 20%. Bihar should strive for 20% tree cover which is not practical considering the

population density and pre-eminence of agriculture. The Agriculture Road Map envisages increasing the tree cover to 15%. This is proposed to be done by two pronged approach as described in the following paras :

8.2.2 Treatment of Forest Areas

- More than half of the notified forest area accounting for 6.87% of the total geographical area of the state is classified as open forest i.e. having a crown density between 10 and 40%. It is necessary to improve the tree cover in the forest areas and transfer these areas into moderately dense forests (crown density between 40 and 70%).
- Similarly attempts should be made to transfer the moderately dense forest into very dense forests (crown density over 70%).This is being done by improving the soil moisture regime by undertaking extensive soil and moisture conservation measures since 2012 under the Agriculture Road Map. The ridge-to-valley principle with multi tier sequenced approach is being adopted. Each watershed has unique characteristics and problems. Its treatment and management would therefore require careful consideration of various site specific factors like topography, nature and depth of soil cover, type of rocks, water absorbing capacity of land, rainfall intensity, land use etc. The intention is to retain as much precipitation as possible within the forest areas. The efforts are already bearing fruit as indicated by the evidence available in the adjoining areas. Number of small water bodies created across the landscape has become a very important source of water for the local villagers in crunch periods. The wells in the adjoining areas which used to run dry in summer are now providing water to the local people even in summer months.
- The soil and moisture conservation measures are being supplemented by plantation at 2500 plants/ ha, 1100 plants/ ha and 200 plants/ ha depending on the existing tree cover. With the improvement in soil moisture regime it is expected that the tree cover would also improve in due course of time. The Agriculture Road Map had fixed a target of treating 2 lakh hectares of forest

land during 2012-17 period during which 10.25 crore plants will be planted. A total of 1.04 lakh hectares have been treated between 2012-13 and 2014-15 and 4.78 crore plants have been planted. This is proposed to be increased to 3 lakh hectares by 2021-22 and the target of planting is proposed to be increased to 1537.5 crores.

- One of the important factors in improving the quality of forests is the use of quality planting material. This can be done by using tissue culture techniques (particularly for bamboo), identification of plus tree and development of seed orchards. This has to be supplemented by creating a seed bank and seed certification mechanism for ensuring the quality of the planting material.
- Infrastructure of production of quality planting material needs to be improved. The state has embarked on this process by sanctioning establishment of two tissue culture labs for production of quality bamboo seedlings. The number needs to be increased as the state has excellent potential for bamboo production.
- Establishment of modern nurseries is another essential input for this purpose. The state is in the process of commissioning six modern nurseries. There is need for establishment of at least one nursery in the 28 forest divisions.

8.2.3 Increase tree cover outside forest areas

- Increase in tree cover outside forest areas will be the key for improving the tree cover in the state. For this purpose the trees have to compete with agriculture by providing higher economic return. Propagation of short rotation, high yield crops should be the route. The state has introduced Poplar on a large scale in the districts of North Bihar. These trees can co-exist with the agricultural crops and provide economic benefit when the crops mature at the expected rotation of 6-9 years. The Agriculture Road Map envisages planting of 600 lakh plants between 2012 and 2017. It is proposed to increase the target to 900 lakh plants by 2021-22.

- Plantation of trees on vacant government lands, roadsides, canal banks, river embankments is another area where tree planting can be taken up. River bank embankments over 3600 kms, 10300 km of canal banks, and nearly 80000 km of roadsides offer scope for planting. The Agriculture Road Map had a target of 2200 km of river embankments, 6235 km of canal banks and 42000 km of roadsides. It is proposed to cover the entire available land by 2021-22. These linear plantations require intensive protection mechanism as they pass through densely populated areas having heavy human and cattle pressure.
- Urban areas, institutional areas offer another window of opportunity for plantation, though their extent is limited.
- Target for plantation on government wastelands, canal banks, roadsides, river embankments, urban areas etc under the Agriculture Road Map was 7.70 crore. This is proposed to be increased to 10.00 crores till 2021-22.

8.3 Strengthening of Monitoring mechanisms

8.3.1 It is necessary to monitor the success of the plantations on a regular basis. In case of plantations in forest areas it is being done using an android based system where regular monitoring of the health of plantation is done by uploading of the status by officers inspected by officers.

8.3.2 Monitoring of the plantations in farm lands is extremely difficult as these are scattered in nature and the number plants in a single plantation is very limited. However, it is expected that the farmers will ensure that the plantations are successful keeping their economic interests in view.

8.4 **Strengthening of institutional Mechanisms** Development of market structure and forward linkages is essential to sustain the plantation program in the farmers field. Large scale availability of wood which will be available at maturity needs a good market so that the farmers get the maximum benefit for their produce. This needs to be integrated with strengthening of wood based industries by providing incentives.

8.5 Financial outlay till 2021-22

S.N	Year	Outlay (Rs. In crore)
1	2015-16	321
2	2016-17	369
3	2017-18	400
4	2018-19	450
5	2019-20	540
6	2020-21	620
7	2021-22	620
	Total	3320

Chapter-9

Approach Road

9.1 Introduction The primary objective of approach road is to provide farm to market connectivity by constructing all weather roads. Various schemes like PMGSY, MMGSY, NABARD funded scheme contribute to this goal. At present, habitation with population of 250 is being connected to main stream under Mukhya Mantri Gram Sampark Yojna by all weather roads. Pradhan Mantri Gram Sadak Yojana (PMGSY), central government funded schemes started with an objective to provide connectivity to settlements with population of 1000 to the main stream, later it revised its plan and habitation with population of 500 were also taken up for providing connectivity. In some extremist ridden areas a habitation with population of 250 is being also covered by PMGSY. The target as per Agriculture Road Map between period 2012-2017 is completion of 63950 km which is quite challenging given the financial limitations.

