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India: Advanced Project Preparedness for Poverty Reduction - Institutional Development for a Value Chain Approach to Agribusiness in Bihar (Financed by the Government of the United Kingdom)

Prepared by IL&FS Cluster Development Initiative Ltd.
In collaboration with Agrifood Consulting International

For Bihar Department of Agriculture

Asian Development Bank

Advanced Project Preparedness for Poverty Reduction - Institutional Development for a Value Chain Approach to Agribusiness in Bihar

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Knowledge Summary

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This TA assignment was essentially designed to facilitate implementation of AIDIP for two identified Integrated Value Chains (IVCs) in Bihar. Major focus of the assignment was formulation of draft agrimarketing strategy along with the communication strategy for the horticultural sector. Another important deliverable of this assignment was to undertake the capacity building of related government officials and Project Management Unit (PMU). Preparation of Project Information Memorandum (PIM) for two already identified IVCs necessitated due to certain changes in the project design since earlier approval was another important deliverable. Major changes in the project design which necessitated preparation of PIM were; a) Reduction in capital grant to the private sector from 70% t 35% of the project cost and b) Land for IVCs to be brought by the private sector.

The agrimarketing and communication strategies were drafted through designing and implementing sector field studies, surveys and stakeholder consultations. The field studies and survey covered 11 districts covering two IVCs (Muzaffarpur, Vaishali, Darbhanga, Samastipur and Begusarai for 1st IVC and Patna, Nalanda, Gaya, Bhojpur, Buxar and Rohtas for 2nd IVC).

As part of capacity building activities, a series of workshops/trainings were conducted on subjects such as Value Chain Analysis, Institutional Structures, Recent trends in Marketing Intelligence and Communication. The capacity building activities were undertaken for the nominated department officials in the initial phase and for the PMU officials during the last 1-2 months after establishment of the PMU.

On the basis of initial stakeholder consultations and field inputs, a review of the Agriculture Road Map of state government was undertaken. As the roadmap mainly focuses on targets without specifying the means to achieve these targets, it was suggested to have a clear agrimarketing strategy with effective monitoring and evaluation mechanism for PPP based projects and through appropriate institutional mechanisms. This review was further discussed in another round of policy roundtable with the PMU and on the basis of this and various other stakeholder consultations, draft agrimarketing strategy and communication strategy were formulated. The suggested agrimarketing strategy stresses the need for a focus on Export & Competitiveness, Food Safety & Certification,

Implementation Arrangement for suggested strategy, importance of Value Chain Development Organizations and Market Intelligence System. The communication strategy focuses on Institutional Arrangements based on a Cluster approach, building of ICT based content and methodology and Capacity building of all the departmental officials as well as farmers.

A PIM was prepared after undertaking a series of consultations with the State Government, PMU officials and the potential investors. On the basis of the revised project design, the PIM provides revisions in the project cost and means of finance. The PIM also provides details of proposed facilities, operating assumptions, revenue assumptions, financial assumptions and the tentative layouts of the proposed facilities. The PIM is accompanied by proposed scheme guidelines for the implementation of the AIDIP along with the revised financial models for the two earlier identified IVCs.

After completion of this TA assignment, the challenge with the PMU would be to ensure the implementation of the agrimarketing and communication strategy in a manner to achieve the objectives of the AIDIP programme and also to achieve the long term objectives envisioned by the State Government. Further, the implementation of the two identified IVCs as per the PIM would set a benchmark and would lead to substantial impact on the identification and implementation of future IVCs.

Introduction & Approach

1. Introduction

1.1 Background - Technical Assistance Programme

Asian Development Bank has appointed IL&FS Cluster Development Initiative Ltd. (IL&FS Clusters) as consultant for its Technical Assistance (TA) programme for Advanced Project Preparedness for Poverty Reduction (Institutional Development for a Value Chain Approach to Agribusiness in Bihar). The TA programme is essentially designed to address institutional and capacity constraints which may obstruct reforms to agricultural marketing and thus facilitate establishment of modern integrated value chains (IVCs), a key objective of AIDIP investment project. Lack of understanding of value chain approach by stakeholders has been identified as a major challenge in this context.

Thus, TA programme aims to impart better understanding of value chain approach to both private sector entrepreneurs and government officials, so as to make them appreciate advantages of its adoption especially for horticultural produces. This is proposed to be done through training programmes and study materials on various aspects of value chains. These initiatives are expected to lead to increased capacity of stakeholders for development of demand driven horticultural value chains in the state and thus meet core programme objectives of increase in income for farmers and poverty reduction.

It has also been felt that development of a demand driven agrimarketing strategy would be a pre-requisite to meet the above objectives of the programme. Thus, a major output expected would be not only adoption of an appropriate agrimarketing strategy by the State Government but also an enabling institutional framework to support such a strategy. The strategy should be prepared in a manner, through policy workshops and stakeholders' feedback, to meet distinctive requirements of horticultural crops, as against foodgrains. A related component of the TA Program is preparation of an effective communication and awareness strategy. This strategy would look at special needs of small and marginal farmers and come out with an inclusive model to reach them through well-designed events, including study tours, seminars and workshops.

1.2 Approach of TA Programme

Based on above understanding of the TA programme, project activities started with an internal kick-off meeting to discuss deliverables from various experts and finalise a work plan. To achieve coordination with the State Government on the planned activities under the TA Programme, a meeting with the Agriculture Production Commissioner (APC), Government of Bihar and other senior officials was held. This was followed by a couple of meetings with the Secretary (Agriculture), Government of Bihar. These meetings were aimed at discussing the overall objectives and deliverables of TA programme and seek understanding of expectations of the State Government in this regard.

As per the ToR of this assignment and as enunciated in the Inception Report, key components of our Approach may be put as follows:

1.2.1 Field Survey

A major task was to carry out review of current agribusiness practices and agrimarketing policy settings, including communication practices. This was to be done through designing and implementing sector field studies, surveys and stakeholder consultation. The field surveys/studies were planned to capture perceptions of key stakeholders on present agrimarketing structure and further assess need for their capacity building and institutional strengthening. It was therefore decided to plan and design this exercise in two streams. While TA experts were to carry out their own field assessments and discussions with stakeholders for arriving at the findings, it was also decided to engage a field survey agency for carrying out a detailed field survey and obtain stakeholders' feedback, through well designed questionnaires. The detailed ToR/Scope of Work for the field survey agency was framed and also shared with ADB and the State Government. Later, based on feedback from ADB, ToR was suitably modified. Also, various questionnaires were developed for this purpose and shared with ADB and the State Government before these were given to the selected field survey agency.

The field survey was aimed at getting details of existing marketing linkages for selected horticultural produce, procurement mechanisms for these produces, status

and perceptions of farmers' groups and community institutions engaged in such activities, quality and food safety standards related to these produces, State Government support mechanisms and their accessibility, communication status and any other issues related to marketing of horticultural produces

The field survey report has been finalised and shared with ADB. The main findings of the field survey have been given later in this report.

1.2.2 Stakeholders' Consultations

In addition to the field visits by experts and survey agency, various stakeholder consultation programmes have been undertaken to arrive at the appropriate prescriptions for agrimarketing and communication strategy for the state. A major stakeholder consultation meeting was a one day Policy Roundtable held at Patna on 18th July 2012. The Roundtable was attended by senior State Government officials and also some traders and agro-entrepreneurs from the private sector.

Also, the Department of Agriculture, Government of Bihar organized a one day Stakeholder Consultation Workshop on Agricultural-Marketing Strategy in Patna on 6th November 2012. The TA team provided necessary support and assistance to State Government in holding this workshop. There was representation from various stakeholders including various departments of State Government, TA team members as well as Private Sector players.

The agenda of this workshop was focused on alternative mechanisms for agricultural marketing in absence of APMCs, importance of Farmers' organizations in agrimarketing and role of State Government in development of marketing infrastructure and establishment of suitable institutional mechanisms. Further details of the workshop are discussed in section 3 of this report.

Two other notable consultations were undertaken in Muzaffarpur and Sasaram (Rohtas districts) in the month of August. The details of these sector consultations have already been documented in the Interim Report.

Submission of Interim Report in December 2012 was soon followed by submission of Draft Final Report from APAAR Sansthan, the Patna based agency whose services were engaged by IL&FS Clusters to undertake Field Survey in TA Program. In early February, 2013 some positive developments took place with the Department notifying Constitution of a Project Management Unit (PMU) headed by Mission Director, State Horticulture Mission. The notified PMU is a five member body comprising of following members:

i. Project Director
ii. Horticultural Specialist
iii. Infrastructure Specialist
iv. Post Harvest Management Specialist
v. Finance Manager and Procurement Specialist

The notification of PMU also to a great extent facilitated smooth unfolding of TA Program. The APC and the PMU agreed to extend full department cooperation in organization of Investor's Meet to discuss the Project Information Memorandum (PIM) and Scheme for Implementation of AIDIP investment programme. Consequently, Investors' Meet was organized on February 26, 2013 during which proposed AIDIP Scheme was discussed in detail with potential investors.

Also, a brief exploratory field visit was planned in some of the districts with a focus on vegetable markets and to look at their potential and modalities in which they can be involved in a meaningful manner in the Investors' Meet.

Another Meeting was held on February 21, 2013 to present the findings of the review of agricultural marketing policy and key ideas of agricultural marketing policy to the PMU and related agencies, so as to elicit feedback and improve the formulation of the new agricultural marketing policy. In order to facilitate the discussion, International expert Francesco also provided capacity building inputs on some key concepts of agricultural marketing and value chain development and lessons derived from projects and case studies in India and other countries.

In the month of March, 2013 some more capacity building programmes were undertaken for the newly formed PMU under the TA Program. This was initiated by the Market Intelligence Expert in TA Program. The capacity building of the PMU on Market Intelligence was soon followed by the arrival of Communication Expert Prof. Dhanakumar's team. During the weeklong stay of Communication Expert's team in Patna, apart from interaction with the PMU the team was engaged in field visits at Gaya and Samastipur wherein they tried to explore the communication structure at the village and district level and interacted with farmers and district level officials.

1.2.3 Capacity Building Initiatives

As part of the assignment, a capacity building programme on Value Chain Analysis was undertaken by the International agribusiness policy expert, Dr. Francesco Goletti during November 1-3, 2012 with necessary approval from ADB.

Selection of participants was done by TA team in consultation with senior officials of Department of Agriculture, Government of Bihar. Representatives were carefully chosen in a manner to have some immediate effect at the hub of activities – from the 11 districts of AIDIP program. Emphasis was laid on having the District Horticulture officer's (DHO's) and Project Director (PD) ATMA in the training workshop as they are directly engaged with implementation of various State Government programmes at the district level.

The training course was about how to understand and develop the actors, actions, context and issues involved in "value chains", and how to integrate this knowledge and practice into State Government programmes and projects. The course objective was to provide government staff in Department of Agriculture, technical expertise and skills in agricultural value chain analysis and development. The expected outcome was that participants and their organizations will deepen their understanding and improve their performance in moving value chains forward in the project and program context. It was anticipated that the course will enhance the participants' expertise and skills in value chain analysis and development

approaches. Detailed proceedings of this capacity building programme have already been shared with ADB.

As part of the capacity building programmes, it was planned to develop training modules and study materials relating to Value Chain approaches, including Financial and Economic Analysis, Development of Farmers' Organizations. The study materials used in various activities have already been documented in Interim Report and also shared along with the proceedings of the capacity building programmes.

Post submission of Interim Report and with the notification of PMU, a series of capacity building measures were organised under the TA Program with a focus on capacity building of the PMU. This began with consultation on Draft Agri-Marketing Policy by Dr. Francesco Golletti with due approval from ADB. The report of this consultation has already been shared with ADB. Keeping in mind the fact that the members manning the PMU were new in their role, Dr. Golletti prior to his consultation for finalising the Agri-Marketing Policy engaged them in the nuances of agri-business and value chain concepts. Apart from members of the PMU, this meeting was also attended by some of the important functionaries of Department of Agriculture who were selected by the Project Director, PMU.

This consultation with the PMU and its capacity building was soon followed by the orientation of PMU to basic concepts of Market Intelligence by TA Expert on MI, Mr. Pawan Bang. During the week-long stay of Communication Expert Professor Dhanakumar and his team, a series of capacity building consultations were carried out for the PMU as well as the district level officials and some progressive farmers in Gaya and Samastipur districts.

1.2.4 Agricultural Roadmap of the State Government

In a significant development which had a major influence on our approach, the State Government wanted TA assignment to focus on further elaboration of the already adopted Agricultural Roadmap, instead of coming out with new agrimarketing policy and act, as earlier envisaged under TA. It may be noted that

TA was earlier expected to come out with, inter-alia, draft law and regulatory framework for agrimarketing in the state. Thus, our experts have carried out a detailed review of Agricultural Roadmap and suggested further inputs in this report.

1.2.5 Changes in AIDIP investment project structure

Another significant development with impact on our approach has been changes in the AIDIP investment project by the State Government. The Government of Bihar made following changes in the implementation model:

(i) Maximum capital grant to the private sector investors to be reduced from 70% to 35% of the project cost, with no requirement of sharing of 30 % of gross revenue as earlier envisaged;

(ii) Land for IVC projects to be brought in by private sector investors and not by the State Government as earlier envisaged.

These changes have a significant potential impact on project structure and investment size. It was therefore decided by ADB and the State Government to prepare a Project Information Memorandum (PIM) which would reflect these project modifications and may be used for inviting potential investors.

The above development has led to following additional activities being included in the Scope of Work of TA Program:

a) Prepare a PIM for AIDIP investment project in Bihar which may be used by the State Government to invite potential investors. The PIM will reflect changes in the project design as decided by the State Government

b) Discuss the revised project design with State Government officials for capturing relevant information in PIM which may be required by potential investors as well as in the contract documents to ensure delivery of the IVC services

c) Study the present model and experience of the Department of Industries, Government of Bihar, as well as the Terminal Market Scheme of Government Of India, in implementation of schemes of agribusiness/food processing sector so as to reflect both necessary learning and prevalent policy reforms of the State Government

d) Discuss the revised project design with potential investors and assess their willingness for investments in both Integrated Value Chain projects

e) Provide assistance to the Project Management Unit (PMU)in finalizing further project design details in line with expectations of the State Government

Draft of the PIM in the light of Cabinet approval of AIDIP that was included in the Interim Report has already been discussed and finalized in consultation with the PMU and various other stakeholders' during the Investor's Meet. The implementation scheme for AIDIP was also discussed threadbare during the Investor's Meet that was organized with due approval of ADB. Report on this consultation has already been shared with the ADB.

Agribusiness & Agrimarketing

Strategy

2. Agribusiness and Agrimarketing Strategy

2.1 Review of Agribusiness and Agrimarketing Policy

The key elements of existing policy on agricultural marketing in Bihar are reflected in two decisions: the repeal of the APMC Act in 2006 and the Agricultural Road Map (2012-1017).

2.1.1 Repeal of the APMC Act in 2006

The repeal of the APMC Act implied that the agricultural produce can be directly purchased from farmers, and there are no market fees. However, in the absence of an organization (private or public) that is in charge of functioning of market yards, new investment in market infrastructure and expenditures on operations and management has not occurred. As a result, erstwhile urban APMC market yards are currently functioning below par, operations are not efficient and market infrastructure is outdated. The markets are overcrowded but new market places have not emerged.

Repeal of the APMC Act has opened up the opportunity for the emergence of a constellation of different marketing structures that could provide alternatives to farmers, enterprises, and consumers. Alternative market structures might include the following:

- APMC markets yards free of market fee
- Private markets
- Direct procurement from farmers
- Direct selling by farmers
- Cooperative marketing
- Producer company marketing
- Contract farming
- Modern retail (supermarket chains)
- Traditional markets
- Rural markets
- Terminal markets

- Electronic auction markets
- Warehouse receipt systems
- Food parks

By providing the opportunity of developing a number of alternatives to the erstwhile APMC market yards, the marketing system could have improved through the combination of:

i. modernizing the marketing system infrastructure

ii. improving farmer's benefits

iii. improving value to consumers

iv. promoting agribusiness enterprise development

To a large extent, these improvements of the marketing system have not yet occurred. The response of farmers, cooperatives, and private sector has been tenuous in agricultural marketing. Only a few examples of direct marketing and very few and small private markets have emerged. By and large since 2006, there has not been any substantial improvement in erstwhile APMC market yards or value chain infrastructure such as pack houses, collection centers, cold/cool/CA storage, and primary processing centers.

Only in the food processing industry the response has been more positive with investment by the private sector. Some corporates (e.g. Britannia in the biscuit industry, Ruchi in oilseeds) have responded to the incentive programs the State has offered to the food processing industry. In addition to the corporates a number of small and medium food processing enterprises have also benefitted of the government incentive programs,

In spite of this positive response in the food processing industry, the agricultural marketing of the state has not yet been altered fundamentally. In the case of horticultural products, as already mentioned, the market yards are still characterized by very rudimentary infrastructure, the yards organization is

outdated, collection of farmers' produce is still done in a traditional way with minimum grading and packaging, and hardly any attention is given to quality and improved postharvest practices. Prices are highly variable and there are no mechanisms to ensure that farmers capture higher and more stable income from their produce.

The main lesson seems to be that most alternative marketing structures (as listed in the above section) will not evolve spontaneously, but require a set of favourable conditions. Elements of these favourable conditions include a conducive investment climate, supporting institutions and regulatory framework, adequate infrastructure, and a comprehensive package of capacity building and incentive programs. Ultimately, alternative marketing structures have to prove themselves as viable and real options that permit farmers, traders, enterprises, and consumers to realize higher efficiencies and benefits.

2.1.2 The Agricultural Road Map 2012-2017

The Agricultural Road Map for 2012-17 was approved by the state cabinet on 3 April 2012 after one year of intense preparation that involved 18 departments working under the Agricultural department, in addition to numerous consultations with scientists, experts, and farmers. The road map pays attention to not only production, but also to basic infrastructure (roads and energy), productive infrastructure (e.g. irrigation), marketing, storage, processing, and research and education.

The road map is comprehensive and promotes a "Rainbow Revolution" that is sustainable and green. Plantation of 240 million trees, rural electrification, investment in roads, and a land survey to be completed in 3 years are some of the key pillars. The program is ambitious in terms of expected financial outlays (see Table 1) and requires financing of about 1.5 lakh crore (equivalent to about US$30 billion over 5 years). The road map envisages tentative targets for 10 years and a more detailed time bound programmes for the 5 years period of 2012-17.

Table 1: Total Investment in Agriculture 2012-17 (Rs Crore)

	Public	Private	Total	Share
Agricultural Production (crop and horticulture)	13,751	0	13,751	9.2%
Animal Husbandry, Dairy and Fisheries	12,025	277	12,302	8.2%
AJIVIKA Mission	700	0	700	0.5%
Water Resources	27,160	0	27,160	18.1%
Minor Water Resources	11,460	0	11,460	7.6%
Energy	7,504	2919	10,423	7.0%
Land Resources Management	662	0	662	0.4%
Plantation and Environment	2,471	0	2,471	1.6%
Storage	4,144	4109	8,253	5.5%
Processing	2,785	11140	13,925	9.3%
Marketing	2,001	2080	4,081	2.7%
Cooperative	4,069	0	4,069	2.7%
Approach Road	38,452	0	38,452	25.7%
Agricultural Research and Education	2,150	0	2,150	1.4%
Total	129,334	20,525	149,859	100.0%
Share	86%	14%	100%	

Source: Based on Agricultural Road Map 2012-17, State of Bihar

Basic infrastructure (e.g. roads, energy) and productive infrastructure (e.g. irrigation) are allocated about 58% of the total investment. Market infrastructure (storage, marketing, processing) is allocated about 17.5% of the total. The private sector is expected to make the largest contribution to market infrastructure, namely 66% of the total, whereas in other types of infrastructure, the contribution of the private sector is as little as 2.6% (see Table 2). The larger share of investment envisaged by the Private Sector can be catalyzed only through appropriate policy reforms. A customized PPP framework could be an appropriate means for achieving this ambitious target. The expected higher contribution of the private sector implies that a favourable investment climate has to be established.

Table 2: Investment in Market infrastructure (Rs Crore)

Item	Public	Private	Total	Share of Total
Storage	4,144	4109	8,253	5.5%
Processing	2,785	11140	13,925	9.3%
Marketing	2,001	2080	4,081	2.7%
Total Market Infrastructure	8,930	17,329	26,259	17.5%
Shares of public and private in Total Market Infrastructure	34.0%	66.0%	100.0%	
Investment other than Market Infrastructure	120,404	3,196	123,600	
Shares of public and private in Investment other than Market Infrastructure	97.4%	2.6%	100.0%	

Source: Based on Agricultural Road Map 2012-17, State of Bihar

In the case of the horticultural sector, the road map envisages an accelerated increase of production (see **Table 3**) with an expected average growth rate of 5.7% over the next 10 years. This is much lower than the envisaged growth of food grain production, targeted at annual rate of 9.6%. Targets are an expression of the priority of the Government. However, for targets to be realistic, at least three conditions should be taken into account:

(i) inputs and infrastructure required to achieve the target are planned and implemented;

(ii) market demand can absorb the envisaged growth of production; and

(iii) the capacity of private sector and state to meet the demand.

Assuming that the necessary inputs and infrastructure are available, the questions remain of market demand and capacity to meet the demand. On the market demand, given the high elasticity of income of fruits and vegetables, it is likely that there will be sufficient demand either in India or abroad for fruits and vegetables. On the other hand, the targeted demand for food grains at 9.6% is on higher side, however, considering the untapped potential of Bihar and increasing procurement targets of GoI would ensure achievement of this growth rate.

Bihar has a potential to not only meet the entire demand of important horticultural products but also can cater to the National demand by virtue of its inherent strength in production of these products.

Meeting the demand for fruits and vegetables outside of Bihar (whether in other states of India or abroad) will require capacity involving not only better infrastructure, but also effectiveness in promoting commercial linkages, finding finance and risk sharing, marketing, and availability of improved technology to farmers and enterprises. The capacity of all the value chain actors (input providers, producers, logistics agents, pack house managers, cool/cold/CA storage managers, processors, packers, finance providers, marketers, wholesalers, retailers) needs to be improved. Fundamental to this will be a **massive effort in capacity building for value chain development**.