9.1.1 Rural road is a life line to the villagers because it enhances the standard of life by fetching valuable emoluments for the agricultural & non agricultural products. The total network in Bihar is 1,40,220 km out of which 1,22,598 km is rural roads network which is about 87% of the total road network in Bihar. At present 50,200 km rural roads has been constructed which has connected as many as 54103 habitations.

9.1.2 State vision is to connect all unconnected habitations by 2025. Bihar Rural Roads Maintenance policy has been formulated for ensuring proper maintenance of rural roads.

9.2 Major challenges

9.2.1 The total road network in Bihar is 1,40,220 km out of which 1,22,598 km is rural roads network which is about 87% of the total road network in Bihar. Constructing these extent of road is itself a great challenges from financing, executing and maintaining point of view. A huge amount of fund is required for constructing rural roads. so, effort has to be made ensure greater budgetary allocation. Govt. of India to be sounded to provide timely allotment under PMGSY schemes in order that sanctioned schemes could be run at accelerated pace.

- 9.2.2 Ganga bridge is required to be improved to ensure movement of heavy vehicle to reach road construction material to the work sites.
- 9.2.3 Proper supply of bituminous material is required to be ascertained.
- 9.2.4 The member of Legislative assembly/council have to be called upon to expedite the process of scheme selection at faster pace, so that execution is not delayed.

9.3 **Vision and policy perspective**

- 9.3.1 The prime objective is to provide farm to market connectivity by constructing all weather roads. Rural road is one of the major component of rural development, it ensures not only agriculture income generating employment opportunity but also strengthens socio- economic services.
- 9.3.2 In turn this expands rural growth opportunities and real income through which poverty can be reduced. In other words the link between poverty and inaccessibility is evident.
- 9.3.3 Rs. 10,000 crore investment in roads reduces incidence of rural poverty by 0.87%. Additional Rs. 10,000 crore invested in roads increase productivity growth by >3%. For each Rs. 10 lakhs increase in investment in roads, 165 person are lifted above BPL.
- 9.3.4 Lack of rural road connectivity seriously constrains agricultural production. In the absence of rural feeder roads, the cost of moving produce can be very high thereby increasing the cost of production in Agriculture. Poor rural connectivity affects timely availability of agricultural inputs and also increases cost. Access to other resources like labour is difficult in absence of rural roads.
- 9.3.5 Rural roads can make it easier to transport agricultural inputs to villages which in a way can lead some farmers to switch from food crops to cash crops. Usage of modern technology become easier with rural connectivity. This will have positive impact on production. Farm mechanization and other extension services will be easily available at the door step of the farmers.
- 9.3.6 Unconnected habitations of populations below 250 is to be connected with rural roads.
- 9.3.7 While developing the roads, the use of soil will be assured with utmost effort for creation of water bodies along with the roads. The water bodies can be utilized for water conservation, recharge of under ground water, fish culture and life saving irrigation for crops.
- 9.3.8 There is a need to link all habitations with the main hats and markets in the vicinity preferably within 5 Kms.

9.3.9 It is also important to create a network of farm roads to facilitate movement of Farm equipments and also to take post harvest collections to the primary processing centres.

9.4 Strategy

9.4.1 Following major connectivity programme has been started,

- Pradhan Mantri Gram Sadak Yojana (PMGSY)
- Mukhya Mantri Gram Sadak Yojana (MMGSY)
- Mukhya Mantri Gram Sampark Yojana (MMGSY)
- Others State plan (NABARD)

9.5 Financial Outlay for Major Programme

Target (2015-16 to 2021-22)

Year	Length(Km)	rate(in Cr) per km	Expected cost (in Cr)
2015-16	9150	0.80	7320.00
2016-17	7000	0.90	6300.00
2017-18	6000	1.00	6000.00
2018-19	6500	1.10	7150.00
2019-20	7000	1.15	8050.00
2020-21	7500	1.20	9000.00
2021-22	5957	1.25	7446.25
TOTAL	49107		51266.25

9.6 MileStones

Sl. No.	Department	Item	Unit	Critical MileStone (2017)	Achievement		
					2012&13	2013&14	2014&15
1	Rural Works Department	Road	K.M.	69350	8500.00	6504.51	5254.22

Chapter-10

Cooperatives

10.1 Introduction : In Bihar each of the 8463 Panchayats has a democratically elected Primary Agriculture Cooperative Societies (PACS). 531 Blocks have Vyapar Mandals Sahyog Samiti (VMSS). They are the main institutions given the responsibility to ensure input supply and also for marketing of agricultural produce. There are 22 District Central Cooperative Banks (DCCBs) and an Apex level State Cooperative Bank (SCB) with wide network of Branches (Both SCB and DCCBs) for catering the needs of short term credit requirements. Presently, short term agriculture credit of Rs. 441.73 crore among 2.43 lakh farmer members has been disbursed through Cooperative Credit Structure. Nearly 8.13 lakh MT storage capacity has been created in PACS, VMSS and Bihar State Warehousing Corporation.

10.2 Vision : PACS and VMSS would be developed to provide services to farmer members regarding agricultural inputs availability and marketing of agriculture produce including procurement. It would be ensured that all families engaged in agricultural activities would have at least one member in the PACS. PACS would be properly strengthened to create adequate storage facility to store the inputs and the marketable produce. It would also maintain a strong database for all farms, input requirements, nature of crops and likely produce so that it can plan proper storage and supply of inputs and also plan for the marketing of the farm produce. Role of State Cooperative Bank and District Cooperative Bank would be further enhanced to meet major chunk of credit requirement in agriculture and allied sector. There is a need to develop state level cooperative institutions to support and guide VMSS and PACS.