It is also important to internalize that an orientation towards exports (outside of Bihar) of the surplus of fruits and vegetables requires the improvement of competitiveness of stake holders in the fruit and vegetables industry. Currently, there is no such assessment that can provide a benchmark against which to compare future improvements. Yet competitiveness is a concept that is elusive in the agricultural roadmap.

Table 3: Production targets (lakh mt)

Item	Current	2017	2022	% increase 2012-2017	% increase 2012-2022	Annual growth rate over 5 years	Annual growth rate over 10 years
Fruit production	38.53	60.37	80	57%	108%	9.4%	7.6%
Vegetable production	136.27	186.11	225	37%	65%	6.4%	5.1%
Total Fruit and Vegetable Production	174.8	246.48	305	41%	74%	7.1%	5.7%
Food grain production	129.81	252.21	324.65	94%	150%	14.2%	9.6%

Source: Based on Agricultural Road Map 2012-17, State of Bihar

On marketing and processing, the Agricultural Roadmap targets 30% of fruits and vegetables production to be processed, wastage to be reduced to 5%, and creation of 2 Rural Agribusiness Centers (RABC) in each block and 3 Mega Food Parks based on fruits and vegetables.

Even though the physical targets are clear, the process through which they are arrived at is not clear. As such, their realism (for example wastage reduced to 5%) is difficult to ascertain. More importantly, it is not clear the overall aims of agricultural marketing policy. The roadmap contains targets in terms of physical and financial outlays for marketing (development of market yards, rural haats, private and cooperative integrated value chains –IVC-, market management, storage and processing), but the **overall development objective** in terms of socio-economic indicators is not clear.

The key **elements** of the agrimarketing policy in the ARM seem to be:

- Participation of cooperative, private, and joint (public-private) sector
- Use of erstwhile APMC market for public warehouses of food grains
- COMFED type of federation for fruits and vegetables
- Promotion of Integrated Value Chains (IVC) and rural haats
- Support to private investors in storage and processing
- Processing at 30% of horticultural production
- Increase in storage
- Establishment of new positions in government
- Expansion of agricultural roads, irrigation, and rural electrification

The Agricultural Road Map does not provide a clear analysis of the **constraints** to agricultural marketing. The discussion of target implies that the major constraints to marketing are:

a. Weak farmer organizations

b. Poor integration of farmers with the market

c. Insufficient storage and processing

d. High wastage

The next sections will elaborate on these bottlenecks including:

a. Capacity of various actors (government officials, farmers, enterprises, service providers) in value chain development

b. Institutional mechanism to promote value chain development

c. Effective monitoring and evaluation system linked to rewards and promotions

d. Use of subsidies: improvement of productivity and competiveness or other purposes?

e. Scaling up and aggregation

f. PPP in market infrastructure

2.1.3 Market Intelligence and Status in Bihar:

Market Intelligence (MI), can be defined as "the process of acquiring and analyzing information in order to understand the market (both existing and potential); to determine the current and future needs and preferences, attitudes and behaviour of the market; and to assess changes in the business environment that may affect the size and nature of the market in the future."

Frequent fluctuations in prices affect the farm income adversely and increase risk. Since farmers have no authentic source from which they can get the information on future changes in prices, they decide the area under various crops mostly by the price level prevailing in the previous seasons. This often results in glut and scarcity. After harvesting the crop, the farmers do not have any information on how the prices would move in the near future; they are not able to decide the best time of selling their produce even for the commodities that can be stored for short periods in the farm itself. So there is an urgent need to establish a permanent mechanism for market intelligence.

Efficient market information can be shown to have positive benefit for farmers and traders. In order to ensure fair returns to the farmers, it is essential that the agricultural marketing should be based on reliable and comprehensive database on market information. Access to such an up to date information base would also enable the farmers to plan their strategies for sale of their produce at remunerative prices. Besides producers, the traders and consumers would also be benefited from such a state wide database.

The markets in Bihar are operating because there is definitely certain amount of market information and intelligence flow that is happening from the producer to the markets and market makers and vice-versa. However, the existing system is highly unorganized and is managed through informal channels and mostly personal connections. Hence, it may not be imprudent to say that currently the State and State Agencies do not have an organised Market Intelligence System to understand the dynamics of the market and provide the required MI support to all the stakeholders.

2.1.3.1 Why Market Intelligence - Opportunities Accessed:

While the revamping of the agricultural marketing system in the State is an ongoing effort, the need for establishing a sound Agricultural Marketing Information System that can provide the Market Intelligence for realising the potential of Horticulture has been strongly felt. Such a system will

ensure proper utilization of the emerging trade and food processing opportunities by the farming and trading community.

There is an urgent need for making available market intelligence services to boost the trade and increase the participation of all importing and exporting organizations or firms in the State which require support about latest developments in trade.

2.1.3.2 Price Intelligence:

Market Intelligence with regard to Price is needed by farmers in planning production and marketing. Other market participants also need MI for taking appropriate trade decisions. For example, the non-availability of latest information on price trend and status of arrivals/stock in different destination markets of the catchment is a major handicap for producers/traders/ processors and exporters. Theoretically, if the information on prices prevailing in various markets is made available, the farmers would be able to get better price for their produce by moving their produce to the market which pays higher price; however, there have been several constraints in this regard.

a. While almost all the States in the country have their own system of providing market prices to the users by way of collection of information at APMC market yards, in Bihar with the abolition of APMC Act market information related to arrivals, sales, and prices at APMC market yards is no longer being collected and collated by any agency in the State

b. Most of the farmers and traders get price related information in various markets by contacting the respective trade contacts in destination market on Mobile Phones. They cross check the price often through fellow farmers who have marketed the produce in the immediate past.

2.1.3.3 MI is much more than Price Intelligence:

While Price Intelligence is an important aspect of Market Intelligence, MI is much more than just knowing the price and price related information of the products in given set of market(s). There are several other areas of marketing with which the various stakeholders need to be fully familiarized for adopting best market practices for improving the price realizations. Knowledge and Information of other areas, which are both 'Static' and 'Dynamic' in nature, and needed for successful marketing of horticultural produce in the local and global markets:

- Static Information:
  - Area and production
  - Post-harvest management
  - Quality assurance and standards
  - Packaging and Labelling Requirements
  - Storage and Warehousing Standards
  - Major Buyers and sellers in a given market
  - Sanitary and Phyto-sanitary measures
  - Handling Charges
  - Payment Practices
  - Historical Data on Arrivals, Prices etc
  - Government Support Price related information
  - Government Sponsored Schemes for Marketing and Market Development

- Dynamic Information:
  - Opening and Closing Stocks
  - Weather related information affecting Crops
  - Transportation Costs
  - Direct marketing and/or Alternative marketing Channels
  - Commodity exchanges and Futures Markets

While knowledge on the above Static parameters is available or can be collected easily, there is no institutional mechanism in the State that is a repository for the information and which can make such information available to the stakeholders on need basis. There is a need to develop product dossier which provide the required market intelligence, both static and dynamic information.

2.1.3.4 Integration of MI of Bihar with AGMARKNET:

The Directorate of Marketing & Inspection (DMI), under the Ministry of Agriculture, Govt. of India had initiated an ICT project - NICNET based Agricultural Marketing Information System Network (AGMARKNET)" in the country, during the Ninth Plan, for linking all important APMCS (Agricultural Produce Market Committees), State Agricultural marketing Boards / Directorates and DMI regional offices located throughout the country, for effective information exchange on market prices. NIC has implemented and is maintaining the project on a turn-key basis. Over 3100 APMC markets across the country have been connected on the online platform which provides information on these markets and provides both the static dynamic information on these markets.

While 58 markets are reportedly connected on the AGMARKNET from Bihar, the information about the markets and information on the arrivals in these markets in not available or updated on the website.

2.1.3.5 Effective MI:

The quality of information, its timeliness and trustworthiness are the three important features that have to be ensured to enable end users to use it effectively to improve trade efficiency. However, without any independent and neutral regulator keeping the track of prices, the effectiveness of the MI in the State is extremely dependent on the relationship and trust between the trading parties, be they producers or traders.

2.1.3.6 Every Market is Unique:

Every market is different; as a result, producers/ processors/ marketers need to develop a deep understanding of each specific market and how their product will fit if they wish to boost their chances of success in the given market. Entering a market without that sort of understanding can lead to poor realisation of the value of the product, costly mistakes, time loss and management frustration.

For example weighment of produce in Motipur market of Nalanda is done in multiples of 5 kgs and the packing bags after unpacking and sale of produce are taken back by the farmers. Whereas in several other mandies across the State weighment is done in the bag brought by the farmer and the buyer takes away the produce along with the bags.

This simple difference in market practice can lead to a very high difference in the transaction cost for the farmer or buyer because of the cost of packing material, weight loss to the farmers (multiple handling), the buyer having the option to remove second grade or damaged produce while every piece of vegetable is being weighed and the additional cost incurred in weighing 5 kgs multiple times is to be factored while making the decision to buy or sell produce in a particular market.

2.1.3.7 Access and retrieval of MI:

Delays in communication of Market Intelligence and information to the target groups can make the information lose its relevance. Keeping in view the time sensitiveness of market information, it is important that gap between generation and dissemination of information is minimized. Easy and timely access to information on ‘what is happening where and when’ is a key element in decision making that the stakeholders need to be provided.

As discussed the most common and widely channel for collection of MI particularly price intelligence, is one to one by communication over mobile phones. As such there is no data capture to study the trends and opportunities in the current system.

2.1.4 Issues and Challenges of Implementation

Capacity building in marketing and value chain development is largely overlooked in the Agricultural Road Map. Yet, the overall success of any marketing strategy depends on the capacity of the human resources involved. Marketing and value chain development is about increasing value and competitiveness through organized linkages in the value chain and innovation. In practice, that *means doing things differently*, changing ways of producing, marketing, processing, and distributing. This requires education, extension, demonstrations, and capacity building through exposure to similar experiences in other parts of India and abroad. This type of capacity building can be partly conveyed through a better education system comprising the universities and colleges. However, the needs go beyond academic education. In addition to formal learning, good practices of value chain development need to be communicated, internalized and adopted, in a similar way that technologies are disseminated. Good practices in value chain development are largely unknown not only by farmers, but also by service providers (including government extension staff and finance providers) and other actors of the value chain (traders, input providers, processors, logistics operators, etc.).

2.1.4.1 Unclear Strategy for promotion of agricultural marketing

Although a need for promotion of agricultural marketing has been stressed upon, roles and responsibilities of various Government departments for this has not been indicated. Further, information dissemination about different schemes to farmers and private sector needs further clarity. The policy refers to some "new positions". However, new positions at the state level without a functional unit/apex body in charge of promoting the sector, coordinating various programs, communicating with districts, and monitoring and evaluating implementation of programs are not likely to be effective. If the existing departments and functional units are envisaged to implement the Roadmap, it would important to provide them with necessary support, funding and to undertake substantial capacity building activities of various levels of officials.

The current public sector system at the district and block level is characterized by human resources that often have limited capacity, but, even more important, are not in the position of using whatever capacity they have for the purposes of agricultural extension or promotion of agricultural activities. A number of competing and different administrative tasks are given to the local agricultural government officers such as the Block Agricultural Officers (BAOs). The execution of these administrative tasks not directly related to extension and agricultural programs leaves little time to the local agricultural officer to devote themselves to the execution of the primary responsibilities of their post.

2.1.4.2 Effective monitoring and evaluation system

The Agricultural Road Map does not talk much about monitoring and evaluation. Monitoring of the indicated physical targets has not been clearly stated. However, the main targets are all about physical targets of input and outputs or expenditures. Even if the targets were achieved, there is no mechanism indicated that would ensure that the outcomes and impacts of those targets could be achieved. For example, the fact that a certain amount of seeds are produced, is not guarantee that those seeds reach the farmers on time, they are of good quality, are actually planted by farmers, and results in higher productivity and income for farmers. Similarly, the fact that rural haats or urban markets are built or upgraded is no guarantee that the marketing will be improved in terms of volumes, quality, safety of products, or in terms of less wastage, lower marketing costs, and higher returns for farmers. Unless an effective monitoring and evaluation system of programs and policies in the Agricultural Road Map is in place, it will be difficult to evaluate its implementation.

2.1.4.3 Use of subsidies

The Agricultural Road Map is a document that reflects a genuine concern for agricultural development in the State and expresses a political will to support the sector with an ambitious budget of about 1.5 lakh crore (about

US$ 30 billion over 5 years). The majority of the budget (almost 66%) is envisaged to be spent on basic, productive, and market infrastructure (roads, power, irrigation, market upgrading and construction, food grains storage). A considerable amount of resources is also going to be spent on subsidies (seeds, animal breeds, fertilizers, organic production, minimum support price for public procurement, processing, cold storage, renewable energy, irrigation equipment). The use of subsidies to support agriculture in Bihar Agricultural Road Map is not dissimilar from similar initiative throughout India.

It is a fact that agricultural activities like production, processing and marketing including storage would require financial assistance to ensure viability at least during the initial phase of implementation/establishment. However, the manner in which subsidies are administered has to be closely monitored and ideally subsidies should be linked to performance indicators rather than providing blanket subsidies.

2.1.4.4 Scaling up and aggregation

The Agricultural Road Map advocates the promotion of a federation for fruits and vegetables, similar to COMFED in milk. However, whether a COMFED-type organization is suitable for Bihar fruits and vegetables system at this stage of development is not clear. One should be wary of promoting a top-down structure to do agricultural marketing, since the likelihood that it will be competitive and sustainable is rather slim. It should not be forgotten that an effective cooperative system, federated at the state level, could emerge only through a gradual and organic bottom-up approach whereby small cooperatives/farmer groups/producer companies are formed, proved their success and then consolidated through mergers and/or acquisitions. To have a top-down approach which is already determined from the beginning runs the risk that the initiative is pushed by the top rather than pulled by the market. Fruits and vegetables are perishable products like milk; however, differently from milk they are heterogeneous,

with processing just one way to add value while several other ways to add value are through postharvest technologies applied to fresh produce. Fruits and vegetables production also varies considerably depending on the agro-ecological environment. While advocating and encouraging synergies, economies of scale, and consolidation in the industry is welcome, the modalities that are proposed in the Agricultural Roadmap needs further study. Bottlenecks in scaling up arise because of finance, capacity building, land fragmentation, logistics infrastructure, etc. The idea that a number of private, cooperative, public, and joint-sector initiatives are needed to promote marketing is a sound one. That flexibility of approaches should be preserved, rather than the full support for a specific model (COMFED type).

2.1.4.5 PPP in market infrastructure

For horticultural marketing to prosper, three types of market infrastructure are of crucial importance: (i) the collection centers/grading centers/primary processing centers/pack houses at the village level; (ii) the aggregation centers at the rural haat level; and (iii) the urban larger wholesale markets. In the case of horticultural produce, appropriate infrastructure facilities either do not exist (particularly at the village and rural level) or, when they exist, they are on premises previously occupied by erstwhile APMC market yards. With the repeal of the APMC Act, there is no marketing organization that is responsible for the erstwhile APMC market yards; as a result the yards are inefficient and have outdated infrastructure. However, the State of Bihar has apparently decided that the State Government will develop these yards, primarily through the construction of warehouses for grains. Proposals to use these market yards in a PPP mode whereby private sector would be invited to upgrade market infrastructure and operate for a period sufficiently long to recover the initial investment were turned down by the State.

The major erstwhile urban APMC market yards for fruits and vegetables are inefficient due to lack of modern infrastructure facilities and overcrowding. In the past 20 years the State has not invested much in creating new market infrastructure apart from those already established by the former state Agricultural Marketing Board. The repeal of the APMC Act makes it possible for the private sector to build a private market in Bihar; however it is doubtful that the private sector will find profitable to establish a fruits and vegetables market yard in the heavily congested urban areas where land prices are extremely high[1]. The private sector might establish such markets in rural areas or in peri-urban areas, but not likely in main urban areas. **So the question remains of how the upgrading of erstwhile fruits and vegetables APMC market yards will occur**. If the upgrading is done fully by the public sector, then the possibility arises that the old system of APMC markets might re-emerge, albeit in a different format.

PPP-type arrangements might have the double advantage of

(i) Saving government funds for investment in other budget items; and

(ii) Ensuring a build-in mechanism for efficient management of the market yards.

In summary, although the Agricultural Road Map has several physical targets related to marketing of horticultural products, it does not articulate a clear strategy for agricultural marketing policy. The following section builds upon the Agricultural Roadmap and will propose the outline of a new Agrimarketing Policy with specific focus on horticultural sector.

[1] One square meter of urban land near the erstwhile APMC market for FV in Patna is about Rs. 5200.

2.1.5 Possible solutions for new Agricultural Marketing Policy

2.1.5.1 A Clearly Stated Vision

The Agricultural Marketing Policy should have a clearly stated vision. Identifying a vision implies a consensus building process whereby the key stakeholders participate and agree. As a result of this process, the vision for the horticulture agricultural marketing policy might indicate the objectives for the growth of the subsector, its competitiveness, and the benefits to farmers, enterprises, and consumers. The vision might also clarify whether the strategy will be primarily based on private sector development or cooperative sector development or some other mechanism.

For example, in Maharashtra a recent expression[2] of agricultural marketing vision is as follows:

> "To develop a vibrant, transparent, competitive agricultural marketing system in Maharashtra by 2015, in which private sector will have a very decisive role, and, the State acting as facilitator, result in better price to producers, non exploitation of the consumers, create huge employment in the sectors allied to agriculture emerging out of backward and forward linkages, which will help the economy to grow at faster pace."

As stated above, the vision statement should be articulated by the state and the key stakeholders. One starting point[3] for discussion of this vision statement could be the following.

> "By 2022, Bihar horticulture has an internationally competitive and sustainable agri-marketing
>
> system supported by modern infrastructure and a sustainable production system with private enterprise and cooperatives contributing to effective

[2] http://www.msamb.com/english/news/MACP_PIP.pdf
[3] We stress the fact that the vision needs to be articulated through a participatory process of consensus building. Therefore the statement proposed here is only intended as illustrative and needs to be further developed and formulated by the participatory process.

and integrated value chains which provide safe, secure, adequate and affordable agri-food produce to consumers and growing and sustainable income to producers".

2.1.5.2 Exports and Competitiveness

The production targets for the horticultural sector indicated in the Agricultural Roadmap suggest that the state should become an exporter. The exportable surplus will either go to other states of India or abroad. If growth of the horticultural sector in Bihar will depend on exports of its produce outside of the state, the idea of competitiveness4 should be not only clearly specified in the vision, but also maintain high visibility throughout the implementation of the strategy.

A workable measurement of competitiveness should be established for the horticultural sector in each district and a Competitiveness Index at District level should be monitored regularly to ensure progress towards agreed upon targets. A very simple indicator of competitiveness might be the level of exports outside of the state. More sophisticated indexes can be also assessed taking into consideration different variables such as:

- Productivity (yields)
- Postharvest losses (% of production)
- Volume of storage (cubic meters)
- Storage in cool/CA/cold (cubic meters)
- Exports outside of country (mt)

[4] We define competitiveness as the ability of an entity (country/state/district/value chain/firm) to increase its share of domestic and export markets where the entity has a comparative advantage in a product when it can produce at a lower opportunity cost than other similar entities. Two issues emerge from this definition. First, the focus of competitiveness analysis should not only be on international market but also on the domestic markets. Secondly, the ability to compete depends on price competitiveness or on product quality.

- Exports to other state of India (mt)
- Pack houses (number)
- Processed products (mt)
- Total value of production (Rs)
- Total value of exports (Rs)
- Food safety incidents (number)
- Investment in the state (Rs)
- Certified (GAP, Global GAP, …) groups/companies (number)
- Perceptions about investment climate (poll output)

The agricultural marketing policy might emphasize the role of exports of horticultural products from Bihar. Given the great potential of the state in horticultural products and the still low income level in the state, consumer demand in the state might not be able to absorb the surplus that could potentially be generated. However, unless demand is available, there is no point in increasing production as prices will fall and thus frustrate the expectations of farmers. Marketing planning is fundamental for farmers and value chain actors to identify the channels and customers who will buy the products that Bihar is able to offer. It is envisaged that most of these customers will be outside of the state, both within India and outside of India. In both cases higher requirements in terms of quality, delivery, and safety will be expected. Bihar's horticultural sector has to become competitive through enhancement of productivity at the farm level, development of postharvest systems, and innovation in products and processes throughout all the stages in the value chain. Targets for exports should be established.

2.1.5.3 Food Safety and Certification

In order to achieve the export oriented targets as per the Road Map, a lot of efforts would also be required to ensure the implementation of Food Safety standards at the farm level, packaging, processing and transportation. The starting point of such initiative would be the facilitation and capacity building at the producer level. This would require an extensive effort for the capacity building of farmers in order to first understand and subsequently maintain various standards as per the market requirement. This would require linkages with the Food Certification organizations and up gradation of value chains accordingly so that these organizations also assume the role of an important actor in the upgraded value chain.

Alternatively, the commodity specific state level agencies under the guidance of APEDA may be promoted as per the needs of the sector in due course. This alternative would provide more control in the hands of the producers rather than introducing a new stakeholder in the value chain. However, during the initial 1-2 years, the existing private Food Certification organizations would assume greater significance as the current level of understanding and capacity of the related officials is limited in absence of such initiatives.

2.1.5.4 Implementation Facility

Agricultural marketing policy is complex. It embodies the key concepts of value chain development and linkages among actors and sectors (production, industry, logistics, infrastructure, quality and safety, markets). Unless there is a well structured unit or facility deemed responsible for the implementation of the policy, it is unlikely that the policy is implemented effectively. This will require a dedicated unit that in this document can be referred to as Bihar Agribusiness Management Society (BAMS) that would promote investment in the sector, coordinate policies and programs, collect and analyze market information and intelligence, monitor and evaluate policies and programs, promote cluster level farmer organizations and

facilitate linkages at the state level and between districts and the state. The State Government has already initiated establishment of BAMS. However, details are yet to be finalized and are under preparation.

2.1.5.5 Value Chain Development Organizations

The development of a competitive horticultural sector relies upon the development of effective value chains. Value chains[5] stress the linkages among actors in order to gain value and competitiveness. However, the state has not yet established mechanisms that foster the development of value chains. The State has emphasized and promoted the formation of farmer groups and associations. Yet, these groups and associations are only one step in a value chain. The value chain needs to bridge over to other stakeholders.

A detailed study material on Farmers' Organizations, various types of Farmers' Organizations and a comparative analysis of various kinds of these organizations has been developed in the form of a module. This module has already been documented in the Interim Report.

Various approaches for development of such organizations have been discussed in details. Some of the suggestions in this regard included:

1. Commercial Agricultural Alliances (CAA) and Value Chain Development Alliances (VCDA)
2. Models based on Raythu Bazaars
3. Three tier Amul model of dairy
4. Model promoted by Rubber Board
5. Model promoted by Coffee Board

[5] We define competitiveness as the ability of an entity (country/state/district/value chain/firm) to increase its share of domestic and export markets where the entity has a comparative advantage in a product when it can produce at a lower opportunity cost than other similar entities. Two issues emerge from this definition. First, the focus of competitiveness analysis should not only be on international market but also on the domestic markets. Secondly, the ability to compete depends on price competitiveness

CAA

The Commercial Agriculture Alliance (CAA) was established in the Eastern Region of Nepal in 2006 in the context of a project on Commercial Agriculture Development Project (CADP) implemented by Government of Nepal with support of Asian Development Bank (ADB). The CAA was designed as one of the first attempts to engage the private sector in the further commercialization of agriculture. Its objectives have been:

- To promote commercial agriculture in Nepal by developing an alliance between the commercial agricultural stakeholders.
- To manage commercial agriculture fund and provide support to its Members from the fund.
- To educate its Members and other agricultural stakeholders about the importance of market linkage on production, its sustainability and multiplying capacity.

CAA was set up as a non-profit company in September 2006, with its head office in Biratnagar. It has been responsible for implementing Component 1 of the CADP Project, namely: "Commercial Agriculture Investment and Management" which is one of five CADP project outputs. It manages the Commercial Agriculture Fund (CAF) which is a cost-sharing grant facility. The total budget for CAA is US$ 15 million including US$ 8 million ($4 million for Infrastructure and $4 million for Non-Infrastructure) for the CAF. The CAF facility is available to CAA general members and the DDCs to strengthen market-chain activities and develop linkages within the market chain. There are currently 474 members from 3 principle groups: farmers, traders and processors. A major incentive for this construction of membership is to enhance sustainable linkages between these three groups. The CAA is managed through a board of 11 members; 6 elected by the general membership and 5 appointed by the Government of Nepal (2 from MoAC, 2 from MLD, and 1 from AEC). This Board meets about every 6 weeks to review applications and decide upon grants.

These approaches along with other possible options were discussed during various stakeholder consultations and on the basis of various discussions; a

broad outline of the proposed model for State has been discussed in the next section. This proposed model would be further discussed with various stakeholders during the course of this TA and further details of this proposed model would be arrived at in the final report.

Proposed model for Farmers' Organizations

A bottom-up approach initiated by the farmers themselves and through cluster level appropriate farmer organizations federated into a state level apex organization (BAMS) would be an appropriate mechanism to achieve the targets set in the Agriculture Road Map.

For effectiveness and efficiency of such apex organization, capacity building of Government officials of agriculture and related departments across the state would be of utmost importance. This TA programme broadly addresses this need; however, extensive handholding and capacity building would be required over a period of time.

Value Chain Development would be the basis of this approach for overall development of Agriculture and Horticulture Sector of the State. Further, a seamless integration of various actors across the entire value chain would be ensured with development of need based institutions/institutional structures.

The bottom-up approach should focus on development of an appropriate three or four tier structure over a period of time. A broad illustrative framework of this kind of approach would consist of:

i. Farmers/Producers Groups/Societies or appropriate structure at the village level
ii. Organization of 1st tier structures into a cluster level commodity specific structures preferably a Producer Company or Private Company

iii. Federation of Cluster Level organizations into a State Level Federated Structure with various sections/departments for various commodities (BAMS)

i. Farmers/Producers Groups/Societies or appropriate structure at the village level

The start of this approach should be organizing farmers into producer groups/societies or other such appropriate structures at the village level as per the needs of the farmers and on the basis of specific commodity/commodities chosen by the farmers themselves with support and guidance of various Government officials of the area.

The focus should be on overall development of the value chain and providing appropriate linkages to the 1st tier structures in order to maximise returns to the producers and providing a strategic control of the value chain in the hands of the producers. This is possible by organizing market intelligence system for the producers so that strategic decision are taken by the farmers themselves which would provide them with better control over the value chain and would also lead to upgradation of value chain over a period of time.

This is possible only if the existing agriculture department and other related departments are revitalized through appropriate capacity building activities of the officials' in order to make them competitive enough to guide the development of such an institutional structure.

ii. Organization of 1st tier structures into a Cluster level commodity specific structures preferably a Producer Company or Private Company

The second and most important step for this approach would be the establishment of commodity specific cluster level organizations. This organization would be established through organizing the 1st tier structures

as members/shareholders of the cluster level organization. The cluster would consist of the area encompassing all the districts blocks involved in cultivation of a specific commodity. Here, the cultivation of commodity and size of the commodity belt/area would be more important than the geographical boundary. The appropriate form/type of this cluster level organization would be decided by the members/shareholders and at a time when sufficient volumes at the cluster level have been achieved. However, considering the regulatory framework and efficiency of various kinds of farmer organizations in the past, a Producer Company or a Private Limited Company would be the most appropriate form of district level organizations.

As a Pump Priming strategy, the State Government through the apex federation might provide an equity contribution for establishment of these cluster level organizations. This would stimulate the development of these cluster level organizations and would take care of the initial hiccups during the initial months of establishment. This second tier organization would mostly work for providing marketing linkages and market intelligence to its members/shareholders. In addition, the latest technical know-how, input delivery mechanism and other specific needs of the members/shareholders would also be taken care of by this tier 2 structure.

Further, the areas such as Logistics, Post Harvest Management and Supply Chain Management for export to other state and even International Export would also be the responsibility of 2nd tier cluster level organization. Depending upon the needs of the members/shareholders and considering the commodity potential for export, appropriate commodity specific storage structures (Dry warehouses/Cold Storages/CA Stores) might also be developed through some equity infusion from the apex organization and rest of the funding from members/shareholders.

Overall, these cluster level organizations would take care of the commodity specific value chain up gradation in the cluster and providing appropriate

linkages for export out of the State through the apex body. Ideally, there should also be linkages with organized retailers through buy-back arrangements for assured price to the producers. This would be the vision of these organizations in order to provide the complete control of the value chain in the hands of the farmers.

iii. Federation of District Level organizations into a State Level Federated Structures with various sections/departments for various commodities (BAMDF)

For the overall development of the sector across the state and implementation of the above mentioned three tier approach for agriculture and horticulture development, an apex organization (BAMDF) at the State level would be established. This might be an autonomous organization and the entire cluster level commodity specific organizations would be federated under these apex organizations. The major functions of this apex organization might be as follows:

a) Equity infusion into cluster level commodity specific Producer Companies/Private Companies for value chain upgradation at the district level
b) Funding arrangements for cluster level commodity specific infrastructure development (Dry warehouses, Cold Storages, CA Chambers, Ripening Chambers, Processing Infrastructure etc.) from the perspective of export to other states or International export
c) Technology upgradation and extension activities for continuous upgradation of commodity specific value chains through handholding and capacity building activities for cluster level commodity specific organizations
d) Establishment and operations of Market Intelligence system for price discovery and timely information dissemination which would help the farmer in production and marketing decision making

e) Overall facilitation of the cluster level organizations for marketing and export of the produce
f) Providing direct as well as indirect credit linkages and marketing tie-ups such as buy back arrangements

This apex organization would guide the farmer groups to establish appropriate institutions at the cluster level without directly interfering in the decision making. The role would be mostly facilitation and support and decision making would rest with the cluster level institutions.

The organization would also work for the establishment of an effective marketing structure throughout the state along with information dissemination across the various value chain actors including input providers, farmers, traders, processors with the aim of developing a strong value chain that grows rapidly, improve competitiveness and value added for its members and consumers

Bottom-up Approach in linking farmers to a value chain

Working with value chain actors will require a bottom-up approach. At the district level, the effort of linking actors in a value chain can start from successful farmer groups or enterprises involved in linking producers to the market. The key factor in this process would be to identify local entrepreneurs working with farmers. A local entrepreneur could be a dynamic farmer, a business person, or a social entrepreneur. With the help of outside human resources available in the district on in the state, the next step consists in linking these actors with other similar actors so that together they can expand the value chain. Next link these actors with service providers. Then link these actors with medium or large enterprises, if scaling up is envisaged. Incentive: throughout the process provide information on market intelligence available, conduct training and capacity building, and facilitate access to existing programs.

2.1.5.6 Market Information and Intelligence

A number of initiatives to collect and disseminate relevant market information could be established through use of ICT, including SMS-based technologies through which farmers are immediately connected to the market and know the prices, the buyers, and the requirements in each market. Additional information relevant to planning of production and marketing (e.g. weather, crop forecast, and events) could be disseminated through ICT systems. A unit for market information and intelligence might be established within the BAMS. Key information will include other markets in India and markets overseas and exports. Profile of various commodities will be made available to the public in various forms (publications, website, telecenters etc.)

Further details for this have been discussed in the section on Market Intelligence and Communication sections.

2.1.5.7 Research-Education-Extension (REE) Integration

The Agricultural Roadmap discusses research, education, and extension; however, experience shows that the three institutions often operate independently rather than synergistically. From the point of view of marketing policy for horticultural products, considerable integration is needed among REE institutions. However, the technologies dissemination and adoption requires not only the input of professionals (researchers, teachers, extension workers) but also structured dialogue with farmers and enterprises. This dialogue could be considerably enhanced through mechanisms such as the Farmer Organizations, CAA and VCDA. Furthermore linkages with international research organizations and private sector could further contribute to a culture of innovation. The BAMS will also promote coordinate of the REE institutions at the state level. Especially in the context of Food Safety and Standards, the role of private sector organizations, various national research organizations and International

research organizations would be crucial for extension and such integration would be of greater significance.

2.1.5.8 Capacity Building

A well structured program in capacity building in marketing and value chain development should be organized for government officers (DDA/H, ATMA) and value chain actors (farmer representatives, lead farmers, cooperatives, companies, financial institutions). The capacity buildings should include training courses, workshops, study tours, exposure visits, audiovisuals material, and sharing of experiences through workshops, conferences, and periodic gatherings. SME capacity building offered by BDS providers (e.g. writing business plans and keeping accounting books) could be adapted to the horticultural sector and targeted to farmer groups and other farmers' organizations.

Particularly important will be the capacity building in marketing and value chain development as these two areas either are not usually present in the professional background of extension workers or they are completely new to most farmers and other value chain actors (traders, processors, logistics agents, finance providers).

2.1.5.9 Demand Driven Extension

A marketing perspective (i.e. customer oriented) should be part of the overall marketing policy, including the delivery of extension services to farmers. Rather than guessing the needs of farmers involved in value chain development and organizing appropriate extension services to meet those needs, the approach might be put on its head. Namely provide farmers with "**extension coupons**" that the farmers can spend as they wish to have extension services delivered to them. Different providers (state and private, academic, and NGOs) could compete for providing extension services to farmer groups. Farmer groups can shop around for the best services. If they are interested they could complement the vouchers with their own money. A number of providers will be certified by ATMA.

Another strategy could be to provide extension services to the farmers of an area as per the request of the farmer organizations. The choice of training programme, training institutions etc. might also be finalized as per the demand from the farmer organizations.

2.1.5.10 Organized Retail in Horticultural Products

A number of corporates (e.g. Reliance Fresh) and cooperatives (e.g. Safal) have tried a more organized retail system for horticultural products in India. Although some of these trials are not fully successful and still primarily directed to affluent urban consumers, agricultural marketing policy should see the trends positively and encourage the integration of farmer groups with modern retail. This will have several benefits in terms of marketing: improvement in quality, establishment of long-term contracts, and push for effective organization of farmers.

2.1.5.11 Funding

The overall funding for marketing activities in the horticultural sector should be determined so that the effectiveness could be evaluated over time. Some funding will be utilized as VGF. It is suggested that matching grant also be used and implemented through farmers' organizations indicated earlier. VGF related to programs for improving cold storage and processing capacity and market infrastructure may be used as intended already. Matching grants could be more appropriate to meet the local needs of communities and farmer groups for appropriate market and value chain infrastructure.

2.1.5.12 BAMS - A Positive Step

The State Government has now come up with an idea of a Society for this purpose named Bihar Agribusiness Management Society (BAMS). Major objective of this society would be the up gradation of erstwhile APMC market yards, building mandatory and support agribusiness infrastructure through integrated value chain approach by supporting public as well as

private investment in various infrastructure components, facilitating the participation of stakeholders like farmers and traders in producer groups around key commodities and promoting and up scaling technology for enhanced price realization through value addition and sound market intelligence.

The proposed objectives of this society are broadly in line with the recommendations made in this section. However, a lot of detailing and facilitation from various departments along with the extensive capacity building of the officials of this society in line with the value chain upgradation would be required.

2.1.6 Setting up a Market Intelligence System in Bihar:

As discussed, with the abolition of APMC Act, the State is currently not collecting and collating any data (such as prices and arrivals in both origination and destination markets) relating to marketing of any agricultural produce.

Development of Market Intelligence System will need a sophisticated system of Information flow from lowest level of the Value Chain to the plan formulation and decision making levels at the macro, meso and micro levels to make MI a critical success factor in the emerging value chains.

To develop the capability for provision and use of market demand information, market intelligence for high value horticultural value chains will need a two level Market Intelligence Development Plan.

The first stage will involve development of a core information collection, collation, data warehousing and data mining network and structure (both physical and institutional). The second stage will involve development of a mechanism that would analyse the data so collected from the network to provide commodity specific and pointed guidelines to the end users.

To accomplish the above stated stages the following MI Development System is suggested:

1. Utilization of the current AGMARKNET systems, protocols and infrastructure by linking the markets of Bihar on AGMARKNET to collect, data warehouse, and disseminate Market Information (Both Static and Dynamic Information)
2. Setting up a Domestic and Export Market Intelligence Cell (DEMIC) in the State that would research the markets, analyze the data including data collected on the AGMARKNET system and more importantly provide guidance to the farmers on production planning and marketing decisions support.

2.1.6.1 Linking with AGMARKNET:

AGMARKNET is the internet based information system aimed at providing "single window" service, catering to diversified demands of market information in agriculture in India. It is facilitating information sharing and

development of data infrastructure for enterprises, industry, farmers, policy makers, academic organizations, government agencies, etc.

AGMARKNET is the flagship project of the Government of India and efforts are afoot to make it of real use/service to the farmers. It is providing on-line marketing information service useful to all the stakeholders on agricultural marketing system of the country. It has an immense potential to service all the market participants to face the new challenges emerging out of liberalization and globalization of agricultural sector.

The objectives of the system are to:

1. Establish a nationwide market information network for speedy collection and dissemination of market information and data for its efficient and timely utilization
2. Facilitate collection and dissemination of information related to better price realization by the farmers. This covers:
    a. Market related information such as market charges, transactional methods, market functionaries, market laws, etc.,
    b. Price related information such as minimum, maximum and modal prices of varieties and qualities transacted, total arrivals and dispatches with destination, marketing costs and margins, etc.,
    c. Infrastructure related information comprising of facilities and services available to farmers with regard to storage and warehousing, cold storage, direct marketing, grading, re-handling and repacking, etc. and
    d. Promotion related information covering accepted standards and grades, packaging, labelling, sanitary and phyto-sanitary requirements, pledge finance, marketing credit and new opportunities available in respect of better marketing.
3. Sensitize and orient farmers to respond to new challenges in agricultural marketing by using IT as a vehicle of extension.

4. Improve efficiency in agricultural marketing through regular training and extension for reaching the region specific farmers in their own language.
5. Provide assistance for marketing research to generate marketing information for its dissemination to farmers and other marketing functionaries at grass root level to create an ambiance of good marketing prices in the country.

The AGMARKNET has been in operations for over 7 years now and The Directorate of Marketing & Inspection (DMI) has developed clear a detailed document indicating roles and responsibilities of DMI, NIC and the Markets including the State Government. The document also contains instructions for using the market level AGMARK application software for creating and maintaining the market level database.

While DMI on its part has developed and stream lined the processes for collection and dissemination of data, the AGMARKNET is not able to achieve its stated objectives completely for various reasons. Internet connectivity and computer usage related challenges were prevalent in the early years which have been overcome with the development of technology. However, the current constraint has been irregular uploading of the data on the website and to some extent the reliability of the data.

To overcome the irregular uploading of information on the website, the DMI has introduced an incentive scheme and results have been positive to some extent.

To overcome the reliability of the data reported by a market, data is monitored regularly for accuracy to avoid wrong decisions by the users of information. Therefore, before publishing the data on the website, the daily data received from various markets are hosted on intranet of DMI. The prices are examined for deviations in (Max, Min) range. The doubtful information, if any, is segregated and published only after cross verification

with such markets. A directory of markets has also been published on the portal to facilitate interaction among users and markets through e-mail.

2.1.6.2 Setting up Domestic and Export Market Intelligence Cell (DEMIC):

The database developed under AGMARKNET need to be linked to other agricultural databases, for instance, on area, production, yield of crops, land use, cost of cultivation, agriculture exports and imports, and so on, to evolve a data warehouse that would provide a sound base for planning demand-driven agriculture production and marketing.

The objectives or targets for DEMIC could be:

1. To forecast the supply and demand of important agricultural commodities in Bihar.
2. To forecast future prices of major agricultural commodities
3. To study the market situation related to important commodities
4. To disseminate the market and price information on to the farmers for planning, production and holding stocks, and
5. To suggest policy measures to the Government of Bihar in the light of the market research
6. To develop Good Agricultural Marketing Practices Data base for the important commodities

Mode of Operation:

To achieve the above stated objectives and provide pointed and commodity specific recommendations, it is suggested to set up DEMIC possibly under the aegis of Agriculture University.

The Market Intelligence Cell will collect the data on arrival and transaction of important agricultural commodities in all the Markets in Bihar and major destination terminal markets in other states. Using these data the Market Intelligence Cell will forecast the prices of these commodities in the

forthcoming months and the same will be transmitted to the markets and the farmers through web, All India Radio, television and newspapers.

Apart from this, the prices prevailing in nearby states will also be informed to the farmers so that they are able to get better prices for their crops which will help them planning crop pattern and the right time for sale of their crop output.

2.1.6.3 Case Study:

The Government of Tamil Nadu has set up a DEMIC in 2007 with the collaboration of Tamil Nadu Agricultural University (TNAU), Centre for Agriculture Development and Rural Studies (CARDS), Department of Agriculture Marketing and Agribusiness, National Informatics Centre (NIC), National Agriculture Innovation Program (NAIP) under ICAR which is providing timely information to the producers. A list of recommendations given by DEMIC in the months from April 2012 to October 2012 and the decision support provided to the farmer has been summarised in the table below:

Table 4: Recommendations of DEMIC for Decision Support

Recommendation	Date	Decision support to the farmer
Farmers recommended to store Maize up to December or to sell immediately	25th Oct12	To Hold
Store and Sell Small onion	1st Oct 12	To Hold
Sell Sunflower Seeds Immediately	1st Oct12	Sell
Puratasipattam Cotton will Fetch Stable Price	1st Oct12	Your Choice
Kadai bogam Potato to Fetch Better Prices	26th Sep12	To Hold
Adipattam Price Forecast	29th Jun 12	Information
Farmers Advised to Sell Red Gingelly upon Harvest	21st Jun 12	To Sell
Store and Sell Maize during June, July	21st Jun 12	To Hold
Sell potato immediately on Harvest	21st Jun 12	To Sell
Small Onion Prices to Remain Stable	10th May12	To Sell
Sell Groundnut upon Harvest	25th Apr 12	To Sell
Sell Sunflower Seeds on Harvest	25th Apr 12	To Sell
Reduce Area under Turmeric Cultivation	16th Apr 12	To reduce area
Sell Red chillies upon harvest	4th Apr 12	To Sell

2.1.7 Case Study of an International Value Chain Upgradation (West Java)

Mr. Unang is a vegetable farmer member of an association of 10 farmer groups representing 100 farmers in the hilly areas of Cianjur in West Java. The association provides a variety of fresh vegetables to Jakarta. Among their produce are fresh lettuce, cucumbers, tomatoes, onion, pak choy, carrot, baby green bean, celery, cherry tomatoes, and leafy vegetables.

Every day they ship 2 trucks full of fresh vegetables to 10 outlets in Jakarta, twice per day. Each trip takes 3 hours. Each truck transports between 500kg to 1 ton, 7 days/week. All together the farmers cultivate about 60 ha of vegetables.

Mr. Unang's and other farmers benefited from an Agribusiness Incubator based in the Agricultural University of Bogor. The incubator helped Mr. Unang and other farmers through training (eg packaging) and facilitated access to credit. The incubator also facilitated the participation of 20 persons from the association to be trained in Japan in the management of fresh vegetables. Mr. Unang spent 2 months in Japan for this training.



In 1996 the farmer association started contacts with supermarket with deliveries of 2 trucks/day. Supply to McDonald started in 2000 and lasted up to 2006. It was later discontinued because of stricter policy requirements by McDonald. The fast food company required to move production to an industrial area and adherence to good manufacturing practices (GMP). He and other farmers did not have difficulty in complying with GMP, but the move to an industrial area would have represented an investment that he and other farmers could not afford. At about the same time, his association became supplier for Wendy and is currently continuing to be a Wendy supplier. According to Mr. Unang Wendy is more flexible than McDonalds; moreover he can make 20% more profit, and benefit from a variable price in the contract (differently from McDonald which uses fixed prices).