10.3 Strategy

To meet the target set for the cooperative sector, the strategy for construction work like godown construction, establishment of processing units (rice mills) and business development works in cooperative societies shall be as follows :-

- (i) For the construction of godowns in PACS and VMSS, in case of non availability of required fund under State Plan, the State Government will borrow loans from National Cooperative Development Corporation (NCDC) or

NABARD and such loans shall be passed on to the PACS and VMSS through Cooperative Banks in form of 50% grant and 50% interest free loan. A Revolving Fund will be created and maintained at the Bihar State Cooperative Bank from amount received through repayment of loans by PACS and VMSS. Such Revolving Fund shall be used to provide interest free loans to societies for maintenance of infrastructural units.

- (ii) For the establishment of processing units, the required fund provisioned under Five Year Plan (2012-17) and RKVY shall be used to provide societies in the form of 50% grant and 50% interest free loan. The amount received under repayment of loan by the societies shall be deposited in the above Revolving Fund.
- (iii) To provide Working Capital or margin money for business development and off season stock maintenance of fertilizer in societies, in case of non availability of fund under State Plan, the State Government will borrow loans for NCDC/NABARD and the societies will be provided working capital or margin money in form of interest free loans or loans under low rate of interest.
- (iv) For construction of godowns in Bihar State Warehousing Corporation, the required fund shall be provided through State Plan and the State Government borrowings loan from RIDF (NABARD).
- (v) The Integrated Cooperative Development Project (ICDP) expansion shall continue on existing pattern of funding.
- (vi) In case of Agriculture Crop Insurance Scheme, the existing pattern of funding shall continue.

10.4 Programmes & Activities :

(a) Strengthening Short-Term Agriculture Credit flow through Cooperative Credit Structure :

Importance of cheap, timely and easy access to agricultural credit can hardly be overemphasized. The average annual credit disbursal in Bihar under the short-term cooperative agriculture credit structure has been around 450 crores covering around 2.0-2.5 lakh farmer members. Compared to the total membership of the PACSs that is one crore, this level of credit flow requires further strengthening. The present level of credit flow is not up to the mark because of the financially weak Central Cooperative Banks, inability to avail refinancing facilities of the NABARD. Another constraint of agriculture credit flow is non-recovery of loan. Thus, the defaulter farmer members, fairly substantial in number, are currently not eligible for fresh credit facilities. In addition, the non availability of Land

Possession Certificate (LPC), an essential document for KCC, is also proving a deterrent to enhanced agriculture credit flow. To meet the requirement of agricultural credit in conformation with the agriculture production by year 2017, a minimum of 20 lakh farmer members and by 2022, 40 lakh farmer members should be provide Kisan Credit Cards (KCC).To achieve the aforesaid objectives following efforts would be made,

- (i) Enhancing the agriculture credit flow and the capacity of Central Cooperative Banks to avail refinancing facility, the government may deposit its money in the Central Cooperative Banks.
- (ii) Deposit drive in Central Cooperative banks and viable PACS will be initiated.
- (iii) Central Cooperative banks will be facilitated to acquire Banking Licence from the Reserve Bank of India.
- (iv) Exiting Central Cooperative Banks will ensure expansion of its branches to cover all blocks.
- (v) New Central Cooperative Banks in unbanked districts will be opened.
- (vi) The financing limit of the Kisan Credit Card, already issued to farmer members to meet their agriculture Credit requirement will be enhanced.
- (vii) The Joint Liability Group (JLG) and self Help Group (SHG) of share croppers would be constituted and agriculture credit facility be extended to such groups in selected PACS.
- (viii) Selection of Districts/PACS to initiate issuing of Kisan Credit Cards and crop financing by PACS itself on the basis of Credit Limit sanctioned by the District Central Cooperative Banks.
- (ix) Current procedure and provisions of short term Cooperative Credit should be reviewed in order to make them comparatively simple and easy.
- (x) A vigorous, effective monitoring system of credit flow to be instituted at DCCB and BSCB.

(b) Development of Physical Infrastructure :

In absence of adequate infrastructure, Cooperative institutions can't be effective service providers. Around 75% of reorganized PACS at panchyat level

and a substantial number of Vyapar Mandals are devoid of any physical infrastructure or office. It is essential to develop sufficient infrastructure in PACS and Vyapar Mandals in order to ensure services in agricultural inputs viz. fertilizers, seeds etc. to farmer members; marketing of agricultural produce; deposit mobilization programmes; procurement of food grains; public distribution system, to impart training to Cooperative human resources.

The physical structure at PACS level should carry storage capacity of at least 200 MT, an office room and a room for deposit mobilization (banking business). In addition, it is also required to develop area and agricultural produce specific processing units in selected PACS.

The Vyapar Mandal Cooperative Societies (VMSS) organized at every block as central societies having membership of primary societies mostly PACS, will be developed so as to function as nodal agency for its member societies, most likely as buffer and off season stockiest for fertilizers, seeds and area specific specialized storage of onions, vegetables, oil seeds, pulses etc. For these assignments physical structure of VMSS should have storage capacity of at least 500 MT, specific structure for specialized storage and processing, adequate room for office and space for training purpose.

Large size godowns each with a carrying capacity of 1000 MT shall be constructed in 100 selected and viable PACS.

The requirement of land for creating storage capacity in PACS shall be met through already available land or donation of land by member farmers of the PACS itself or through lease/purchase from its own resources. However, for creating storage capacity in VMSS at block headquarters the land available in the block campus will be used. For the Bihar State Warehousing Corporation, it will be appropriate to provide land in Agriculture Produce Marketing Yard (dissolved) on priority basis.