In addition to their own small packinghouse, farmers use the pack house in the cooperative. Total volume of produce in the cooperative is 15-20 tons/day. Being part of a cooperative implies stronger negotiation power with supermarket and higher negotiated price (20% higher). Each member of the coop supplies directly to the supermarket, but the price is negotiated collectively. His association is currently planning to build 2 screen/plastic house of 1,500 m^2 for a cost of Rs 35 million. They intend to be certified organic farmers and dealers of fresh vegetables, a plan that might be possible to implement in their area which is relatively high-altitude and less exposed to pests. The association won a National Award for Agricultural SME innovation. Another plan is to invest with a group of like-minded people in a retailing cooperative. That investment will require considerable investment but he believes that the expected benefits will be high. His total sales in 2010 were 1.3 billion up from Rs. 700 million in 2006. His direct costs are about 20% of sales and his margins about 30%. He plans to increase the size of his business through the development of organic production and retailing. He is currently writing new business plan, using GMP of McDonald, will need capital of Rs. 6-10 billion.

Note: at the time of the writing, 1 USD was equivalent to about 10,000 Rupiah.

Field Visits, Stakeholder Consultations, Workshops & Capacity Building Activities

3. Field Visits, Stakeholder Consultations, workshops and Capacity Building activities

3.1 Field Visits and Stakeholder Consultations

During the last one year, various exploratory field visits and stakeholder consultations were undertaken by the TA team in order to have detailed understanding of the current status and field level issues especially related to the horticultural produce.

The exploratory field study in this regard carried out by the various team members had the following objectives:

i) Sensitization of stakeholders in government department at district and block level about TA Program, main AIDIP and its objectives.
ii) Identify potential investors and get their feedback on AIDIP as approved by State Government
iii) Explore the existing marketing structures and arrangements and different actors involved in it.
iv) To undertake an analysis of the post harvest and marketing practices currently being used by the farmers.

The field visits were initiated after the kick-off meeting of various TA team members. The kick-off meeting was followed by various rounds of meetings with the functionaries of agriculture department starting from the State level officials followed by district and block level functionaries. After thorough consultation with various levels of government functionaries, exploratory visits for consultation of other stakeholders including farmers, farmer groups and PACSs, food processors and other private players etc. were also conducted.

As already indicated some notable stakeholder consultations included a one day Policy Roundtable (details provided in the next section) along two other stakeholder consultations undertaken in Muzafarpur and Sasaram (Rohtas district) in the month of August. In addition to these, a brief exploratory field visit was planned in some of the districts with a focus on vegetable markets and to look at their potential and modalities in which they can

be involved in a meaningful manner in the Investors' Meet. The Communication Expert and the Market Intelligence Expert followed up on their earlier visit to the state.

3.2 Policy Roundtable and Stakeholder Consultation

To analyse the current level of understanding of various stakeholders about the current status of agrimarketing sector, a policy Roundtable and stakeholder consultation was held in Patna. The objective of the policy Roundtables was to support the development of a State Agribusiness and Marketing Policy that will guide the development of the horticulture sector. During this policy Roundtable, a policy strategic planning process aimed at identifying the key elements of a policy statement was facilitated by the TA team and this was also further discussed in the subsequent phases of the TA during the various other stakeholder consultations and Workshops.

The policy Roundtable in Maharashtra was held on 12 July 2012 in Pune on the premises of the MACP and the policy Roundtable in Bihar was held in Patna on 18 July 2012 in the office of the Secretary Agriculture.

The strategic exercise undertaken by the participants was facilitated by the TA team with the aim of outlining the main features of a preliminary agribusiness and agrimarketing strategy for the horticultural sector in the state. The entire strategic exercise went through four stages:

i. Assessment of current situation
ii. Identification of a vision
iii. Identification of options to move from the current situation to the identified vision
iv. Formulation of preferred options (strategic paths) and road map

For each of the four stages, the process was facilitated by providing some background information and issues for discussion that were elaborated by participants and will be further developed during the course of the TA.

The various stakeholders present in this consultation programme included representatives of Agriculture department, representatives of COMFED, private traders, progressive farmers and private players.

A brief of the discussions undertaken during this stakeholder consultation programme is given below:

Discussion Points of Policy Roundtable

1. The Agricultural Roadmap provides a broad outline and approach to agrimarketing. It does not provide a detailed strategy which needs to be thoroughly worked out. For example, the agrimarketing strategy might include private sector initiatives, PPP initiatives, or cooperative initiatives such as COMFED.

2. The National Horticultural Mission also emphasizes the creation and upgradation of local mandis in rural areas which will help in the emergence of alternate marketing channels.

3. The richness of the state in horticultural sector provides a potential for expansion, however it is not clear whether fresh produce offers a large market potential. Instead, the state might become a hub for agro processing.

4. COMFED is not necessarily a good model of marketing of horticultural products. Rather than export fresh produce outside of the state, Bihar might want to specialize in exporting processed products. Most vegetable farmers are landless or marginally farmers

5. There is a need to promote primary as well as secondary processing centers for highly perishable and low shelf life agricultural products of Bihar such e.g. Litchi, Mango, and Vegetables etc.

6. In order to meet the requirements of raw material for agro processing industries, it is imperative to assure the varietal suitability of the crop and a long term approach on selection of varieties is desired. For example, even though mango quality in the state is good, the quality is not suitable for pulp and therefore does not lead to emergence of a processing industry. Similarly guava. Pineapple should be explored. Banana is very small and does not have shelf life.

7. Private markets are not remunerative. Dedicated efforts in terms of facilitation and funding are required from the State Government for increased involvement of private sector in investment related to agrimarketing.

8. Contract farming does not have a regulatory framework: in particular there is no mechanism for resolution of disputes between farmers and enterprises.

9. There is a need to deliberate up on the regulations desired for the proposed Agrimarketing channel e.g. the methodology for fees collection. It may be either of the following:

    i) Cess System

    ii) User fee model for the services provided

10. In creation of alternate marketing model to APMC, the following points must be considered:

i) Type of Regulation for the users : Cess systems or Usage based fee;

ii) User fee model on services provide;

iii) Enable the development of private markets with remunerative returns;

iv) Reduce the vulnerability of private market developers, generally happening through the changes policy in Agrimarketing ;

v) Development of regulation and redress mechanism for dispute settlement on the purchases of agri products from farmers;

vi) Which is the best model for Bihar? Can the Reliance model of purchase from farmers be replicated in other instances?

vii) Development/ Up gradation of Rural mandies /local markets;

viii) Suitability of Cooperative model in purchase of fruits and vegetables;

11. There is a need to upgrade the quality and bring in some certification programmes for quality of the Agricultural produce being marketed. For example honey production needs testing laboratories and standards.

12. There is a need to develop agrimarkets linked to the processing centers so as to mutually benefit the processor and the primary producers e.g. Soy crop development in and around the soy oil production unit in Kaimur, through Oil Palm Area Expansion (OPAE) scheme. In Bihar, under this scheme, eight districts have been identified.

13. Cluster approach for the development of relevant agricultural produce markets in and around the processing units would be a promising method.

14. In development of clusters the cooperative model of Safal/Sudha may be emulated.

15. The development of Primary Processing centre at the field level is desirable for better product quality to the processors. This indirectly will provide better price realization to the farmers also.

16. The discussion about vision for agrimarketing in the state emphasized the consistency with the Agricultural Roadmap while developing a specific statement for what agrimarketing system would look like in the state. Important elements of the vision would include:

- A well developed supporting agricultural Infrastructure to facilitate marketing
- An agrimarketing system that provides mutual benefits to producers and consumers

17. In such a vision farmers would undertake a more efficient and sustainable production that is oriented to meet consumers demand. Farmers would be facilitated in meeting consumers demand by improved and modern facilities for sorting, grading, and making produced ready for the market.

18. Both the private sector and the cooperative sector should be involved in the development of common service facilities for the development of markets. This will involve the development of storage facilities in conjugation with the processing industries so as to offer a win - win situation for both farmers and processors.

The different milestones that were indicated for achieving at the vision were:

i) Minimum of 20% produce must be processed

ii) Physical connectivity of producers through road, rail or air cargo

iii) Assured irrigation facility to all farming areas

iv) Inclusive and sustainable growth of agriculture

v) Development of skilled manpower

3.3 Capacity Building workshop on Value Chain Approach

A training workshop on Value Chain Approach was undertaken by International Agribusiness Expert, Mr. Francesco Goletti during November 1-3 at Patna. The course objectives were to provide technical expertise and skills in agricultural value chain analysis and development for the government staff in Department of Agriculture. The expected outcome was that participants and their organizations may deepen their understanding and improve their performance in up gradation of value chains in the project and programme context.

The workshop was based on a structured and interactive approach and the participants were involved in commodity specific group activities throughout the three days of this training workshop. The programme also focussed on issues and challenges of horticulture sector based on experience of Government officers from across the State. In addition, real life case studies from within the state, within the country and International successful examples were also discussed in detail during the various sessions. A progressive farmer from Muzaffarpur district who is actively involved in the organic vegetables cultivation and value chain development was also invited for this workshop to share his experiences of value chain upgradation in the State.

Overall, the workshop was well appreciated by all the participants and a positive feedback was provided by all the participants in fulfilment of objectives of this training workshop which were as follows:

- Enhance participants' expertise and skills in value chain analysis (VCA) and development approaches in:
- Value chain concepts, principles and applications
- Analysis and assessment of value chains, including value chain mapping, economic analysis, value-added calculation, and governance mapping
- Promoting linkages and facilitating value chain upgrade including through public private partnership (PPP)
- Monitoring and evaluating value chain development and sustainability

A detailed note on the objectives of this workshop, course material used, evaluation by the participants and proceedings of the workshop have already been shared with ADB and State Government.

In addition to the training material used in this programme, a study material on value chain approach and upgradation has been developed for study and use by the officials.

3.4 Workshop on Agrimarketing Strategy

The **Krishi Roadmap (Agricultural Roadmap) 2012-17** of Bihar has been rightly hailed as a landmark document in as much as it reflects upon the sincerity and positive intentions of the State Government for upliftment of agricultural sector. However, even in Agriculture Road Map, the alternative marketing structure was not discussed in detail. It has been generally discussed in the documents with an emphasis on multi-pronged approach with multiple agencies working for it e.g., Commodity interest Group, Farmer's Group etc. for capacity building and increasing bargaining power. Issues related to specific types of structures and institutions required to carry out various activities to meet the targets outlined in Roadmap, have largely remain undefined in the Roadmap.

It was in the above backdrop that Department of Agriculture; Government of Bihar assisted by TA team organized a one day workshop on Agri-Marketing Strategy. The workshop was inaugurated by Hon'ble Minister of Agriculture and Chaired by Advisor on Agriculture to Chief Minister. All the senior officials of the department were present in the meeting. The TA team provided necessary support and assistance to State Government in holding this workshop. There was representation from various stakeholders including various departments of State Government, TA team members as well as Private Sector players.

During this workshop and brainstorming session, discussions were held on various issues outlined by the Honourable Minister, Advisor on Agriculture and other department officials. The agenda of this workshop was focussed on alternative mechanisms for agriculture marketing in absence of APMCs, importance of Farmers' organizations in agrimarketing and role of Government in development of marketing infrastructure and establishment of suitable institutional mechanisms.

A detailed description of the various discussions held during this workshop has been documented as Minutes of the Meeting and has already been shared in the Interim Report. A list of emerging issues highlighted during the discussions which needs to be tackled in the agrimarketing strategy is given below:

1. There is an urgent need to focus on APMC markets. IL&FS Clusters has already prepared DPRs for 11 of these markets. EOIs for their refurbishment and renovation should be urgently put up.

2. There is huge gap in the existing and required agri-marketing infrastructure and there is enough scope for co-existence of APMCs and marketing infrastructures that are proposed to come up following the revised approval of AIDIP.

3. Concerted cluster wise efforts for promotion of crops/groups of crops, somewhat on the lines of Rubber Board or Coffee Board is desired to have positive impact on development of various crops in the state.

4. Monitoring and evaluation has to be the mainstay of agri-marketing development strategy.

5. Regular and ongoing capacity building programmes would be the key for sustaining the proposed agri-marketing strategy.

6. Group formation has to be the desired strategy to have wider coverage of small and marginal farmers.

7. However, to make them sustainable it is imperative to link them with value chains.

8. Market Intelligence is must for developing sound decision support system.

9. An Apex Level Decision Making and Policy Implementation body in the state is must to carry forward the ideas of agri-marketing strategy.

10. This body can subsequently decide about the district, block and village level institutional structures for supporting the proposed agri-marketing policy.

3.5 Policy Roundtable for Finalising Agri-Marketing Policy

A half day orientation and discussion meeting was held on February 21, 2013 at Patna. The meeting was an outcome of both a request from the Project Director PMU, Mr. Ajay Yadav as well as suggestion by the visiting Consultant Dr. Francesco Golletti. Dr. Gollettti proposed to organize a roundtable discussion on the draft Review and Key Elements of Agrimarketing Policy prepared by him as part of TA Program. The meeting apart from the members of the PMU and the Project Director was also attended by some key officials of agriculture department from some of the select districts who were called by the Project Director.

The major objective of the meeting was to present the findings of the review of agricultural marketing policy and the key ideas of agricultural marketing policy to the PMU and related agencies, so as to elicit feedback and improve the formulation of the new agricultural marketing policy.

In order to facilitate the discussion, the consultant also provided capacity building inputs on some key concept of agricultural marketing and value chain development and lessons derived from projects and case studies in India and other countries.

The orientation was originally the idea of Project Director, PMU who felt that since the PMU is new in existence, majority of the members would require some orientation before they can react to different aspects of Draft Policy paper.

The positives and negatives of the repeal of APMC Act were discussed and it was understood that the development of alternate market in horticultural produce require an all-round support in form of investment climate, regulatory frameworks and benefits to the value chain members.

The Agricultural Road Map of GoB was critically analyzed to know that it stresses upon creation of market infrastructure by private intervention whereas the fringe activities of market development including capacity building is to be undertaken by government. The requirements of capacity building, well planned promotion strategy, monitoring & evaluation, proper use of subsidy, scaling up and aggregation of marketing efforts and

introduction of PPP in market infrastructure for success of the ambitious Road Map was well appreciated by the group.

While discussing on the Key elements of the new Agri marketing policy the group was made aware on a clear vision for introducing clarity to the policy and bring in proper monitoring & evaluation mechanism.

The need to infuse competitiveness amongst the different districts was impressed upon with the requirement of creation of a Competitiveness Index on various parameters.

The creation of Bihar Agricultural marketing Development Fund with focused approach on holistic development of Agri marketing in Bihar was discussed. In the series of discussions on Value Chain Development, the group zeroed on creation of a Value Chain Development Mechanism where all Value Chain (VC)stake holders need to be included and forge a Commercial Agricultural Alliance at different strata of operation.

The role of market information and market intelligence in fostering market development was highly appreciated by the group and an integration of Research Extension and Education was also felt as a means to this end.

The concept of launching Extension Coupons for providing need based extension services from the desired service provider was well introduced to the team.

The Project director impressed upon the point that development of Ag- marketing infrastructure is very important in wake of the increasing Agricultural production envisaged in the Agricultural Road map.

The group reached on common conclusions on requirement of capacity building of the different stake holders in value chain so that the whole value chain may work for maximizing mutual benefits.

It was well understood by the group that along with the idea of creation of marketing linkages for the horticultural production of the state, it was equally important to establish organized backward linkages.

Creation of PPC (Primary Production Centers) at identified suitable pockets may be initiated as the first step towards establishment of backward linkages. These PPCs may be further linked forward to markets.

The production of horticultural crops must be driven by market demands and a federation of growers with the support of GoB may be created for the better sustainability and success of such federations.

The emerging benefits to the farmers from such associations must be clearly stated so that they associate properly and remain there for long.

The District Horticulture Officer (DHO), Nalanda informed that around 300 Groups of farmers have been formed into Federation in his district but Groups require support in operations and management. The Groups also need market orientation for realising better prices for the farmers.

The DHO Sasaram drove in the idea of providing proper training to stake holders of the value chain so that the farmers may appreciate the total emerging benefits to the whole VC by increasing the mutual benefits.

The DHO Vaishali, said that litchi in his district is a crop with very high price volatility and variations across the value chain. The farmer gets a price of Rs. 25/kg whereas the consumers end up paying Rs.80/kg or more. The farmers do not get proper price and the consumers end up paying exorbitant price without any value addition in quality. A Value Added facility with storage may be very useful as it may increase the crop holding capacity of the farmers and insulate them from distress sales. There has been no adequate packaging and processing efforts in this regard and more such interventions are welcome.

It was also pointed out that in case of honey, the farmers are unable to create groups of their own and the traders/middlemen are getting most of the money at the cost of farmers. . At a time, when COMFED entered in honey procurement from these farmers the middlemen increased their rate of purchase and subsequently ousted COMFED from market. As on today, the farmers are getting throw away prices from the middle men and

the consumers end up paying very high prices. Resurrecting the supply chain is a desired activity to benefit the whole chain of stake holders.

It was also mentioned that Namdhari Seeds tried to purchase litchi at the farmer's level at Vaishali but the farmers presented manipulated stock of the product, leading to mistrust between the two and finally the links broke down. Hence, it is equally important to educate the farmers on crop standards and quality specifications along with forging of forward linkages.

The entire group agreed on a creation of Innovation fund for supporting, nurturing and dissemination upcoming innovations in the value chain development.

The group further agreed on the need to incorporate the discussed points as a part of the proposed Agri marketing Policy in Bihar.

3.6 Orientation of PMU on Market Intelligence and Communication

With the arrival of Market Intelligence Expert in TA Program in early March a one day orientation of members of PMU was undertaken on March 13 in the concepts of Market Intelligence. The team of Communication Expert in TA Program arrived the very next day and interacted with the PMU on the importance of communication tools and their importance with the PMU on March 15.

Field Survey

4. Field Survey

4.1 Planning and Design of Field Survey

4.1.1 Survey Background

As per the ToR of the TA assignment, a sector stakeholder survey was undertaken to understand the current agrimarketing and communication status. The survey design and detailed ToR for survey were finalized in consultation with ADB and State Government. After finalizing the ToR for the sector stakeholder survey, an agency "APAAR Sansthan" was shortlisted to undertake this survey. The survey work started from the month of October after getting due approval from ADB. The sector stakeholder survey was aimed at getting details of existing marketing linkages for selected horticultural produce, procurement mechanisms for these produces, farmer groups and Community Institutions engaged in such activities, quality and food safety standards related to these produces, State Government support mechanisms and their accessibility, Communication status and issues related to marketing of horticultural produce. The survey agency was also mandated to make some selected case studies related to successful/unsuccessful models of marketing linkages for horticultural produce.

4.1.2 Survey Objectives

The objectives of the sector stakeholder survey were:

I. To understand the present dispensation of farmers engaged in horticulture products – marginal, small, medium & large

II. To ascertain the role of different stakeholders – farmer groups, traders/ processers market operators and infrastructure providers.

III. To work out volume, value and seasonality of each crop, their marketing routes, linkages etc.

IV. The value addition measures adopted by stakeholders and

V. The prevailing communication network for information dissemination and its accessibility to various stakeholders.

4.1.3 Geographical Area and Focus Crops

The districts selected for the survey included: Patna, Nalanda, Gaya, Bhojpur, Buxar Vaishali, Muzaffarpur, Darbhanga, Samastipur and Begusarai. In each district 2 Blocks and in each Block two Panchayats were covered. Thus in all, the survey covered 11 districts, 22 Blocks and 44 Gram Panchayats. The selection of focus produce and identification of blocks and districts were done in consultation with District Agriculture Officer, District Horticulture Officer and Project Director, ATMA. The selection of Blocks was done on the basis of intensive cultivation of horticulture produce in the district. Among the vegetables the crops which were identified for detailed study included: Potato, onion, tomato, Brinjal, Okra, pointed gourd, Bitter gourd. The selected fruit crops for the survey included: Mango, Litchi, Banana, Guava, & Makhana.

4.1.4 Scope of Work

As per the scope of work of survey, the survey was intended to collect data and collate information about following major aspects mainly through primary sources:

A. Present Marketing Systems and Issues

B. Procurement Mechanism

C. Farmers' Groups and Community Institutions

D. Quality Standards

E. Government Support

F. Communication Status and

G. Scope for value addition

H. Selected case studies

4.1.5 Linkages among the Stakeholders

As the linkages among the stakeholders are key factors both in the existing agribusiness framework and in the proposed integrated value chains, it was tried to captures as much information as possible on various kinds of existing linkages amongst different actors of horticulture value chains. Broadly, following aspects of stakeholder linkages were captured in the sector stakeholder survey:

A. The category of farmers' bodies engaged in farming of the focused produce.

B. The linkages of the farming community with local, wholesale, and intermediary traders.

C. Roles of infrastructure support providers in marketing of focused produce, and

D. Kind of linkages, networking for information dissemination, marketing of produce and other support services provided by various government agencies.

4.1.6 Orientation of Survey Teams

The two-day orientation of the survey team was undertaken in Muzaffarpur at the start of the survey. The selection of venue was made on the basis of the following consideration:

I. Centre for one of the two proposed Integrated Value Chains (IVC) under AIDIP

II. It is known for intensive cultivation of most of the focused horticulture produce, and

III. Officers posted in the line departments had fairly good knowledge about TA programme of ADB.

The orientation session began with a brief introduction of all the participants, explaining the objectives of the project and scope of work for the study. In-between the district level officials provided their inputs and helped in identifying two blocks having cluster of horticulture produce for the pilot survey work.

Thereafter, the structured questionnaire for four stakeholders – farmers, traders, infrastructure providers and marketing and policy makers - was shared and explained in detail to the survey team. The survey team was briefed about deliverables expected from the field study. The orientation session concluded with the finalization of schedule for pilot scoping of structured questionnaire.

Figure 1: Vegetable Farmers in Minapur Block interacting with traders from different places

The participation of key officers including District Agriculture Officer, Project Director, ATMA, SMS, Minapur & Bochahan and the kind of suggestions and support extended by these officials made the orientation and subsequent pilot scoping exercise quite productive. Apart from the core study team of APAAR Sansthan, IL&FS programme team also extended valuable inputs during the orientation sessions.

Figure 2: Heaps of fresh vegetables kept in Minapur

Following day the pilot scoping exercise was carried out in Minapur and Sakara Blocks where intensive cultivation of both Litchi and vegetables like Brinjal, Okra and pointed gourds is undertaken.

The team interacted with individual farmers, farmers' group, local traders, transporters, and market operators. Later in the evening, there was sharing of experience among the survey team members and the core team members of APAAR Sansthan and IL&FS programme team. This entire exercise helped the survey team in better understanding of the scope of work.

The survey team subsequently proceeded with the study of allotted districts. On their part, the core team members of APAAR Sansthan and IL&FS programme team visited the selected districts in advance to have focused group discussion with district level officers and other stakeholders on agri-marketing related issues. The team members solicited the views of participating stakeholders on integrated value chain for well regulated agribusiness.

4.1.7 The Survey Strategy

The strategy to conduct survey largely consisted of sequencing the interaction with the stakeholders. At the outset, the survey team met the district level officers, got identified the focused fruits and vegetable produce in the district and the blocks having concentration of the same. The district level officers also supported the survey team for interactions and inputs from Block level functionaries who in turn provided necessary support to the survey team in interacting with farmers, local traders and local hat/collection centre operators.

Figure 3: Surveyors interacting with group of Farmers

After their interaction with the district officers, the survey team proceeded to the designated Blocks, got in touch with Block level functionaries and taking their support and help interacted with the following stakeholders.

i) Farmers – farmers' group – PACs
ii) Local Traders – wholesale traders – intermediaries – Retailers
iii) Local hat, collection centres, wholesale markets
iv) Infrastructure support providers like transporters, cold storage owners, market yard, etc.

4.2 Final Findings of Field Survey

4.2.1 Main Features of the Survey Area

The eleven districts selected for the survey were located on either side of the Ganges: Vaishali, Muzaffarpur, Samastipur, Darbhanga, and Begusarai on the northern side and Buxar, Bhojpur, Rohtas, Gaya, Patna, and Nalanda on its southern side. These eleven districts constitute the major fruits and vegetables growing belt in Bihar.

For fruits, out of 11 districts surveyed, 7 districts had mango producing major belts, 4 districts had litchi producing belts, 5 districts had banana belts and 7 districts had guava belts. For vegetables, out of 11 districts, 7 districts had major potato producing belts, 9 had onion producing belts, 9 had tomato producing belts, 8 had cauliflower belts and cabbage producing belts, 7 brinjal producing belts, and 8 pointed and bitter gourd producing belts. Share of potato produced in the 11 districts of the total production of potato in Bihar is 41.75 percent. Similarly, for onion it is 42.02 percent, for tomato it is 42.90 percent, 43.45 percent for cauliflower, 42.30 percent for cabbage, 47.25 percent for brinjal, 41.27 percent for okra, 39 percent for pointed gourd, and 40 percent for bitter gourd respectively. Among the fruit crops, the total production of different fruit crops in eleven districts as percentage of the total production for a particular fruit crop in the state is 46.2 percent for Mango, 48.7 percent for Guava, 44.33 percent for Litchi, 45.87 percent for Banana, and 43 percent for Makhana respectively.

Figure 4: Dilapidated Condition of APMC Market in Biharsharif (Nalanda)

4.2.2 General Profile of the Stakeholders

Among all farmers, 73 percent of the farmers were marginal and small farmers, 21 percent were medium farmers, and 6 percent were large farmers. Marginal and small farmers being resource scarce tended to work in the field with all their family members. This helped them in saving on labour cost, on the one hand and wastage, on the other, because of the care and attention they brought into play while working in the field. This practice of associating family members and friends continued in selling their produce as well. Almost 83 percent of small and marginal farmers tended to sell their produce on their own or trusted their friendly farmers to take their produce to the collection centers for selling.

The small and marginal farmers are hesitant to join any group unless they see farmers of their category reaping benefits. Otherwise, their association with any group is limited to getting fertilizers etc. on subsidized rates, Kisan Credit Card from banks, Crop insurance etc. In matter of selling their produce almost all of them (around 83 percent) preferred to be on their own. The small and marginal farmers as compared to the medium and large farmers did not feel shy in taking on the mantle of local traders and sell their produce in local markets. This helped them in getting retail price for their produce. This mantle they normally took on during

early season when the price in the retail market was high and quantity of produce was small enough to carry to the market on their own.

For the pricing of their produce they largely depend upon the fellow farmers and information they got in bits and pieces on their mobiles. It is always the end season of harvesting that poses problems for the small and marginal farmers when the quantity of produce is huge and the prices are low. The cost of transportation and hired labour further add to their problems. It is at this stage that the marginal and small farmers suffer from all sorts of handicaps: scarcity of resources, lack of information and contact, and the disadvantages of being on their own.

As compared to the marginal and small farmers, the medium and large farmers, who mostly are engaged in fruit production, which has a far better shelf life than vegetables, are positioned better in many ways: resource–wise, information wise, networking in market wise and availing of government support in the form of schemes and subsidized supplies.

But like the marginal and small farmers, medium and large farmers also tend to be on their own and averse to group formation unless it helps them in reaping some extra benefits. In matter of selling their produce, the medium and large farmers took resort to hundi (60 percent), bulk (26 percent) and staggered (14 percent) selling. While hundi selling (Selling entire crop in advance) helped them in getting return in one go (50 percent in advance and the rest 50 percent after the selling of the produce), it also saved them from bothering about wastage, labour cost, transportation cost and worries about vagaries of prices. In bulk selling they got all their money in one go, had the opportunity to negotiate and if armed with market information and alternative buyers, were somewhat in a position to dictate prices. This helped them in saving on transportation cost and botheration to find market. In staggered selling the advantages reaped were generally twofold: selling the produce at a price prevalent at the time and second, taking advantage of infrastructure facility like cold storage and selling when the prices were at their best.

The local traders of vegetables were many faced entities. They provided various resources to small and marginal farmers, including market information, help in negotiating with wholesalers and support in taking their produce to market by paying transportation cost etc. In doing all these, the local traders tended to exploit the marginal and small farmers. On the face of it, they did not charge any commission from the farmers for helping them to sell their produce. But they always got pricing fixed in favour of wholesalers from whom they get their commission. That way whether at the farm level or at the collection centre level, the local traders befriended the marginal and small farmers to exploit them without making them feel the pinch of it.

In the case of fruits, the local traders were basically retailers in the local market. It is wholesale dealers, who mostly coming from places outside the state like Kolkata, Kanpur, and Luckhnow, did the hundi purchase of the whole orchard at the flowering stage or the bulk purchasing of the fruits from orchards itself.

Among the infrastructure providers, 72 percent were transporters and 28 percent were cold storage and warehouse providers. The vehicles used from farm to market were tempo, tractor, and truck, though from market to market as well as from market to processors was mostly trucks were used. They largely worked for the traders and less for the farmers. Among the markets covered, 58 percent were private ones and the remaining 42 percent consisted of local hats, collection centers and erstwhile APMC marketing yards largely used by private operators. The market operators had sympathies with farmers but remained neutral as they benefited from the traders who paid commission to them.

Figure 5: A Farmer carrying Okra to local mandi

4.2.3 Existing Features of Marketing Strategy of Major Focused Crops

Among the horticulture produce, vegetables & fruits have different patterns of marketing which are largely based on three segments of the harvesting season – early, middle, and end.

For vegetable growers, the early harvesting season is the most profitable season during which most of small and marginal farmers themselves sell their produce in the retail market at a premium price. Around 63 percent of the vegetable growers revealed that they could pay rental for the leased farmland out of the sale proceed of the early season itself. The sale proceed during the mid- season helped the farmers in recovering their cost etc. It was the end season, during which 60 percent to 65 percent of their produce remained in field, that posed immense marketing problems depending mostly on the perishability of the produce. For example, in case of tomato the problems of all hues and dimensions were there due to the fact that with the onset of summer tomatoes ripened very fast and, therefore, had to be plucked and marketed quickly. The problem in marketing of tomato during the end season is doubly difficult for the farmers. On the one hand, due to sudden onrush of supplies the prices are at its rock – bottom and, on the other, the fear of tomato getting overripe forces farmers to hire labour and transportation means to reach the market at the earliest. Sometimes the prices in the market sink so low that farmers, in fear of paying transportation cost from their own pocket, abandoned their produce in the market yard and stealthily hastened to their homes.

For fruit orchard owners the pattern of marketing is somewhat different. As 60 percent of orchard owners sold their produce in hundi, they remained untouched by problems of selling their produce. Those 26 percent who sold their produce in bulk also remained free from fear of losing market. It was only those 14 percent farmers, mostly of medium category, who had to care about price as well as catching the market in time.

In case of Litchi, which has a season spanning from 25 to 30 days only and which require delicate handling and packaging, the marketing had to be timed and transported in a planned manner. In fact, due to haste involved, like tomato among vegetables, litchi among fruits put the agri–business strategy to test.

Cultivation of potato and onion due to their storability stood more or less usurped by medium and large farmers. Out of potato and onion growing farmers interviewed, only 23 percent were marginal and small farmers. It was understandably so because both potato and onion required resources to store and supply to distant destinations where better prices prevailed. And this involved considerable transportation cost. 41 percent of the potato and onion-growing farmers interviewed chose auction route, 18 percent through wholesale buyers and 41 percent through local traders for selling their produce. Those who chose local traders were mostly medium, small and marginal farmers and those who chose auction route were mostly large farmers. The payment terms were part cash in advance and balance on delivery. None of the growers had any kind of support from government agencies in marketing of their produce. And only 35 percent of them were members of any farmers club or Primary Agriculture Credit Society (PACS) and that too to avail subsidy on fertilizer etc. and to get Kisan Credit Card.

Of the tomato growing farmers interviewed, around 35 percent sold their produce through auction. 50 percent of the farmers came to know about the price through local traders, through whom they sold their produce, and 15 percent through the wholesale dealers. The payment terms were in part cash on delivery and rest after produce was sold. The advances taken were adjusted against the payments made after the sale proceeds. 57 percent of the farmers interviewed were members of one

group or another but that was purely to get seeds, fertilizers, and pesticides at subsidized rates and to avail the facilities like Kisan Credit Card. 42 percent of the farmers used mobile phone to know about the price, rest of the 58 percent entirely depended upon local traders or co–farmers for getting information about prevailing price. Awareness about the prevailing price range, however, was always there among 70 percent of the farmers. In selling their produce no government support at any level was made available to farmers.

Of the cauliflower-growing farmers interviewed, 93 percent were marginal and small farmers and all of them directly sold their produce in the retail market through local traders. 35 percent of the farmers came to know about the price through the local traders, co–farmers and commission agents and the rest 65 percent through auction in the market. Wastage in cauliflower was huge ranging from 35 percent to 45 percent. The payment was part cash on delivery and balance after the produce was sold. 31 percent of the farmers were members of one Kisan Club or another. Only 7 percent of the farmers used mobile phone for knowing the price in the market. Rest of them depended upon the information disseminated through club, local traders/commission agents.

Of all the brinjal-growing farmers interviewed only 17 percent of them were medium and large farmers. 13 percent of the farmers sold their produce to commission agents and the rest at the collection centers to the wholesale farmers. 58 percent of them sold through auction at the collection centers; 36 percent through local traders/commission agents and rest 6 percent to wholesale traders at the farm level. The wastage in brinjal ranges to as high as from 35 percent to 45 percent. 17 percent farmers used mobile phone to know about the price from the wholesale market itself. Rest of them depended upon the local traders/commission agents to know the price. 39 percent of the farmers were members of farmers club but in matter of selling their produce they tended to be on their own. Only 15 percent of the farmers said that they get support from government but only in the form of training and orientation and supply of farm inputs at subsidized rates.

The acreage of plantation of mango ranged from 3 acres to 55 acres in the survey area. Interestingly, 19 percent of those owning less than 10 acres size of orchards, chose to export their produce, whereas the rest of them and specially the entire large orchard owning farmers chose to cater to the consumer market through wholesale buyers. The sale proceed was 99 percent through auction which included hundi selling at the flowering stage itself (43 percent) and wholesale of the orchard at the time of plucking (36 percent) and staggered bulk selling through local traders and commission agents (21 percent). Around 19 percent of these also catered the export market through outside the state exporters. The wastage of the produce from flowering to fruition stage was as high as 40 percent. The payment term was invariably in cash: 50 percent advance in cash of on farm purchase and 50 percent after sale. In case of hundi 50 percent was paid by way of advance and balance amount in a phased manner as per the terms of negotiations. 34 percent of the orchard owners mostly having less than 10 acre of orchard were members of farmers' club in order to avail the benefits of getting fertilizers and pesticides at subsidized rates. 38 percent of the farmers had their own network in commodity specific wholesale markets and participated in auction through the network. It gave them the advantage of selling at the best price prevailing. The source of information about price they normally got from their contacts among the local traders/commission agents and wholesale dealers.

In Litchi, 61 percent of the farmers mostly owners of more than 10 acres of orchards dealt with wholesale buyers. 19 percent of the farmers were engaged in export business. Only 20 percent dealt with commission agents/local traders. Like mango orchard owners, litchi farmers also preferred hundi selling at the flowering stage itself and selling the produce through auction. The wastage in litchi was on an average as high as 40 percent. 19 percent of the farmers got advance payment on the basis of a negotiated price. Rest of them got payment on supply basis. 17 percent of the litchi farmers were members of one farmers group/club or another. Rest 83 percent preferred to be on their own. In spite of the Litchi Research Centre being there in Muzaffarpur, none of the farmers interviewed had availed any assistance from the research centre. Around 80 percent of the growers had availed

the facility of Kisan Credit Card. Apart from this none of them availed any support from the government agencies. Around 30 percent of the litchi growers got communication about price direct from the market, around 19 percent from the farmers club of which they were members and the rest 51 percent got the information about price through the local traders/commission agents.

Of all the banana growers, 66 percent dealt with wholesale market and 34 percent with export market, which also included sending outside the state. 50 percent of the banana growers sold their produce through auction; only 17 percent sold their produce directly in the retail market. The wastage during farming was 5 percent to 10 percent, during loading, unloading, and transportation 3 percent to 5 percent. Terms of payment varied from 50 percent cash in advance and balance after selling of the produce. None of the banana growers interviewed was members of any farmers club or group. None of them received any support from the government agencies. The communication about price they received was mostly from the market.

Of all the guava-growing farmers interacted, 45 percent were small farmers. The cropping acreages ranged from 2 acre to 10 acre. The official thrust on promoting guava plantation had encouraged even small farmers to go for the same. The plantation ranged from 2 acre to 16 acre of land. The markets the farmers catered to were local (36 percent) and wholesale (54 percent). Instances of contract farming were noticed in isolated instances among the guava growers. The selling was done through auction (27 percent), local traders (36 percent), and wholesale buyers (18 percent). The wastage during flowering and fructification was as high as 50 percent due to various factors. The payment term was usually 50 percent in cash on supplies and the balance after the sales proceed was complete. Only 27 percent of the farmers were members of club/groups and none of them availed any support from the government agencies. Only 27 percent of them availed Kisan Credit Card facility. They knew about the prevailing price in the market from co–farmers/ local traders (73 percent) from market/commission agents (27 percent).

The marketing of Makhana is entirely dependent on wholesale buyers who control the product from cultivation to processing as well as trading. Due to complex production process the wastage in the Makhana is as high as 50 percent. Of late Makhana Research Institute located in Darbhanga seems to have made useful contribution both in the area of cultivation as well as processing. However, in spite of Makhana being geographical location based produce its marketing remained in the hands of market operators outside the state like Kanpur, Lucknow, and Delhi. The price was auction driven and the market operated through a network of location-based traders and on credit lines passing from market operators down to retailers.

4.2.4 Main Features of Agri-Marketing Structure in the Survey Area

4.2.4.1 Erstwhile APMC and Emergence of Un-organized Local Markets

After the repeal of APMC Act both farmers and market operators made marketing of horticulture produce a matter of their own convenience and in the process each suffered in absence of a regulatory authority. Between the two, farmers suffered most. A host of private market yards and collection centers cropped up along with a new breed of middlemen, commission agents, aggregators, and local traders. For instance, in Patna district, in spite of Masallampur (Patna) erstwhile APMC yard being there although ill – maintained, similar market yards came up in Mithapur, Antaghat, Digha and Maner which indicate that farmers preferred selling their produce at a location convenient to them as well as to the retailers. What was true of Masallampur APMC yard in Patna was also applicable to all other erstwhile APMC yards at the district headquarters level. They are mostly ill – maintained having no basic infrastructural facilities in terms of sale price display boards, warehouse or cold storage, refreshment units or farm inputs center. However, in spite of being in disarray, these APMC Market yards still remain trading centers for fruits. Supplies from places like Nagpur, Nasik, Rajasthan, Himachal, J&K come here for local traders from all over

the state to do bulk purchasing. Fruits like Mango and Litchi from local farmers came here for onward supplies to markets outside the state.

4.2.4.2 Main Features of Existing Market Structure

1. Apart from APMC market yards there were local hats/markets at Gram Panchayat (Village) level and Collection Centers at the Block level areas where horticulture produce from neighbouring areas are brought. Traders from within and outside the districts thronged these places as they get produce at comparatively cheaper prices.

2. Both fruits and vegetable are marketed at the erstwhile APMC yards. In private market yards, however, only vegetables are marketed. In APMC market fruits from all over and outside the state come to be marketed. But in private markets vegetables from only neighbouring areas come. In case of potato and onion the arrivals were from within the state as well as from outside the state.

3. Out of total traders interacted with, 55 percent were local traders, 17 percent were commission agents, 24 percent were wholesale traders, and 4 percent were exporters.

4. Different components that determined the Cost structures in the market on an average were:

Labour Charges	Transportation	Commission Charges	Market Cess	Wastage(Harvesting to Marketing)
2percent to 3 percent	3percent to 5 percent	5 percent to 6 percent	2 percent to 3 percent	5percent to 10 percent

5. Handling loss and labour issues are major problems affecting the fruit and vegetable marketing.

6. The price discovery mechanism for the vegetable growers and fruit orchard owners differed widely. Among the vegetable growers those farming potato and onion had different routes than those growing tomato, brinjal, cauliflower, etc. Fruit orchard owners had their network in the commodity specific market, for example, for litchi in Lucknow, for mango in Delhi, and for makhana in Kanpur. It is these markets where supplies were sent and auction done. The floor price was largely arrived at by biddings conducted by the market operators and done by buyers of networking centres. It is purely supply and demand driven in which farming community had little say, specifically, those from Bihar who preferred to keep a low profile and suffered due to lack of aggressive marketing mind-set.

7. There was no officially or privately organized price dissemination mechanism in the study area. It was all individual initiative based, even in the case of large farmers groups. It was all based on mobile (34 percent), radio & newspapers (26 percent) and personal interaction with co farmers, local traders, commission agents (40 percent).

8. Irrespective of the process of sale proceeds, that is, hundi, wholesale, etc. and the marketing channel through local traders or sale at the collection centers, the transactions were always cash based. Even in the case of commodity specific market outside the state, it is electronically transferred in the farmers' bank account etc. However, it is the term of payment and timeliness, which gets worse down the line to the marginal and small farmers who like others get 50 percent of the sale proceed immediately. It is the other 50 percent, which in the case of marginal and small farmers get staggered on various counts – adjustment against cash-credit – 56 percent, farm inputs – 31 percent, take it as and when

required – 17 percent. There is no assured line of credit (except the Kisan Credit Card) for the marginal and small farmers in Bihar.

9. There were traders' associations at the district level in the study area and they were affiliated to the state level association. There were commodity specific associations of traders also. These associations looked after the interests of the traders. Their roles were more or less crisis driven rather than creative relationship driven. They had three-pronged relationship to maintain firstly, with farmers; secondly, with infrastructure support providers, and thirdly, with markets. Among these three, they cared for relationship with the market operators only. There were farmers' group and clubs in the survey area and PACS in every Gram Panchayat. Around 22 percent of farmers interacted with were members of one group or club and 17 percent of them of PACS. But they were there (around 90 percent) to get farm inputs at subsidized rates. Beyond that the members of the groups including those of PACS preferred to be on their own, so far as marketing of their produce was concerned.

10. Although some APMC yards had all the facilities - warehouse, cold storage, covered shed, road and power but after the repealing of APMC Act, they were not functional anywhere excepting cold storage in Patna APMC. In the Private Markets, but for the covered shed for selling and warehouse and a semblance of road, no other facilities were available. In the vicinity of the market, however, there were facilities of cold storage and warehouses, which were availed, by traders and wholesalers.

11. The supply of various horticulture produce from the survey area to different market was as follows:

    - 70 percent of Tomato to Gorakhpur and Kanpur
    - 50 percent Litchi to Lucknow, Mumbai, Delhi

- 60 percent Makhana to Kanpur
- 30 percent Potato to West Bengal & Odisha

12. The evacuation of horticulture produce from farm to market was done with tempo, tractor, and truck; from collection center to market and from market to processing centers by truck. In Darbhanga, Madhubani, Katihar, and Purnea some makhana is processed in-house. These processing units are Shakti Sudha, Paras Mangu, and others. The cost of evacuation normally ranged from Rs. 25 to Rs. 80 which varied from produce to produce.

Table 5: Modes of Evacuation and Costs

Produce	Transportation to other bordering States	Transportation Cost to other Cities	Transportation Cost to Local Markets within 10 KM
Mango	Rs. 500-800 per quintal	Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Litchi	Rs. 500-800 per quintal		
Banana			Rs. 25-30 per quintal
Guava		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Makhana	Rs. 800 per quintal		
Potato	Rs. 500-800 per		Rs. 25-30 per quintal

	quintal		
Tomato		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Cauliflower		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Cabbage		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Brinjal		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal
Chilli		Rs. 80/- per 40 KM, per quintal	Rs. 25-30 per quintal

13. After harvesting, farmers did sorting and grading at the farm level itself (90 percent). There was no facility for waxing in the survey area. Except tomato, all other produce were packed in gunny bags or baskets. In case of fruits, however, packing in cardboard or wooden box was done at the orchard itself. In case of litchi in some cases it was also observed that thermocole packing was used. In case of both vegetables and fruits, sorting, grading, and loading for transportation was done in quick succession. So there was no lapse of time. In spite of this, losses during this process amounted to the tune of 15 to 20 percent.