(c) Business Development & Marketing :

Only economically sound PACS and VMSS can be better service provider to their members. Thus, it is essential to develop business in these societies to the optimal levels.

Most of the PACS and VMSS lack working capital to transact the business related to agriculture inputs (fertilizer, seeds etc.), marketing of agriculture produce (procurement), Public Distribution System, processing units etc. Thus, it is essential to provide financial assistance to PACS and VMSS in the form of working capital. In order to translate potential into performance PACS and VMSS at the grass root level must be enabled to undertake a number of agri-business activities. Agri-inputs (Fertilizer, Seeds and Insecticides), deposit mobilization, agri-processing, agri-marketing and agri-counselling are areas in which such societies can make much needed and very meaningful intervention. To begin with every PACS and VMSS should be provided with financial assistance in form of working capital at the rate of Rs. 2.0 lakh per PACS and Rs. 5.0 lakh per VMSS . In addition PACS should be provided with additional working capital at the rate of Rs. 2.0 lakh per PACS for fertilizer business exclusively.

In order to develop business activities in the societies, the following efforts will be made -

- (i) To facilitate the PACS and VMSS to get license for fertilizer, seeds and insecticide business.
- (ii) To coordinate with the departments concerned in facilitating allocation of at least 25% of the fertilizer from private sectors (other than IFFCO & KRIBHICO) to PACS and VMSS.
- (iii) PACS will be encouraged and promoted to purchase big Agriculture Implements to extend services facilities to their farmer members on rent basis.
- (iv) Selected societies shall be encouraged for seed farming, seed processing and running agri-clinics.
- (v) PACS will be encouraged and promoted on pilot basis for the commercial production of Vermi compost.
- (vi) To strengthen the PACS and to make them economically viable, at least 5 selected PACS per district per year shall be encouraged to start deposit mobilization programme and micro financing activities.

- (vii) To ensure the security of the money deposited in PACS and to encourage trust among the members, introduction of Deposit Guarantee Scheme in PACS.
- (viii) The PACS which are not covered under the revival package based on the recommendation of the Baidyanathan Committee shall be strengthened economically by increasing their business turnover. A specific programme should be launched by Cooperative Department for this purpose.
- (ix) Efforts shall be extended towards PACS covered under the revival package to increase their business activities to meet their own contribution scheduled in the revival package.
- (x) Off –Season lifting and Buffer Stock Maintenance of fertilizer is an area where positive intervention is long overdue. It is also necessary to check fertilizer crisis during the peak season when supply fails to meet the demand of fertilizers. Vyapar Mandal Cooperative Societies (VMSS) at block level can be entrusted with the assignment to function as nodal agencies to lift fertilizers during the off-season and to maintain the buffer stock of the fertilizers in VMSS godowns at block head quarters. In this system it will be easy and appropriate for PACS to lift fertilizer from VMSS, that is, from their block head quarters.
- (xi) Arrangement for State Government’s participation in share capital of the district Central Cooperative Banks proposed to be constituted.

(d) Human Resource Development :

To meet the challenges and responsibilities relating to supply of agriculture inputs, short-term agriculture credit flow, post harvest management, agri-processing, agri-marketing, and to deliver better agri-services to member farmers, it will be essential to strengthen Human Resources with appropriate working strength of personnel and their capacity building on professional lines. To achieve these objective following steps shall be taken –

- I. The PACS, DCCBs and SCB will fill up the existing vacancies. The DCCBs will redraw their personnel policy in line with Mitra Committee recommendations and keeping individual bank’s financial health to fill up

the required vacancies in phased manner by adopting fair, transparent and objective recruitment procedure.

- II.** Having regard to the Vaidhyathan Committee recommendations which have been incorporated in the Cooperative Societies Act after tripartite MOU, the CEOs of the DCCBs and SCB shall be appointed by the respective Bank Boards considering Fit and Proper Criteria laid down by the RBI.
- III.** As the economic health of Vyapar Mandal improves, possibilities of creating separate post of secretary/manager for appointment of non government employee on contract basis will be explored as the present system of having Cooperative Extension Officer (CEO) its Secretary is not serving the purpose due to large scale vacancies of BCEOs and lack of accountability.
- IV.** Regular training, workshops, seminars will be organised for stakeholders to build their capacity and generate awareness and motivation. Excursion to processing and marketing centres of excellence in other states and institutions will be encouraged so that best practices are adopted without going through learning curve.
- V.** The training and infrastructure in the state will be strengthened by capacity expansion of the existing institutions like DNS Patna and Pusa. In order meet the growing demand for capacity building effort shall be made to set up state level premier Cooperative Institution at Patna depending upon the availability of land in the pattern of Vaikunth Mehta Institute of Cooperative Management, Puna.
- VI.** To enhance the efficiency of the system and improve the mobility and communication, facilities of vehicles to all Sub-divisions, Districts, Divisional and Directorate officials, Mobile, Telephone and Computers with accessories e.g. fax printer and internet connection will be provided. Computersition and e-governance in departmental offices and introduction of MIS for effective monitoring will be essential ingredients.
- VII.** To make the administrative and monitoring system efficient, it is essential to re-orient and re-structure the State services and cadre accordingly. It will also require establishment of new departmental offices in division, districts, sub-divisions and blocks devoid of any departmental officers. For that matter

surrender, creation, upgradation of existing posts and establishment of new field offices shall be considered.