14. Marketing Channels:

    i. Directly to Consumer at Rural Haat – 48 percent

    ii. Fellow Farmers – 84 percent

    iii. Aggregator at Farm – 5 percent

    iv. Commission Agent in Mandi/APMC - 4.5 percent

v. Contract Farming Company/Institution – None

vi. Exporter - 2.7 percent

vii. Processing Company; Litchi and Makhana – None

viii. Direct Export – 3 percent

The marketing channels adopted by Vegetable farmers varied from season to season –

Table 6: Marketing Channels adopted during different seasons

	Early Season	Mid Season	End Season
Vegetables	Direct to consumer at Rural Hat/Township Market	Fellow Farmers Aggregation at Farm, Local Traders, Collection Centres	Commission Agents, Wholesale Buyers
Fruits	i) in case of hundi buyers they handle the produce ii) in case of wholesale buyers of orchard again they decide. iii) in case of staggered selling the farmers sold their produce in markets where they got best price. It was largely done through local traders and market operators. iv) There was no direct export of fruits from the survey area		

15. Communication Status

Usually farmers had their own contacts with local/wholesale traders and contacts in the market with whom they regularly interacted over mobile phone. They also got price or commodity related specific information from their co- farmers in-group meetings. However, in rural areas any piece of information spread like wild fire. And if there was any confidentiality about it, it was more or less an open secret. There was no government/non government institution primarily responsible for information dissemination regarding agricultural marketing. Regarding government schemes, the government officials normally talked of it during visit to have group meetings with farmers.

4.2.5. Way Forward for Institutional Development of Value Chain Approach to Agri-business in BIHAR

The study provided an outline of modes of communication and information asymmetry in the context of value chain approach to agri-business in Bihar. There is absence of any organised system and mechanism of communication and information dissemination either from government, non-government or privately organized entity that provides inputs on agri-marketing, auction related information, real time price, Minimum Support Price (MSP), overview of buyers & market players etc. The study identifies the small and marginal farmers to be main sufferers of these lacunae. On the contrary, the study also identified some of the active farmers' clubs who have gained due to strong network and communication with market players which has been established with their own initiatives. These groups maintain regular communication linkages to monitor prevailing market prices, assess quantum of demand, decide on periodicity of supply chain, etc. The farmers plan out harvest as per the demand in various markets and thereby manages to get the best price in all the phases of harvest- early, mid and end season.

Consequently, the study proposes that if farmers are to be relieved and comforted from the uncertainty, a strong information, communication and outreach system

need to be in place. Some of the major highlights of the study findings in the regard are:

1. Setting up a communication and information dissemination hub for market promotion to be located within the department (district and block office) but exclusively managed by active farmers groups and federations under the supervision and guidance of concerned DHO (District Horticulture Officer) and BHO (Block Horticulture Officer). This will be an effective platform to assimilate, update and disseminate critical information whenever required.

2. This communication system will be linked to a centralised portal system which will connect with kiosks, radio, TV, SMSs etc so that the farmers can update on real-time information.

3. This facility will provide all agri business related information from all over the country and abroad and monitor price paying market on daily basis.

4. The potential buyers and market players from India may also place their orders or enquiry so that there is a level playing ground and the farmer can contact immediately to negotiate on the quantity, schedule and price points.

5. Under the existing government scheme each PACS located at Gram Panchayat level there is a provision for setting up a Warehouse, Communication Center and Micro–Finance facility centre. Besides this under the Central Government Scheme there is a provision for Vasudha Kendra in each Gram Panchayat. All these schemes and provisions can be mobilized to set-up on common communication and information hub to host all necessary information at Panchayat level on government schemes related to health, education, agriculture etc.

6. The Vasudha Kendras at Gram Panchyayat level will also be linked with the district and block level Communication hubs so that the famers can connect whenever they want if they do not wish to visit Block.

7. To manage the Communication and Dissemination hubs, it is proposed to have one District Communication Officer responsible to assimilate, monitor and update real time information on day to day basis on various issues related to agriculture and horticulture.

8. Under him there will be Block Field Officers who will be functioning not on salaries but incentives, which s/he earns from the farmers group. If s/he is unable to provide necessary and timely information service, the farmers groups can decide among themselves to replace him with someone more responsive and effective.

9. The process has to be carefully facilitated and monitored and prior to this the guidelines and key functions need to be articulated well.

10. Both at Block or Panchayat the farmers group/clubs registered with the communication system will have to pay a nominal amount as registration fees to access some of the paid and free services.

11. The government can subsidize some of the services for small and marginal farmers.

12. The existing free SMS-based system known as "Fasal" that connects farmers with buyers and provides them with real-time price information in some of the states in India needs a closer look and replicated in Bihar as well.

13. The study in view of the land holding pattern in the state and preponderance of small and marginal farmers advocates for formation of strong and active farmers groups as a way forward for agricultural development in general and agri-marketing strategy in particular.

14. Finally, the study suggests for continuous and on-going training and capacity building programmes at various levels to sustain the momentum.

Figure 6: Interaction with Farmers Group in Muzaffarpur

Communication & Information Dissemination

5. Communication & Information Dissemination

An effective communication channel is key to success of any development programme more so in the case of agricultural development in which multiple diversified stake holders are involved. Farmer is the key audience in agriculture and the challenge in dissemination of knowledge and information is how efficiently the flow of information is channelized. Besides the farmers there are various other stake holders including the extension machinery, the research institutes, universities, input suppliers, media etc involved in the agricultural development and an effective communication channel connecting all stake holders therefore is a challenge. Communication is a two way process which necessitates participatory approaches to be adopted. An efficient communication strategy designed specifically for target audiences is therefore critical to success of various development programmes envisaged under the state agricultural policy. While the traditional extension system is perhaps the most effective one as Transfer of Technology (ToT) is mostly interpersonal, it cannot meet the challenges posed in the value chain due to the fact that ratio of the extension officers to farmers is widening and the challenges posed in the production system is more complex due to technology fatigue, climate change etc warranting a closer interface with Scientists and researchers. A communication strategy equipped to provide customised decision support to the farmers for targeted yield, quality and market needs to be put in place which calls for increased use of ICT enabling to minimise human interface. It may also consider enhancing the reach and penetration of communication in a participatory mode which calls for a group approach particularly targeting the resource poor and marginal farmers.

Bihar offers tremendous scope for improving productivity and there is a need to bridge the wide variations in productivity observed across a range of crops within the state itself before trying to catch up with best in the country if not in the world. Unlike many other states Bihar is endowed with favourable natural resources, optimum utilisation of which can result in quantum jump in yields. This can be achieved through only reaching out to the masses and the first step towards this is equipping the extension machinery in the state, the change agents, to be armed with knowledge and information. A well defined channel of communication for the Agriculture Department of the State therefore is of paramount

importance besides linking the extension machinery to the scientists and researchers. The TA therefore proposes to provide a well defined road map for a communication strategy encompassing all key stakeholders.

5.1 Background

While the state has made rapid strides and improved its socio-economic indicators over the last 7-8 years, the state remains one of the most under-developed states of the country. Though there have been considerable improvements in recent times, nevertheless, there is immense scope of further improvement and progress especially in the rural context. The literacy rate in Bihar remains low with less than 60 percent of the total population returning literate according to the Census of India figures of 2011. With rural literacy rate being still lower the scope of printed material to be used for dissemination and communication remains limited. The most potent medium for dissemination in rural areas remain the All India Radio and the recent services of many private operators through FM channels. This overall socio-economic condition of the state has a definite bearing on the prevailing communication structure and information base. Just to substantiate this point if telephone/mobile density and internet density figures are any indication of the status of communication structure, Bihar appears to be badly placed. Though the most latest figure with regard to number of mobile connections in the state of all the service providers put together has been quoted as 50 million (figure gathered by Manager, DoT Patna), however, the figure does not tells us about the actual number of mobile users in the state.

Information collected from various secondary sources, on the other hand suggests that Bihar has the lowest telephone (fixed/wire line) density (0.47) in India. It is around one-fifth of national average. If we compare it with Delhi, it is around 30 times less. However, Bihar fares much better in wireless/mobile density, but it is still lower than national average. The wireless density in Bihar is 46.70 against national average of 74.15. The total teledensity (telephone/mobile) in Bihar is 47.16 against the national average of 76.86. The teledensity in Bihar is better than Assam only and is one-fifth of the Delhi (highest teledensity of 235.54). The other comparison shows that Bihar fares well in the urban sector and betters many states in the urban teledensity. However, as far as rural teledensity is concerned it is way behind. However, there have been some important shifts that we

have come across in recent times. Even though in the earlier period in the rural sector, farmers mostly used mobile for social interaction and less for business purpose. However, of late as has come out in our recent surveys that mobile is increasingly being used by farmers as well as different layers of traders in agricultural products for getting mandi (market) and seed prices. Sharing of weather information is also helping them in protecting their crops against harsh weather.

As far as Internet density is concerned, the state figures badly here as well. As per March 31, 2011, there were only 87,103 broadband subscribers in Bihar which is just 0.73% of the total broadband subscribers in the country. However, from our present point of view the one positive aspect is that Bihar is better than national average if we compare the percentage of village panchayats having broadband. Bihar has around 50% of panchayat with broadband. Bharat Nirman-II targets covering 100 per cent of the panchayats in the country with Broadband by the end of 2012.

5.2 Existing Communication Channels

These figures have been brought in here to reflect upon the feasibility and access of some of the strategies that are already in use both by the department of agriculture as well as other stakeholders.

5.2.1 IFFCO Kisan Sanchar Kendra

In recent times a farmer's call centre has been opened in the state. This centre known as **IFFCO Kisan Sanchar Kendra** is operational now and is stationed in Agricultural Research Centre of Department of Agriculture, State Government. This is a toll free number and works from 6 A.M. from 10 P.M. The centre receives calls from all the areas in the state on issues related to problems at the farm level faced by the farmers. Agricultural Scientists, in shifts take calls from the farmers and in cases of some problems that these scientists are not able to answer they are collated and taken to some senior scientist who then resolves them and farmers are subsequently contacted with solutions of their problems. As we can see that this call centre is accessible to all the farmers with mobile facility, though does not include in its purview people who are not covered by telephones and mobiles. In

the absence of FIGs or any type of Farmers Groups, information disseminated through individual phone calls cannot be expected to percolate to all the sections.

The IFFCO Kisan Sanchar Kendra, however, is one of the most recent services started by the department of agriculture, wherein, a dedicated wing of Bihar Agricultural Management & Extension Training Institute, Patna (**BAMETI**) & its district level units Agricultural Technology Management Agency (**ATMA**) have been engaged in extending communication and extension facilities to the farmers. ATMA is the premier wing of the Department of Agriculture that organizes training and exposure visits for the farmers. There are regular programmes, organized by ATMA in all the districts like **Meet the Scientist** in which farmers are brought face to face with the agricultural scientists from KVKs and Agricultural Universities.

5.2.2 Kisan Salahkar and Kisan Pathshala

With induction of **Subject Matter Specialist** at sub-block level and ***Kisan Salahkar*** (literally meaning Advisor to the Farmers) at panchayat level (village level self-governance institutions), the outreach of the extension service has tremendously increased in recent years and marks strengthening of extension service in the state. These services are extremely important in the sphere of seed management, optimum mix of chemical fertilizers for different crops, adaptability to new cropping patterns and introduction of new and efficient varieties of existing crops. The State Government in recent years has taken initiative to make farming more productive and make agriculture a rewarding rural occupation. It has taken pains to transfer knowledge treasures of the agricultural institutions to farmers to enhance their level of production. Farmer's training through **Farmers Field Schools** (Kisan Pathsala) has gained prominence in recent times.

5.2.3 Developmental Camps

A series of '**Krishi Vikash Shivir**' (agricultural development camps), programme for interaction between agricultural scientists and farmers, is providing a platform for knowledge and technology-transfer.

The camps are organized at each Panchayat all over the state. *Kisan Melas* (Farmer's Fair) are organized every month at the district level. These fairs expose the traditional cultivators in the village to the new world of technologies being introduced in farming besides, providing an interface with different development schemes. One of the major initiatives in this regard is to arrange for **Minikit** distributions at the Panchayat or village level. These Minikit programmes cover a number of crops, grown in kharif, rabi and zaid seasons and contain details of different stages of production for the concerned crops. The recent beginning of **Rabi** and **Kharif Mahotasava** are further additions to the repertoire of demonstration, interaction and outreach forums. During these Mahotasava's with focus on the main crops of the concerned agricultural season, demonstration of tools and implements are organized, incentives are provided to the farmers on the purchase of the agri-machinery, minikits distribution of different crops are done, meet the scientist events are organized and at the end of the Mahotasava an open discussion with farmers of all the line departments officials of the Agriculture Department takes place. Wherein officials come face to face with problems of farmers and efforts are made for resolving them.

5.2.4 Publications

In addition, there is also a quarterly publication (ATMA SANDESH) by the department for technical knowledge and case studies of prosperous farmers from within the State. This publication is available online also through department's website. This publication is also available at the district level ATMA and is also distributed to farmers. Although, this is a very positive initiative by the department, there is a need to market this publication amongst the targeted stakeholders including various department officials. It has been observed during various interactions that many a times, stakeholders are not aware about the information available in this publication.

It appears from the above mention initiatives of the State Government, that there are enough number of events and channels through which the agriculture department tries to connect with the farmers. The feedback from the farmers that has come to us from our recent surveys also makes a positive reflection on the events organized by the department.

The issue it seems is not only the medium, channel and modes of communication but rather the content or packages of practices that are prepared for dissemination and sharing with the farmers. The State Government and the department of agriculture have in the recent times rightly taken pride with figures of world record production in paddy and potato in some of the districts. It seems much effort has been spent at the farm level and it is the post harvest practices that remain an area of concern. The on- farm initiatives taken by the government like promotion of organic farming, cultivation of mushroom, flowers, medicinal plants, have helped in opening new vistas for the farmers. But, as they are not adequately aligned to market or supported by market promotion the initiatives have caused more frustration among the farmers than contentment. Adding packages on information on aspects like, "What is value-chain?, Ways of integration of different groups, areas and clusters to such chain and similar other issues" will go a long way in making the various communication forums presently being utilized by the department really meaningful.

5.3 Communication Strategy

Any communication strategy would need to factor in the ground realities in terms of socio-economic indicators such as literacy level, availability of telecommunication facilities etc. in order to be effective. The communication strategy needs to focus both on channel of communication and the content to be delivered. These two are the most important factors of any communication strategy and if any of these two factors is ignored, the overall effectiveness of the strategy reduces considerably. Often it has been observed while modern tools of communication are being used increasingly across various sectors for speedy and wider delivery, the content part gets overlooked. In addition to these two, the third important aspect is institutional capacity for delivery of knowledge and information which would require a lot of attention in Bihar to not only organize farmers into effective communication targets but also to build the capacities of State Government officials. Although, a lot of efforts and money is put into agricultural communication by the Government every year, the efficiency and efficacy of the methods used by the Government departments is questionable most of the times. Hence, there is a strong need to evolve a strategy with a clear vision and make it a part of the overall agricultural policy in order to make it more effective.

5.3.1 Major Challenges

The major challenges currently faced for the agricultural communication and information dissemination, which needs to be taken care of in the proposed communication strategy, include:

1. Limited capacity of district and state level government officials in terms of delivery of the communication. In addition, there is absence of any assessment mechanism to understand the gaps in the capabilities of various individuals involved in the communication dissemination.
2. ATMA is currently the last leg of information flow initiated through the department of Agriculture. However, the content of information disseminated by ATMA does not have enough checks and balances to verify the authenticity and applicability of the information disseminated
3. Due to lower literacy rates, the written information in the form of leaflets, pamphlets or mobile sms's is of no use to majority of the farmers. Hence, a

more holistic approach is required reach out to masses. This approach should be based on other tools which can be utilized by even illiterate farmers

4. It is important to manage the quality of information flow across the hierarchy without any communication gap while transferring information to farmers through 3-4 levels of information hierarchy started from research institutions
5. In the absence of Farmer Groups, PACSs and other kinds of Farmer Organizations in the hierarchical flow of information, it is not possible to disseminate quality information to illiterate masses. Thus managing the quality of information disseminated is another major concern which needs to be tackled.
6. All India Radio and Television have been used continuously over the last 30-40 years for disseminating agricultural knowledge and information. However, the controls on type of information disseminated through these sources have not been very effective in the past. Mostly, very generic information is communicated which does not generate much interest amongst the farmers. Further, it needs to be assessed further that what % of time farmers spent on these mediums and the timings and duration of agricultural programmes need to be planned accordingly.
7. Absence of any dedicated and continuous mechanism for dissemination of information related to service providers such as input supply and crop insurance services. In addition, the availability of credit from various categories of financial institutions and banks is also communicated mainly through the individual marketing initiatives of the specific credit or service providers. Farmers don't have any tool or system wherein a comparative analysis of various service providers is possible.

5.3.2 Proposed Strategic Interventions

In the above background, the strategy being suggested has considered both the challenges of socio-economic status of the target population and the existing communication channels. In this context, it is attempted here to chalk out a detailed communication plan for the state of Bihar based on the following strategic inputs:

1. **Intra Departmental Interventions:** As already discussed, delivery of knowledge and information require a lot of attention in Bihar to not only organize farmers into effective communication targets but also to build the capacities of State Government officials. While care has been taken to study the existing channels of communication on the basis of discussions with various stakeholders, however, any communication plan need to have a comprehensive assessment of the existing status. This aspect of communication is so critical that it require a much more comprehensive exercise including a detailed capacity need assessment. Hence, the State Government my need to undertake a detailed capacity need assessment for all categories of functionaries within the State Agriculture Department. On the basis of this capacity need assessment, detailed capacity building interventions across various levels of the department should be planned. This capacity building should include both technical training as well as training for use of latest technology and multi-media based platforms of communication.

   Further, representation of women extension officers across the ATMA's and at the state level should also be assessed and efforts should be made to increase the no. of women extension specialists across the state. This is important in Bihar's context since during the months of migration, women members of the household undertake all the agricultural activities. At such times, it is important to involve women producers in the communication hierarchy and the availability of women extension officers would help to involve women producers in various communication activities.

2. **Importance of Farmer Organizations in increasing Reach:** In order to increase the overall reach of the agricultural knowledge and information, it is important to make Farmer Organizations as the main touch points for the information dissemination. Instead of individual farmers, the Farmer Organizations should be the last leg of hierarchical flow of information dissemination in order to reach out to rural masses. It may need to be

appreciated that considering the population of the state, it would not be possible to reach all the individual farmers by any communication strategy. This further increases the significance of farmer organizations which can act as a funnel for disseminating the useful information. These Organizations might act as Farmer Information Centres with provision of various ICT enabled tools including Internet and mobile connection at the specified locations of these organizations. Further, the kind of tools to be used should include a mix of traditional as well as ICT based methods with a stress on graphical and visual description in traditional tools and multi-media based ICT enabled tools which are visually more appealing to the targeted groups. Further, some specific applications based tools might be developed for 3-4 major perishable commodities of the state with the specific inputs from subject matter specialists.

Currently, the no. of commodity specific and area specific farmer organizations is limited in the state. State Government may promote commodity specific farmer organizations through BAMS as already being successfully done in Maharashtra through MSAMB. In Bihar, Litchi, Mango and Banana might be the commodities to start with due to a larger area covered under these commodities. The commodity specific farmer organizations could be the nodal agencies for the launch of communication strategy in order to increase the overall efficiency of the communication.

Existing Farmer organizations like PACSs and NABARD promoted farmer groups could be the starting point for this approach. Similarly the existing SHGs could also be targeted at the start for this purpose.

3. **Quality of Information and Content:** The content for information dissemination initiated through the State Agricultural Department should undergo considerable checks before it is passed on to every next level of information hierarchy. Currently, the information is collected through various sources such as Agricultural University, Research Institutions and in certain cases NGOs such as PRADAN. The information collected from

State agricultural Universities and KVKs is collected and to an extent collated by the dedicated wing of Agriculture department i.e. Bihar Agricultural Management & Extension Training Institute, Patna (**BAMETI**). Information collected from NGOs etc. is first verified through the Agricultural Universities before dissemination by BAMETI to district level ATMAs. However, there is no Administrative Monitoring Mechanism to verify that the content of information reaching the farmer is up to the mark as initiated by the researchers.

Although there is an Agricultural Information Centre at the State Department level, it's primarily function is passing on information to the district level.

In order to manage the flow of information as per the original content originated by the researchers, a mechanism for administrative monitoring needs to be established at the State Department Level. This could be in the form of a Farmer Information Monitoring Bureau as a separate wing of the department or a part of the Agricultural Information Centre. Alternatively, there could be provisions for an authorized technological service provider who can provide the required checks and balances at every level.

Further, for information dissemination through FM radio and Doordarshan at the state level, a quarterly meeting is conducted in the State Department to plan for the content to be delivered in the next quarter. This should also come under the purview of administrative monitoring for frequent checks and balances to maintain the quality of information delivered through FM and television. Further, the frequency of such meeting should also be more than the quarterly interval.

4. **Medium of Information**: In the recent years, the State Agriculture Department has started using FM radio for agricultural communication. Due to increasing popularity of FM radio, this could be a technology enabler and can be more actively and effectively used by the Agriculture Department. It could be an effective tool in entire rural areas and also very

remote areas for timely information dissemination and also as a warning mechanisms especially in case of floods which is a frequent phenomena in certain areas of Bihar. In addition to this, the agriculture department can also promote community radio as a forum for empowerment of the rural community

As already discussed, the state department plans for the content to be delivered through Doordarshan every quarter. Further, the department has also developed some video documentaries which are screened by the ATMAs at the village level during various meetings and programmes. There is a need to further upscale the development of crop specific and topic specific documentaries which could be delivered through ATMAs or Doordarshan in a planned and regular manner. Ideally, these documentaries and films should be in the vernacular language and should be based on local case studies.