(e) Crop Insurance

Crop cultivation in the State is still largely dependent on natural resources and hence, it is essential and relevant to compensate farmers timely for the damage caused by natural calamities. Though, the Crop Insurance Scheme is effective since 1987-88 and insurance coverage both in terms of area and number of farmer has been increasing substantially, it is still necessary to reduce the gap between the cultivation area and crop insurance coverage area. In addition many shortcomings in the process, procedure and payment of compensation are required to be improved. Following steps shall be made to make the Crop Insurance System effective and Farmer Friendly –

- I. Scope of the crop insurance need to be increased in consultation with GOI and Insurance companies to give insurance cover to more cash crops.
- II. Alternate strategy needs to be devised to improve the reliability and timely submission of data of Crop Cutting Experiments (CCE).
- III. Time gap in payment of crop loss compensation needs to be reduced from current average of 16 months to 10 months.
- IV. PACS to be given orientation training on operational aspects of the crop insurance as their role is important for the wider coverage and prompt disbursement of the claims.
- V. Conduct a study about the efficacy of CCE based National Insurance Scheme, Modified national Insurance Scheme and Whether Based Insurance. Ultimately the scheme should be farmer friendly and the cost of insurance should be competitive.
- VI. Set up a strong monitoring and evaluation cell at the state level by creating a post of officer supported by statisticians, data entry operator and computers.

(f) Development of the Bihar State Warehousing Corporation :

The Bihar State Warehousing Corporation, an institution established under Agriculture Produce Development and Warehousing Corporation Act,

primarily provides for scientific storage of agricultural produce, agriculture inputs and constructions of godowns. At present, the corporation is operating with storage capacity of 2.60 lakh MT.

In view of the storage requirement of the state by 2017, the corporation can be entrusted with the task of creating additional storage capacity. However, for that storage creation the availability of land, most likely in the premises of Agriculture Marketing Yard (APMC, dissolved) may be ensured.

10.4 Financial Requirement for 2017 & 2022 :

(Amt. in Crore)

Programmes	Requirement 2015- 2017 (Estimated)	Requirement for 2017-2022 (Estimated)
	Government	Government
(1) Creation of Storage Capacity		
(a) PACS	186.662	346.66
(b) VMSS	36.60	76.66
	223.262	423.32
(c) BSWC	884.10	600.00
(2) Establishment of Rice Mills with/without Biomass gassifier & Processing units		
(a) Establishment of Rice Mills	47.53	114.00
(b) Cold Storage	17.50	31.85
(3) Financial Assistance for Business		
(a) Working Capital for PACS/VMSS	195.31	--
(b) Working Capital to PACS for Fertilizer Business	105.26	--
(c) Share Capital for New DCCBs	30.00	--
(4) ICDP Expansion	500.00	800.00
(5) Capacity Building	50.00	10.00
(6) Capital Expenditure for New DCCBs	10.00	--
(7) Crop Insurance (Premium & Indemnity)	1350.00	800.00
GRAND TOTAL	3412.962	2779.17

Chapter-11

Storage, Marketing & Processing

Storage:

11.1 Vision: In view of the increase in agricultural production, its storage capacity assumes paramount importance for its protection, storage and food security 4.09 lakh MT foodgrains is being handled, stored and distributed every month in government TDPS schemes implemented in public interest as mandated by National Food Security Act(NFSA). For this storage capacity is of utmost importance. In addition to this foodgrain has to be distributed among those additional beneficiaries who are not included in the list of the beneficiaries of central scheme. Paddy and Wheat is procured at minimum support price in Kharif and Rabi respectively. During 2011-12 rabi season target for wheat procurement was set at 11 lakh MT and during Kharif 2012 a target of 25 lakh MT of paddy procurement is set. The decentralized Procurement Programme for Wheat/Rice has been implemented for the year 2013-14 in the State of Bihar. The State Government originally envisaged the Procurement Programme of Paddy/Wheat with clear intent to provide MSP to the farmers. The State Government provisions bonus to the farmers on its own resources in addition to MSP. There is need of Sufficient godowns to store paddy/CMR/wheat. During 2013-14 and 2014-15 rabi season target for wheat procurement was set at 5 lakh MT. Besides these the target of maize procurement has been set for the year 2015-16 about 7.21 lakh MT. For the procurement of this dimension, adequate storage capacity is extremely important. As a result of these procurement operations, farmers will be directly benefitted. In this context a target of 72.15 lakh MT storage capacity for 2017 and **92.15** lakh MT for 2022 has been envisaged for this road map.

11.2 Requirement assessed for agriculture road map (agencywise) following target is set 2017 and 2022:

(Capacity in lakh MT)

Agency	Storage Capacity Current	Target for 2017	Target for 2022
PACS	5.77	11.42	15.64
Vyapar Mandal	0.49	2.41	3.41
BISCOMAN	2.45	3.45	4.45
State warehousing Corp.	2.60	12.60	22.60
State Food Corp.	12.65	18.50	21.35
Central warehousing Corp	-	8.00	-
PEG/Private Sector/Farmer	-	15.77	17.55
Total	23.96	72.15	85.00

11.3 Financial requirement

Year	Expected cost (in Cr)
2015-16	770
2016-17	847
2017-18	932
2018-19	1025
2019-20	1127
2020-21	1240
2021-22	1364
TOTAL	7305

In addition to it there will be required to do some supports works like:- Construction of Godown Office, Labour Shed & Toilet, electrical substation. Guard Cabin. Weigh Bridge Counter, Driveway and Parking, external PHE services, Underground water Tanks, external electrification, Approach Road where it is necessary. Government provisions bonus to the farmers on its own resources in addition to MSP. There is need of sufficient godowns to store paddy/CMR/wheat. Taking into consideration the financial condition of the state and financial implication therein, the Central Govt. may be requested to make available the amount incurred in terms of providing bonus to the farmers of the state. Moreover, the Govt. of India

may also be requested to reimburse the fund on time against CMR so that BSFC can be protected out of financial loss faced due to delay of payment.