Further, a dedicated space and time should be blocked in advance for TV, FM and print media for information dissemination through these sources in a periodic manner. This, however, should be planned in a careful manner after analysis of time and duration devoted by the farmers to these media.

As already mentioned, there is a quarterly publication (ATMA SANDESH) by the department for technical knowledge and case studies of prosperous farmers from within the State and many a times various stakeholders are not aware about the information available in this publication. Here Farmer Organizations might play a crucial role in disseminating the information published in this quarterly magazine to the targeted end point of the information hierarchy.

5. **Market Related Information:** With the repeal of APMC act, there is no direct source of price related information for market intelligence and decision making at the farmer's level. While the department would not be

interested in revisiting the APMC's like institutions or mechanisms for price information, there should be a proper mechanism at the state level for timely collection of price and related information and further dissemination to the information flow without much time lag.

For this to happen, under the existing Agricultural Information Centre a separate cell might be established for collection and dissemination of price related information. An officer from the department might act as authorized person for collection of price related information at the district level major markets. The information collected by these authorized representatives might be collected at the state level, could be collated and a weighted average of price would be calculated for dissemination to the information network. As it would not be feasible to collect and monitor this information from all the markets, there could be a monitoring system wherein the information collected by the authorized representatives could be cross checked from 5-7 major markets periodically.

6. **Mobile platform for Market Information and other services:** For dissemination of market related information, mobile based sms services could be an important tool. Although due to lower literacy rate, it is difficult to disseminate technical information through mobile based sms or application platforms, the price related information might be successfully disseminated without any time lag through mobile based sms or applications. In addition, the role of farmer organization would also assume further significance to reach out to illiterate masses for dissemination of this kind of information. Further, with the intervention of farmer organizations, mobile based application could be developed for use by farmer organization to communicate system-driven and crop-specific decision support systems. Further, this could also prove a technology enabler for disaster management and warnings.

In addition, mobile based applications to be used by Farmer Organizations might also be developed for a comparative analysis of various service providers and to disseminate detailed information about various products available in the market such as Seeds, Fertilizers, Crop Insurance, Credit provision, farm equipments etc. For information collection and collation, various service providers might be roped in as this would provide them indirect marketing of their products and services.

7. **Role of organized retail players and other private players:** The corporates have started taking interest in agricultural extension activities during the recent years. Some of the organized retail players and service providers have already entered into agricultural extension and communication sector through their own funding without any direct involvement of agriculture departments. Two such examples are ITC's e-chaupal and Jain Irrigation's extension activities.

   Further PPP in agricultural communication is an untouched subject. State Government might explore partnering with these kinds of corporates for PPP based extension activities. These kinds of initiatives might be further promoted by State Government through part funding through various government funds and also through linkage of these extension agencies with research organizations and marketing information. This would not only start and alternate system of agricultural communication but would also aid in improving efficiency of the government system through synergic interventions of both the channels. Under RKVY, an important programme PPPAID has been launched where corporate can get funding upto 50% of the project cost in case the programme covers agriculture based farmer oriented interventions.

   Further, with the advent of FDI and organized retail, the numerous retail players would have to manage their supply chain continuously in order to maintain quality and quantity of the produce in their stores. In such a

scenario, PPP based agriculture extension activities would be preferred by these players and would assume greater significance.

8. **E-commerce:** Another important aspect for linkages and information dissemination would be the online business mainly for organized retail players. State Government might plan linking various farmer organizations with producers directly through online e-commerce portal of its own. This kind of portal might also have the required technical information including quality and certification related information especially for export of commodities and also demand driven decision support system for farmers wherein farmers undertake the production on the basis of specific requirement of buyers/consumers in terms of quality, quantity and other certification related aspects.

   In addition to the above, such portal might also link various major markets across the state with the future trading portals. This would ensure involvement of more no. of players' in future trading market of agricultural commodities and it would not be possible for few large players to hijack such future trading.

9. **Individual/Group Communication:** It is important to decide on the individual or group communication depending upon the needs of the stakeholders at each of the hierarchical levels. This choice further assumes greater significance at the producers' level in order to make the communication more effective and without any communication gap.

   At the last leg of information dissemination to the producers, both one to one as well as group communication is important. In case of large horticultural farmers, one to one interactions of horticulture specialists and extension officers would be required whereas in case of small and marginal farmers involved in field crops cultivation, group communication through group meetings, through farmer organizations and through radio &

television would be required. This would also depend upon the literacy level of the farmers as already explained in the earlier section.

At the level of the extension officers, group meetings with the district departments for the discussions on overall strategy and goals for the area would be more important than the one to one meetings. However, in case of area specific problems or needs of the extension officers, one to one meetings of these extension officers with subject matter specialists would be required.

10. **Communication timing:** The right time of communication for specific information is another important criteria which needs to be taken care of while planning the yearly communication activities and budgeting. Broadly, in respect of crop specific information, the timing of dissemination could be :

    a) Production
    b) Post Harvest
    c) Marketing

    All the three timings are important from the stakeholder point of view as lack of information at any of these three stages might result in loss of revenue to the farmer. It is also important to disseminate the time specific information for particular activities to be undertaken at that time. E.g. A marketing related information would not be much important at the production period. The importance of such information would assume higher importance at the time of Post Harvest Management. Further, at the actual marketing of the commodity, this information would be of lesser important as the producer would not be in a position to withhold the produce due to perishability of lack of storage space. Hence, a careful annual planning would be required to finalize the time of information dissemination on a specific topic.

On the basis of the above discussed strategic considerations, a pictorial representation of the Farmer oriented strategy is also depicted in the next diagrammatic representation. In addition, a draft communication hierarchy has also been depicted explained in the following section.

Figure 7: Communication Strategy framework targeted at Farmer Organizations

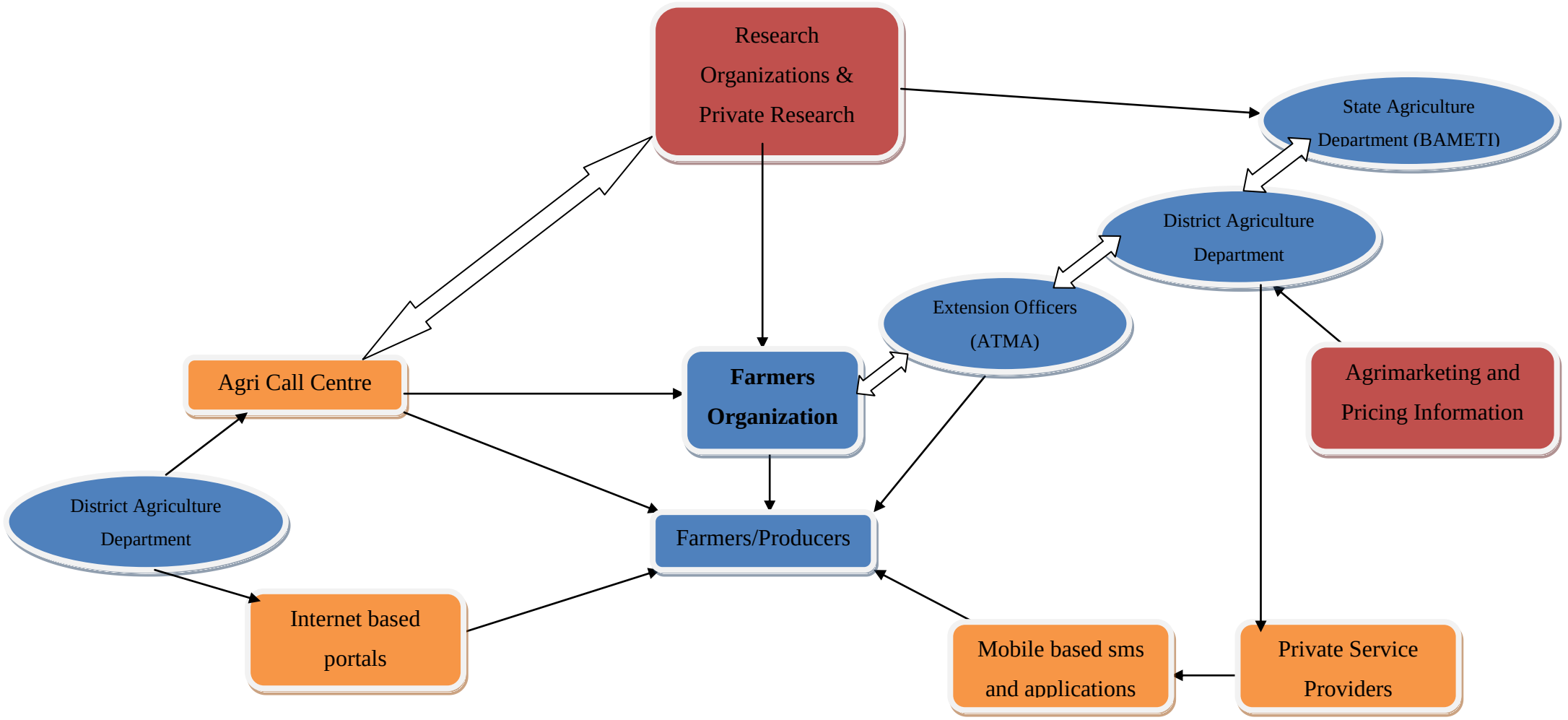
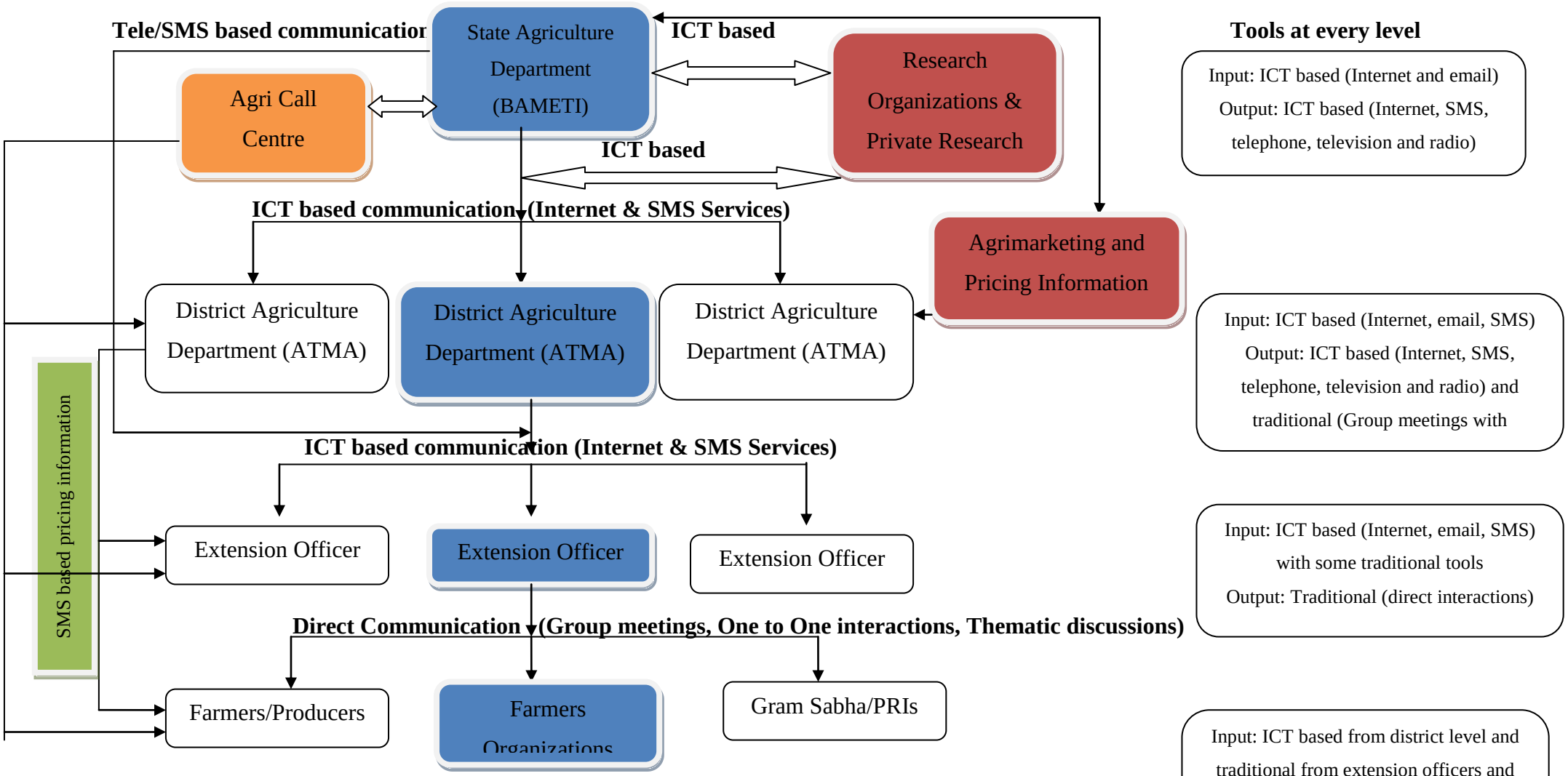


Figure 8: Proposed Information Hierarchy



11. Hierarchy of Information flow

a) **Farmer Level:** Producers/Farmers Organizations would be the main target of the entire communication flow. Although, the communication dissemination to other stakeholder such as traders, processors, exporters and input suppliers would also be a part of the overall communication strategy, the focus would be the income improvement of the producers.

The farmer is the last leg of the hierarchical information flow; hence, there are chances of increase in communication gap while information is disseminated from research institutions to farmers through 3-4 intermediaries. Hence, it is advised to adopt direct communication tools initiated from the top to tackle the issue of communication gap. Considering this, mainly traditional tools such as leaflets, pamphlets, air transmission and sms services initiated at the top level have been suggested at this level.

b) **Extension Officers:** These are the most important intermediaries in the communication hierarchy as these officers would be in direct contact of the farmers and hence would be the most influential disseminators in the entire hierarchy. The information available with the extension officers should be regular, timely and correct in the local context. There should be periodic meetings of the extension officers with the district department officials and various subject experts from research institutions. In addition, they should also be involved in continuous and seasonal exposure trainings in order to equip them with the up to date information about the region specific commodities and other aspects of the value chain in the global context.

c) **District Extension Department and ATMAs:** This level serves as the most important link for the collection of information from various information providers. The dissemination from this hierarchical level should be both direct as well as through the extension officers. The sms services for various stakeholders should also be initiated from the district level. The tele call centre currently run at the state level should have divisions at the district

level in due course of time depending upon its usability and popularity amongst various stakeholders.

Overall, the major responsibility of this hierarchical level is the collection and dissemination within the district, managing direct as well as indirect contact points with producers and other stakeholders, managing the market intelligence and pricing information flow across various stakeholders, providing information regarding export linkages and other marketing related information. The success of the entire communication efforts would depend upon the coordination provided at the district department and hence an appropriate cell for communication monitoring might be established within the agriculture department in each district. This would provide the necessary focussed approach to this particular aspect within the department.

d) **State Extension Department:** The State department mainly play the strategic role of overseeing and managing the entire communication network. At the top of the information hierarchy, the state department should also work for international linkages for bulk export and operating the farmer call centre. In addition, the state department should also ensure coordination of the district level departments with various research organizations and timely provision of market related information for market intelligence and pricing decisions.

5.4 Various gaps in the communication process / information flow

Based on the observations made above, and the information collected from various stakeholders, various gaps in the communication process / information flow have been identified.

i. The Government has brought in a structure and hierarchy within the department and appointed various officers at the Taluka/Mandal and Village levels with the sole aim of working towards the betterment of farmers. They also have set up a system of Communication across various levels and functions to ensure that the flow of exchange happens in a structured manner. However what needs to be taken care of are the various distortions that happen at various levels while information is being exchanged. There needs to be accountability at all levels to ensure that the information reaches the target audience.

ii. Associations like ATMA and BAMETI take up a lot of initiatives that provide a strong support system to farmers and farmer groups. These associations need to be given more empowerment in order to help them function smoothly without too much interference. Institutionalizing farmer groups and networking them with these institutions will help them operate more effectively. Once these institutions are empowered there will be a sense of responsibility in delivering quality service

iii. Most of the farmers also felt that the schemes and initiatives taken up by the Government were not always relevant and did not address the core issue or problems faced by the farmers. Here again the onus of responsibility lies with the Krishi Sevak who needs to be more pro active and involved with the farmers so that the underlying issues can be communicated back to the Directorate. Backward integration of information is not effective. This calls for a need to strengthen system for information exchange.

iv. The government has set up various initiatives through which all officers are trained on the new technology and innovations. However the general perception among farmers is that these officers are not well informed and have outdated information. This belief has led to entire network of farmers refraining from seeking any help

from these officers. The farmers don't seem to want to approach any of these officers for assistance or seek any information from them.

v. There also seems disconnect in the awareness about the government assistance among the farmers. Big producers or resource rich growers seem to be more aware of the officers than the small growers. The information reaches only to a select few farmers within the village. Krishi Sevaks seem to be target centered rather than people centered

vi. There is also a general fear and negative perception about schemes and benefits offered by the government based on past experience. Farmers are not ready to risk their crops in the process of experimenting with new technology. Higher awareness and education of the technology among farmers need to be undertaken. This calls for a need to build capacity of the personnel and the system that does the transfer of information. The above few conclusions links back to the Communication for Behavioural Impact (COMBI) approach which was revalidated during final stage of field visit. This stresses on the fact that there is a need to change in behaviour and attitude among the personnel in charge for disseminating information

vii. Best practices in the agri business are not collected and shared with stakeholders. Most of the best practices spread only among personal networks through sharing on an informal basis. This shows the need for information hub and also a need for backward integration of information.

viii. While on paper, a lot has been achieved there seems to be a disconnect between the various strategies implemented by the Government. Though a lot of the schemes, initiatives are for the benefit of the stakeholders, the stakeholders themselves are not aware or don't seem to want to avail any information or benefit. Especially in a State like Bihar, there needs to be more attention given to content of information that is being disseminated across levels. Just distributing brochures or setting up kiosks will not answer queries. More robust methods of communication are needed that will focus on what, when, where, who and how of the information being disseminated?

ix. There is grossly inadequate availability of data which can help processors get information pertaining to harvesting schedules of crops and prices in the market. They depend on their own network for all source of information. There is no Communication channel built between all the stakeholders. This creates an imbalance in the demand and supply for the available crops and in turn affect price. This also results in processors looking for produce outside the state even though the same is available in a nearby village. It reduces the demand of crop for the farmer and increases cost of procurement for the processor. This can be curbed if there is a network established between producers and processors using the cluster approach to create interdependency.

x. Since no formal network of communication channels exist between the government and processors, it hinders the flow of information both ways. There is absolutely no backward integration of information in the sense of understanding the needs of the processors before designing any new agriculture related initiatives. The network between Government and the processors needs immediate attention as this can ease a lot of demand supply issues and in turn design schemes that can assist the farmer improve his efficiency in production. If there is a network for information exchange, the cube Model of communication can be implemented. This helps answer questions like where, how and with whom to begin the communication strategy? What communication strategy to used\ and when?

On the whole, there seems to be a need to establish a comprehensive system of communication that will help build a network between the Government / Farmers / Processors so as to make the exchange of information more robust and effective. There is currently a gap between the demand and supply of information among stakeholders.

5.5 Recommendations for strengthening Communication Process

Various Opportunities and potentials were identified during the course of the study. Based on those, a few recommendations have been suggested for strengthening the Communication process between various stakeholders in such a way as to make it mutually beneficial.

(1) Institutional strategy for diffusion of information through Cluster Approach

The cluster concept focuses on the linkages and interdependencies among stakeholders in the value chain for production, innovation and marketing of goods and services. Clusters can be characterized as economic networks of strongly interdependent stakeholders in a value adding production chain.

The Bihar Government has currently created various Co-operative Societies that are created and governed by farmers. Organisations like ATMA have taken up various initiatives through which they provide assistance and technical support to farmers which is well received by the farmer community. The need of the hour is to spread awareness of the benefits that can be obtained through such associations and spread the same among all farmer groups. Another important requirement is the need to include processors/exporters as part of these associations as then it will complete the network at the Meso level and ensure smooth functioning of these societies. The cluster approaches in the Agri Business sector can bring in a lot of value add for all stakeholders involved in the chain.

The methodologies involved in creating clusters are:

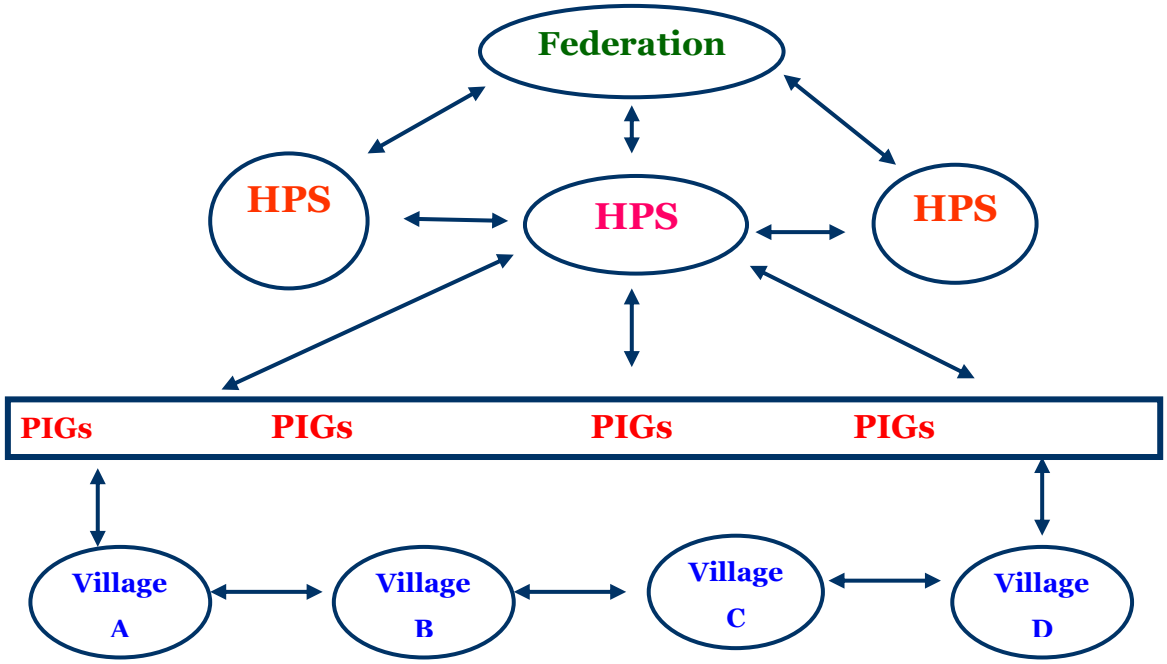
a. Grouping of farmers based on their land holding, type of crop grown, background etc at the village level. Each group can consist of a maximum number to ensure effective operations. These groups come together to form associations that sustain on their own network. They form Producers Interest Group (PIG) that supports each other to sustain and improve production efficiency.

b. Various such PIGs at the village level come together to form societies. These societies partner with other stakeholders in the value chain to form a network that is mutually beneficial. This kind of network helps the flow of information between various

stakeholders and this in turn helps increase efficiency in planning and designing schemes for both production and marketing.

c. These societies are then governed by a board set up by the Government. This will help monitor the operations of the clusters and ensure that there is long term sustainability for such Organizations.