11.4 Cold Storage: The target for cold storage is envisaged at 64 lakh MT by 2017. A cold storage capacity of about 4.36 Lakh MT has been created from 2012-13 to 2014-15. Till now in the financial year 2015-16 very small cold storage capacity of 0.28 MT has been created. Looking at the achievement, the target of 64 Lakh MT seems too ambitious for period up to 2017. Looking at the current achievement of the scheme, the cold storage is reduced to 52.34 Lakh MT by 2022.

The Cold storage capacity shall be created through traditional cold storages, modern multi-chamber cold storage and cool chain and processing. Cold storage capacity shall be created in the private sector. The Cold Storage Policy has been formulated by the industry department and subsidy is being released as per the same. Private Entrepreneurs shall be assisted for construction of cold storage and cool chain.

The physical and financial target is given below:

Year	Capacity Target (Lakh MT)	Gob contribution ¹ (In Rs Cr)	Investor contribution (In Rs Cr)	Project cost (In Rs Cr)
2015-16 (E)	2.55 ²	204.12	816.49	1,020.61
2016-17	3.32	265.36	1,061.43	1,326.79
2017-18	4.64	371.50	1,486.01	1,857.51
2018-19	6.04	482.95	1,931.81	2,414.76
2019-20	7.85	627.84	2,511.35	3,139.19
2020-21	10.24	819.00	3,276.00	4,095.00
2021-22	13.34	1,066.80	4,267.20	5,334.00
Total	47.97³	3837.57	15350.28	19187.85

¹ It is assumed that a subsidy of Rs 80 Lakh is required for 1000 MT cold storage

² Assumed 5% over the 2013-14 achievement

³ The target has been revised for the Cold Store as they are facing challenges due to poor availability of power, less capacity utilization, high power tariff.

11.5 Food Processing

11.5.1 **Vision:** 15 to 20 % agriculture produce gets wasted due to the lack of infrastructure and processing facility in the state. It is envisioned to increase processing capacity upto 30 % and to reduce wastage to 5% by 2022. This will increase farmer's income by 25% and about 12 lakh employment will be created. The Commodity wise vision is detailed as below,

- **Rice:** Rice production is estimated at 126 lakh MT by 2022. The present rice milling capacity is limited to 51.198 Lakh MT per annum (April 2015-16). There is large demand for edible oil in the state. There are no rice husk based power unit, whereas the power demand is increasing at the rate of 50% per annum. Therefore following is proposed,
 - ❖ Production of 225 MW power through paddy husk based fuel
 - ❖ State to become self sufficient in edible oil production (rice bran oil)
 - ❖ Creation of **100.80 Lakh ton/Annum** of total paddy milling capacity to be created by 2022 (**80% of the total production⁴**)
- **MAIZE** – Presently Bihar produces 19 lakh MT of maize. By the year 2020 the state will be producing 90 lakh MT (estimated 2020 data as per Agri Road Map). The state of Bihar presently imports 80% of its poultry and fish from other states. With more hatchery, milk production, and fish production units coming up, there is a huge demand for in-house state production of maize based poultry/fish/cattle units, along with the warehousing facilities. In the international market there is already an increasing demand for corn oil and starch. Therefore it is proposed that:
 - ❖ 25 Corn processing units of 200 TPD each which includes like starch, poultry/cattle/animal feed & snacks
 - ❖ 6 Corn Oil Units of 200 TPD processing capacity
 - ❖ Creation of 20 Lakh Ton of maize warehouse capacity
- **FRUIT & VEGETABLES** – Fruit & Vegetable production is estimated to increase to 80 and 226 lakh MT by 2022 from present level of 38 lakh MT and

⁴ Looking at the current climatic condition and stagnation in creation of irrigation facilities, it will be difficult to reach the paddy production target of 126 Lakh MT by 2022. So to avoid the excess capacity creation, the processing capacity target is taken as 80% of the expected production.

136 lakh MT respectively. Out of the total vegetable production 60% consists of potato. In modern cold stores along with potato about 10% of the fruits and other perishable items are stored. To safeguard the interest of the farmers by reducing the wastage from a whopping 30% to less than 5% and increasing the processing infrastructures, the following targets are envisioned,

- ❖ Increasing the processing to **20%** of the total production.
 - ❖ Reducing the wastage below 5%.
 - ❖ Creating more than 2 RABCs in each block & 3 Mega Food Parks based out of F & V.
- **WHEAT** – Wheat production is estimated to increase to 74 lakh MT by 2022 from present level of 49 lakh MT. 40% of the total wheat goes to other states for manufacturing biscuits, bakery items, vermicelli and other flour items. To create more job opportunities inside the state, the following are envisioned,
 - ❖ Setting up of 10 lakh MT per annum modern biscuit & bakery factories.
 - ❖ Another 50 units each of 300 & 500 TPD of suji, atta & maida based modern flour mills.
 - ❖ To be self sufficient in supplying fortified atta to the population of Bihar.
 - **SUGARCANE** – Presently Bihar produces 125 lakh MT of sugarcane. By the year 2022 the state will be producing 250 lakh MT. To make the sugar mills more viable, it should generate its bagasse based power plant. To make this happen, the vision for the sugarcane sector will be:
 - ❖ Making 28 Sugar mills functional
 - ❖ Sugar recovery to be increased to more than 13%

11.6 Programmes: The state has prepared the food vision 2015. The food vision has made 16 recommendations which are in different stages of implementation. The scheme has been declared the most admired scheme by MoFPI, GoI in the history of the food processing in India. The state government has approved two schemes

for food processing industry and these are implemented since 5th December 2008. Under the “Scheme for integrated development of food processing sector” grant up to 40% of the project cost, subject to a maximum of Rs. 10 Crores in case of common cluster infrastructure proposed by SPV and up to 35% of the project cost subject to maximum Rs. 5 Crores in case of an individual investor. Similarly under the Food Parks Scheme two food parks in fruits and vegetables cluster in the State are proposed. The assistance provided by the state government is 30% of the project cost subject to a max. of Rs. 50 Crores to the Special Purpose Vehicle (SPV), registered as a corporate body with 51% equity of the private entrepreneurs.

11.7 Financial requirement, Rs in crore

Year	Gob grant (In Rs Cr)	Private investment (In Rs Cr)	Total investment (In Rs Cr)
2015-16 (E)	668	2672	3340
2016-17	735	2939	3674
2017-18	669	2676	3345
2018-19	736	2944	3680
2019-20	670	2680	3350
2020-21	737	2948	3685
2021-22	671	2684	3355
Total	4886	19543	24429

11.8 Agriculture Marketing

11.8.1 Agriculture Road Map envisages increase in production of food grains, horticulture, milk, animal products, fisheries. Market for agricultural produce shall be developed for assuring remunerative price to farmers and to increase their income.

11.8.2 Agricultural Produce Market Committee Act was repealed in 2006. The market yards of the dissolved marketing board and committees was converted into Rent free markets. Agricultural produce can now be directly purchased from farmers. Mandi Fee is not levied on these products.

11.8.3 As a result of the structural reforms in agricultural marketing the market development would involve public, cooperative, private and joint sector

participation. Government support will be extended for development of market in cooperative, private and joint sector.

- 11.8.4 Agriculture market will be developed according to the nature of the agricultural produce. Procurement will be strengthened for foodgrains like paddy and wheat. Modern warehouses shall be set up in the market yards. As per the provisions of the agricultural market committee land use policy, government institutions will be provided with the land available in these market yards for construction of godowns.
- 11.8.5 Farmers shall be organised for marketing of the perishable agricultural produce viz. fruits and vegetables. Farmers groups will be tied up with the aggregator and modern market service providers. Along the pattern of the milk federation, a similar fruit and vegetable federation shall be constituted.
- 11.8.6 Integrated Value Chain shall be developed for development of modern market for fruits and vegetables. Primary processing facility such as cleaning, sorting and grading will be created at the village level and at the farmers group level. Private entrepreneurs shall be assisted for setting up cool chain.
- 11.8.7 Market shall be developed at different levels. At the village level, the rural haats shall be modernised. Hub and Spoke based Terminal market and Integrated Value Chain shall be developed. The commercial farming may be regulated as and when it is required.
- 11.8.8 Private entrepreneurs shall be assisted for setting up modern markets. In these markets basic marketing infrastructures such as cold storage, ripening chamber, trading platform etc. shall be made mandatory for development. Any entrepreneur desirous of setting up such infrastructure shall be eligible for government assistance. These entrepreneurs shall be given assistance limited to the provisions of food processing policy.
- 11.8.9 New full time positions shall be created in agriculture department for development of agriculture market in the state.

11.8.10 The financial target for market development is given below:

Financial requirement, Rs in crore

Year	Expected cost (in Cr)
2015-16	570
2016-17	627
2017-18	690
2018-19	759
2019-20	835
2020-21	918
2021-22	1010
TOTAL	5408

Chapter-12

INSTITUTIONAL CREDIT

12.1 Agriculture is the mainstay of state economy. Investment in agriculture as a direct bearing on farmer's income. Modern agriculture is input intensive. In order to adopt the modern agricultural practices both capital and revenue investment is required. Commercial banks, Regional rural banks and Cooperative banks are the main institutional systems for credit availability in agriculture. Inadequate institutional credit to farmers has been an issue hampering the pace of agriculture development. There are about 40 lakh Kisan Credit Card of which more than 50 percent is inoperative, which is a major cause of concern. Therefore to improve the credit linkage following steps may be taken,

12.1.1 Financial Literacy: To make aware the largely uneducated manpower engaged in this sector regarding advantages of banking services and how to properly avail these services for their benefit with ease and convenience.

12.1.2 Bank Account Opening: Until & unless the bank account is opened in the name of beneficiary, the banking services can not be availed. Under PMJDY, more than 81 lakhs of new accounts have been opened during 14th August 2014 to 26th January 2015 due to arduous efforts from the bankers in the state, but where the population in state crossing 11 crores mark, there seems to be a long way still to go in this regard.

12.1.3 Access to Banking Services: Mere opening of accounts would not serve the purpose if the easy access to banking services is not available. To efficiently provide this, bank branches need to be there in near vicinity, else the poor farmers would find it hard to walk miles and miles to reach a bank branch. Majority of panchayats do not have regular Brick & Mortar or Ultra Small Branch. Same is true for villages having population more than 5000 and 10000 as per census 2001. In the state the average population per bank branch is nearly 18000 as against national average of around 11000. so, there is a yawning gap. However, banking services in rural areas are mostly being provided through Banking Correspondents with weekly visits and in some cases with a little bit lesser intervals. This mechanism has its own

limitations. So, sufficient number of regular bank branches direly required to be opened in rural areas.

- 12.1.4 **Rural ATMs:** Farmers are being provided KCC with Rupay card and now the new accounts are being opened with ATM/Debit cards. If the sufficient number of ATMs are not installed in rural areas, the account holders in those localities will not be able to make use of these cards. its desirable that all villages with population more than 5000 as per census should have ATM. Again in all the panchayats block headquarters and other rural market places should have ATMs installed.
- 12.1.5 **Kisan Credit Card (KCC):** KCC is the major taker of credit in agriculture sector, but in Bihar, the land holding being small, fragmented and in the name of ancestors, the issue of LPC becomes a big issue. This is further marred with another reality that the actual tiller of land in most cases are not necessarily the land owner. This makes issuance of LPC further difficult. This problem can be overcome by issuing "Loan Eligibility Certificate" to the actual tiller for getting KCC.
- 12.1.6 **Crop Insurance:** The process needs to be farmer centric with simplified procedures and claim disbursal mechanism transparent, easy and convenient.
- 12.1.7 **Self Help Groups (SHG):** There are nearly 4 lakh SHGs registered in the state and this figure is intended to be doubled in a couple of years. Their credit linkages for 1st and 2nd instalments need to be doubled from existing Rs. 50,000 and Rs. 1,00,000 respectively.
- 12.1.8 **Restructuring of Agriculture Loan:** Proper care and consideration needs to restructure Short Term agriculture loan to Medium Term agriculture loan in case of natural calamities and other unforeseen disastrous events.
- 12.1.9 **Ease in Financing:** At times poor farmers have to run pillar to post to secure credits from banks. Its desirable that banks should not unnecessarily harass them. Poor farmers need proper facilitation and dealt with human face without diluting the procedural paraphernalia.

Chapter:13

Disaster Management

- 13.1 Bihar is prone to multiple natural hazards. It is affected by flood, drought, earthquake, cyclone, hailstorm, fire etc. Flood and drought are recurrent problem. 28 districts, which are mostly in north Bihar are food prone and 17 districts of south Bihar are considered drought prone. Flood, drought, cyclone and hailstorm damage crops and consequently crop production is affected. Flood, drought, cyclone and hailstorm damage standing crops whereas due to drought not only the standing crop is affected but crop coverage is reduced due to lack of moisture. Therefore large cultivable area remains barren. Fire, which is mostly accidental affects standing crops and the crops on the threshing floor. The affected farmers get input subsidy as per the provisions of Calamity Relief Fund (At present State Calamity Response Fund). The input subsidy is provided in cases when loss is more than 30 percent of the standing crop. However, farmers get no support for the area remaining fallow or uncovered.
- 13.2 To protect agriculture from these calamities there need to be long term and short term measures. There has been paradigm shift in disaster management. Now disaster management is not only relief but in broader perspective it involves preparation, mitigation, response, relief, rehabilitation and reconstruction. The disaster management perspective of agriculture sector would entail preparation, mitigation, response and relief. The following measures would be initiated to mitigate the impact of damage caused due to flood and drought,
- Flood hazard maps for flood prone districts and contingent crop planning for mitigating the impact of flood and creating awareness among farmers about the same.
 - Contingent crop plan and creating awareness about the same in drought prone districts.
 - Deputation of agriculture scientist for timely advisories in case calamities like drought and flood.
 - Administrative measures to ensure canal water upto the tail end of irrigation canal.
 - Measures for implementation of crop insurance, timely repayment of indemnity claims from insurance companies.
 - Since the input subsidy is very small, matching grant will be provided from state plan.

- Drought resistant varieties will be promoted in drought prone districts and submergence tolerant varieties in flood prone districts.
- Bihar Rajya Beej Nigam will set up a seed bank in which short duration varieties of rice and other suitable crops will be kept so that it could be utilized in case of need.
- Input subsidy is a major strategic intervention in case of crop damage due to disasters. Diesel subsidy has also been implemented in case of drought like situation. Financial requirement for such interventions would be as below, Rs in crore

Year	Expected cost (in Cr)
2015-16	822
2016-17	904
2017-18	995
2018-19	1094
2019-20	1203
2020-21	1324
2021-22	1456
TOTAL	10644

14. Physical Milestones to be achieved,

SI No	Item	Description	Unit	Critical Milestone (2022)
1	2	3	4	5
1	Crop Production	Rice	lakh MT	126
		Wheat	lakh MT	72
		Maize and coarse Cereals	lakh MT	90.65
		Pulses	lakh MT	36
		Food Grains	lakh MT	324.65
		Oilseed	lakh MT	4.5
		Fruits	lakh MT	80
		Vegetables	lakh MT	225
		Certified Seed Availability (Paddy)	Lakh Q	3.97
		Certified Seed Availability (Wheat)	Lakh Q	12.78
		Certified Seed Availability (Pulse)	Lakh Q	2.68
		Certified Seed Availability (Oilseed)	Lakh Q	0.13
2	Animal Husbandary Dairy and Fisheries	Milk	thousand tonnes	14867
		Egg	No. (lakh)	234000
		Meat	thousand tonnes	1423.5
		Fish	lakh MT	10.25
3	Water resources	Required gross irrigated area	lakh ha	130.9
		Required irrigation intensity	%	209
4	Energy	Projected total power requirement	MW	3852
5	Plantation and Green coverage	No. of Plants	No. (lakh)	3437
		Green cover	%	15
6	Storage, Marketing & Processing	Storage capacity	lakh MT	85
7	Approach road	New Road	Km	49107
8	Procurement of foodgrains	Rice/Wheat/Maize/Pulses	Lakh MT	60

15. Summary of financial requirement from 2015-16 to 2021-22

(Rs in crore)

Item	Outlay(Rs in crore)
CROP PRODUCTION	25931
ANIMAL HUSBANDRY	7587
WATER RESOURCES	110677
ENERGY	9660
LAND RESOURCE MANAGEMENT	1499
PLANTATION & GREEN COVERAGE	3320
APPROACH ROAD	51266
COOPERATIVES	6192
STORAGE	7305
COLD STORAGE	19188
PROCESSING	24429
MARKETING	5408
DISASTER MANAGEMENT	10644
Total	283106