The statement indicated as points a, b, c illustrate the process and conceptual understanding of cluster approach which is illustrated in fig shown below



Conceptual Model of Cluster Approach

It becomes important to build a system of pull strategy rather than the push strategy. The village has progressive farmers and they are aware of what is their need. In such cases the institutionalization of such groups will lead to them demanding for information rather than accepting whatever comes their way. Empowering such groups will help increase their need to be accountable and responsible to their members and hence will ensure that the right kind of information reaches them.

Some of the key features in institutionalizing farmer groups and clustering them are:

• Develop a sense of interdependency among farmers to help each other and adopt new innovations with ease and sense of trust

• Develop management and entrepreneurial capacities in farmer's organisations

• Develop farmer organisations as vehicles to improve farmer access to inputs and outputs, always in response to farmer initiatives.

• Contribute to capacity building of the entire system by learning from one another and keeping the information flow open

• Strengthen systems in a way that there is an effective exchange of information among stakeholders that results in a well coordinated system functioning as one.

• Promote relationships between farmers and processors so that there is a balance in demand and supply not just in quantity but also quality and variety of crop produced. This will result in optimization of the requirement cycle.

(2) Build ICT - Strengthen Content and methodology for Effective Communication

To build an Information and Communication Technology System (ICT), various factors have to be considered. In today's age, most stakeholders are technology savvy and don't hesitate in using the latest available technology to their advantage. In such a situation, it is only practical to make use of Technology to build a robust Communication System. This is the need of the hour as it can help penetrate information to a wide section of stakeholders and build a complete network around them.

In the State of Bihar, ICT needs to focus more on content and the medium used to deliver information. Majority population of farmers are illiterate or do not have access to technology. In such cases, identifying the right medium becomes critical. Also due to the nature and social background of the farmer community, what gets communicated becomes very important. For ex: Designing and distributing brochures and leaflets may not help disseminate all the information as the region may have farmers who can't read. Even with

farmers who are literate, demonstration based communication is what will help achieve efficiency in communication.

It is of primary importance that the information being communicated is relevant, clear, concise, consistent and correct. These factors along with the right medium of communication will go a long way in ensuring that communication is effective and will have a lasting impression on the receiver.

Some of the factors that need to be considered in designing a communication strategy using ICT are

• Source Factors

• Medium Factors

• Message Factors

• Receiver Factors

Sourcing of information relevant to stakeholders should be developed by a group of Subject Matter specialists (SMS), consisting of scientist of the concerned subject from the university, representative from DOA, Marketing board, ATMA, APMC and IT may develop seasonal and felt need based message on quarterly basis and diffuse the same through appropriate channels.

The above package of information developed by SMS has to be diffused through Block level representative to Producer society of the Horticulture community.

(3) Capacity Building of the Personnel

Throughout the study, it was noted that the main source of information from the Government to any of the stakeholders is person dependant and its effectiveness is directly proportional to the efficiency of the officer who is communicating the information. Adopting the Cluster Approach is about strengthening the system, but what needs to be paid attention to next is the person who is involved in building and sustaining the information flow within the system.

Most farmers depend on the private company sales agents and Agricultural Service centers for information pertaining to production. There is an element of mistrust among the farmers regarding information coming from the agricultural assistant. There is also a feeling that most Agriculture Assistants are not sensitive to the needs of the farmer. They are more target centric than person centric.

Some of the key components in building capacity are

Train the trainers – Develop master trainers who can then pass on the information effectively to other concerned stakeholders. The extension Officers are the face of the Government. It is with them that the onus of responsibility lies to ensure that information is integrated forward to the stakeholders and backward to the Department of Agriculture. The fundamental effort should be towards making the extension officers become facilitators in the process of obtaining information rather than become vehicles for delivery of messages in a top-down approach

Some of steps to be taken for capacity building are

• Develop training centers for Extension Officers in specialised areas and keep them up to date on the new innovations and technologies. There is also a need to sensitize them on farmer needs.

• Make extension Officers accountable to stakeholders in terms of information that is collected and disseminated.

• Certify Extension Officers as Trainers and this will be an added incentive to keep them updated and well informed.

• Establish permanent training services for extension officers / farmers / agriculture advisors and motivate them to become qualified Agricultural service providers

The main agenda would be to improve the capacity of the Extension Officers by ensuring that they are well equipped with the necessary knowledge on the various technical aspects involved in production and marketing of crops and the skill to communicate the same effectively.

Successful/Unsuccessful Case Studies of horticulture commodities

6.0 Case Studies – Value Chain Efforts for select horticulture produces

During the various consultations, meetings, field studies and survey undertaken under the TA Programme, the TA experts have studied various cases of successful agrimarketing of perishable commodities. In addition to these studies, pats experience of IL&FS Clusters officials of last five years in Bihar was also instrumental in studying and developing these case studies. A total of 8 case studies enlisted below have been developed

1. Vegetable Growers Group of Macchahi village, Sakara block, Muzaffarpur – A successful example of organic cultivation primarily with the efforts of a dynamic leader with hands-on experience

2. Organic Farming in Sodhadih, Nalanda - A successful case of Government initiative in horticulture marketing

3. Ravi Shankar Cold Storage, Biharsharif, Nalanda – A successful case of private sector investment in agribusiness infrastructure with direct benefit to farmers using this facility

4. District Horticulture Officer (DHO) of Nalanda District – A successful case of a Government official playing a crucial role in establishing successful agrimarketing linkages through farmers' organizations

5. The Kaushalya Foundation – An example of partnership between Government and Private Sector for establishment of agrimarketing linkages

6. Mushroom Cultivation, Nalanda district - An Initiative where production volumes have come down mainly due to absence of any direct marketing linkages and lack of value chain approach

7. Pan (Betel Leaf) Cultivators of Nalanda – An example of low profitability due to absence of direct marketing linkages and any Value Addition facility

8. Makhana crop in Madhubani – An example of low returns to various stakeholders in case of high value crop due to lack in coordination between research, production and marketing

9. Rythu Bazaar in Andhra Pradesh - A successful case of Government initiative in direct agriculture marketing

6.1 Vegetable Growers Group - Leadership that rallies both people and purpose around it

Macchahi village is located in Sakara block of Muzaffarpur district. The area these days is abuzz with the success of vegetable growers of this village. Like in other success stories, the initial impetus for this turnaround came from an individual called Mr. Dinesh. While in the earlier period agriculture in the village was basically practiced in subsistence mode, however, the entry of Dinesh has completely changed this scenario. A native of this village, Dinesh landed up in Haryana in 1991 after doing his matriculation. He did odd jobs for two-three years and in 1994 took 34 acres of land from Haryana government on lease and started doing vegetable cultivation. The improved technology that he employed in his agriculture was the main reason behind his selection as a progressive farmer and he received award from then Agriculture Minister in central government Mr. Nitish Kumar. Subsequently, he received several other awards from government agencies for his progressive farming and use of technology. In 2001, due to his record production of sugarcane per hectare he was selected by Haryana government for training programme in Thailand on organic farming. Coming back from Thailand he started cultivating brinjal, okra and chillies through organic farming and became one of the suppliers for Reliance Fresh. He was again sent to Japan by Haryana government to get training on use of modern technology for agriculture. In 2006, due to family callings and on request of some senior members of his village in Muzaffarpur, Dinesh decided to settle down in his native place. Though his operations in Haryana continue unabated and are looked after by his brothers.

Figure 9: TA Experts interacting with Dinesh

Figure 10:Members of Macchahi Vegetable Growers

Some of the first few things that Dinesh initiated in consultation with his co-villagers were to form a Farmers Club, get in touch with KVK Saraiya in Muzaffarpur, Vegetable

Growers Farmers Interest Group. Today the expertise of Dinesh is being used by Agriculture department in more than half a dozen villages. He has trained more than 40,000 farmers in advance cultivation of vegetables and paddy. More than 50 quintals of vegetables is sent by associations of farmers formed at his behest to other states from Bihar.

Combining the collective strength of farmers in his own village and some of the adjoining villages, Dinesh got in touch with Mamta Fruit & Juice Company based in Bengaluru for supply of organic cabbage. Beginning from 800 quintals in 2010 the farmers from Macchahi and neighbouring villages have been supplying more than 4000 quintals of cabbage in the present to this company. The structured manner in which Dinesh and his associates have been moving ahead can be seen from the fact that members of groups are advised for a particular crop after full exploration of its market linkage. Thus some 400 farmers are engaged in cultivation of brinjal, with the entire production having assured supply in Kathmandu in Nepal.

The evolution of cultivated area under organic farming in the case of Machhahi village has been gradual. From 5 acres in 2006 it has now come to 275 acres. There are 147 farmers presently members of different groups who are attached to Dinesh for marketing of their vegetables. It was in one of the Farmers Fair in Delhi that Dinesh met the owner of Mamta Fruit & Juice Company. Casual interaction soon took shape of serious business deal and the entire operation of organic farming started. Incentive of an assured market has resulted in sincere work at the farm level. The reported average yield for cabbage per acre in the village has been 25 tons per acre. All the 275 hectares of land under organic farming are cultivated thrice a year.

The cost of production for cabbage is 30 percent of the sale price that the farmers receive giving them enough reasons to think positively about their agriculture. Price of cabbage with the company is negotiated every day after getting the sense of prevailing local market price. Over and above the average price of Rs. 7/kg that the farmers receive from the company, the company pays 10% of market margin to Dinesh. From this amount of marketing margin Dinesh bears the cost of local transportation and rest of the cost of transportation is borne by the company.

Figure 11: Farmers interacting with TA team in front of their net house

The model initiated in Macchahi village has tremendous potential for replication in other parts of the state. The most telling lesson of this case is preparing and cajoling farmers for production of particular varieties of vegetables after exploring their market demand and after establishing market linkage. There are hardly any losers in this process and there are many in Macchahi now sounding as professional and confident as Dinesh himself.

The case of Vegetable growers group of Macchahi village is a case of 'action – research' in the promotion of agri–business and value – chain institution. Market – intelligence oriented and specific produce based group formation provided the best entry – point for promoting agri–business and value – chain additions and linkages. The case also reveals that well – groomed and well – exposed farmer leadership is vital for the formation and development of an interest group. The success of vegetable growers group of Macchahi is as much a story of the group's growth and development as that of Mr. Dinesh as a farmer leader. Both are as identical as both sides of a coin.

Third, honesty of purpose and commitment to the cause both on the part of Mr. Dinesh and member – farmers are the binding force. This is exemplified by an incident. Some of the farmers of a neighbouring village did not believe in the group activities. So they did not pay their membership fee. But when they saw members getting good return, they came forward to join. The membership committee, however, decided that they could join only when they cleared their dues, which they happily did. That way, honesty of purpose and

commitment to a cause was given its due in the development of the Vegetable Growers Interest Group of Macchahi village.

6.2 Organic Farming in Sodhadih - A Government led Initiatives in Nalanda

Sodhadih village is located on NH 31 at a distance of 8 kms. from Biharsharif, districts headquarter of Nalanda. The total population of the village is roughly 4000. The hard work of villagers in agriculture, especially in vegetable cultivation is quite well known in the area and it has received due attention from the Horticulture Department as well. The village was selected for organic farming by the Horticulture department. Farmers in the area have been competing among themselves to make distinct identity for themselves and their village as organic vegetable growers. Rakesh Kumar of Sodhadih village started doing vegetable cultivation a decade ago on his five acres of land. Recently with the assistance of horticulture department he set up a vermi-compost unit. Further, from assistance with horticulture department he has also been able to set up grading house, storage facility for onions, drip irrigation and poly house. The construction of the storage for onion has been very carefully customized to suit the local requirement. It has a capacity to store 75 metric ton. The enterprising abilities of Rakesh have been recognized by making him the head of Marketing Division of Nalanda Organic Vegetable Growers Federation.

Sodhadih Organic Vegetable Growers Federation in three years time has been able to extend its influence from 100 hectares to 300 hectares. The farmers in the village have been doing organic cultivation of vegetables like potato, onion, bitter gourd, okra, brinjal, green chillies and some other vegetables. Altogether, the Federation is able to sell 7 to 8 quintals of green vegetables to traders in Patna. Apart from this farmers are also able to send vegetables twice a week to traders in Kolkata. Negotiations with traders based in Delhi and some other states are also going on.

The Federation in Sodhadih village is constituted of 45-50 Farmers Group. Each group has about 25-30 members. According to Rakesh 65-70% of the farmers are marginal and small farmers who work on leased in land and pay lease rent of Rs 1000 to 1500 per Katha.

Figure 12: Organically Grown Cauliflower

As more and more farmers' groups started associating with the organic farming, there was a need to establish a strong marketing wing within the federation for direct and collective marketing. Federation assigned the task of exploring marketing links to nearby and distant markets for vegetables to Rakesh. He has additional responsibility to provide the technical inputs on organic farming to the new groups who are interested to associate. During the field survey it was observed that traders from Mithapur in Patna would come to Sodhadih in the evening and make payments to all the farmers whose produce has been collected by their agents in the morning. Rakesh was paid some commission by the traders over and above the price that individual farmers got from the traders. Apparently, the incentive for Rakesh in this transaction was the undisclosed percentage of commission which he received. The positive aspect of this transaction was that it worked as incentive for people like Rakesh to ensure everything works well at the farm level so that supply is able to meet the demand. It further incentivized them to interact with more number of farmers to get in the fold of Federation. Needless, to add the growing number of members in the Federation amply reflects that everyone was benefitting. All negotiations with the traders take place over phone both on the selling price and the assured quantity that the Federation can supply to them. Rakesh interacts with other buyers located in different markets that help him to evaluate prevailing market rates at that point, understand the demand and competitive pricing from other producers and accordingly fix best market rate. He strikes a deal with the buyer for that particular day or period. The buyer agent comes directly at the federation collection point, with its own transportation and assures to carry the produce as per the assured offer price.

Each group is responsible to bring quality graded produce and packed in prescribed weight. The group is provided additional 2% more on the selling price by the federation. If the selling rate of one particular crop is Rs 10, the federation provides additional Rs 2 to the group to cover the cost of packaging and graded quality. The president of each group is member of the federation and is solely responsible for the quality. Federation staff once again scrutinizes the produce from each group when maintain the records before loading. If there are consistent complaints on poor quality from any particular group, the group is asked to nominate a new president. This is the mechanism to ensure transparency and maintenance of quality parameters at the level of federation.

Since the buyers come to the village to collect the produce in bulk this benefits particularly the smaller and marginal farmers. It is a hassle free deal for the farmers; they do not have to worry to carry their produce all the way to the market. The small and marginal farmers find it difficult to carry their harvest from their village to the local market. The farmers save on the cost of selling themselves in local market to the traders. Since the price fixed is uniform, for all the framers, all farmers stand to gain and are assured a competitive market price.

The Nalanda Organic Farmers Federation, however, in the present seems to be more of an association purely based with the motive to avail best market price through the federation. However, to make the Federation sustainable it would be imperative to bring in the rules and regulations of Farmers Groups and Federations. These can be provided by professional agencies or farmers themselves with experience in Group activity, and can be discussed among the farmers. Presently, for example there is no meeting of Farmers groups or Federation itself. Neither there is any contribution from the groups to federation corpus savings. Though there are some individual members of the Federation who are willing to offer some portion of their land to pilot and test efficacy of new schemes, crops, help provide necessary feedback and monitor the implementation process. But these things need to come in Packages of Practices (PoPs) and cannot be isolated efforts.

Some Suggestions from Mr. Rakesh:

1. In some of the far away locations, farmers find it extremely difficult to carry their produce to the federation collection point. It is also not economically feasible for the federation to go and collect their produce from their village farmland. Either the state should support for construction of storage sheds at common point close to main roads or highways so that small farmers can come on their own from their villages. Then a collection van can be planned by the federation, which can collect farmers' produce on some fixed days.

2. The cost of labour is high and they are also not easily available during cultivation or harvesting season for factors including minimum employment guarantee schemes by the government. The state government can support the farmers groups through the federation by providing 80 percent subsidy on mechanized agri-tools and equipments to boost state economy.

3. Each of the farmers group also needs inputs on cropping system, updated knowledge and skills to enhance the quantity and quality of produce. Should a particular cluster of farmers group cultivate one single horticulture crop they collectively stand to benefit if they sell it on one uniform market price. The quantitative and the qualitative grading inputs will help the farmers to determine competitive market price.

4. Mr. Rakesh informed that in the district wherever an entrepreneur who is himself a famer owns facilities or infrastructures like cold storages, storage yards they are mostly functional even today since these facilities tend to benefit mostly farmers. The state should extend such benefits and subsidy to farmers groups to establish and manage infrastructures and facilities.

5. There are instances of police extorting money when the crop is being transported. The district agriculture department and the state police authorities need to work out modalities so that such nuisances could be reported and eliminated.

6. Mr. Rakesh mentioned that the federation could move ahead on organic farming and collective marketing primarily due to active support and involvement of district agriculture

and horticulture department. The department helped facilitate solve several hurdles and bottlenecks. He opined that the department officials are the face of the government and farmers expect a lot from them. A case study on the federation and how the DHO has taking active interest to transform the farmers of the district need to be shared widely with other districts to encourage similar officials.

7. Mr. Rakesh in his individual capacity is supporting farmers from other districts also in a limited way by attending their phone calls. However, an individual like Mr. Rakesh has a larger and important role to support the department to play as change agents. Federation members like him, Dinesh, Hemant could form strong and active members of horticulture boards that could influence and inform state agriculture and horticulture policy and plan.

6.3 Owner of Ravi Shankar Cold Storage, Biharsharif, Nalanda

Mr. Bijay Babu is the Chairman of Bihar Cold Storage Association and Mr. Mahendra Singh is the President. His Cold storage is 34 years old and it has a capacity to store one lakh (Hundred thousand) metric ton (400 MT or 40 lakh kgs) of potato. He mentioned that ideally Nalanda should have 75-90 cold storages. Many ventured into this business but could not sustain for several reasons. Today there are only 17 operational cold storages in Nalanda. Shortage of electricity is one of the main reasons behind closure of cold storages in Nalanda. Every month he pays electricity bills worth Rs 2,80,000 or roughly Rs 30 lakh annually. This is a huge amount for him just on buying electricity apart from maintenance of staff and other resources. According to him, unavailability of steady electricity in Bihar and the high unit cost (Rs 5.75) as compared to other states (Rs 4.60) is the major bottleneck. There is also no subsidy on fuel provided by the government.

The storage is rented majorly to farmers and only 5 percent of traders use the facility. Since the farmers need security more so as they are dependent on the facility. Either when they need seeds during cultivation or when they wish to sell their produce during off-season they use the cold storage facility. There are two rates for storage:

1. Loose at a rate of Rs 180 quintal, and

2. Packed at a rate of Rs 190 quintal

In last season, 2011 there was low productivity of potatoes. Government had assured the farmers that the state will help facilitate export and they all stopped selling it locally. Neither their potatoes got exported and nor they could fetch even minimum support price. As a result the middlemen and the traders made good margin.

There are three varieties of potatoes that are stored:

1. Table potatoes for edible propose

2. Potatoes for seeds which are known as Goli locally

3. Charri is the very small size varieties used for either cultivation or even consumers prefer without skinning.

When a famer gets his potatoes, it is weighed and a receipt is given to him. Each farmer is allotted a designated place in the cold storage premise and the rental is paid based on the weight and the duration of storage. When a farmer desires to sell some portion of his stored potato, he himself need not come but may send the copy of the cold storage receipt through the trader. The trader is not allowed to enter the cold chain area beyond the restricted area. The trader will be shown a sample of 1- 1.5 kg of the potato of that farmer by the staff. If that quality is accepted or not accepted by the trader then he may negotiate the price with the farmer or may decide to purchase the lot and further grade the potatoes and pay the amount to the famer after selling. The cold storage is not involved in the price negotiation between the farmer and trader. At times both the farmer and trader come together at cold storage. Every year the potatoes are stored after the harvest between January and February. The farmers may choose to store some portion of their produce to sell it round the year when the prices are good. Onions are stored in April but it does not require cold chain area. Onions are kept in a ventilated but shaded and airy space.

Mr. Bijay Babu mentioned that his cold storage facility offers service to farmers like any other bank. As the bank customers are free to keep or take away their savings or expensive possessions in a secured place, similarly, he offers the facility to the farmers at some service cost. He does not intend to purchase farmers produce directly from them to sell it to traders. There are risks involved and he will have to be accountable to the farmers if he is not able to sell their produce.

Mr. Bijay Babu has been in the cold storage business since last 34 years. He mentioned that one should move with the changing times. He is interested to diversify into setting up processing and packaging units. But he is reluctant to invest his time and effort to run around the line departments to avail any support. He enquired if he is eligible to avail any hassle free scheme under the Rural Agri-business to set up processing units, purchase of referral & pick-up vans, open seeds & organic pesticide shops, etc.

6.4 District Horticulture Officer (DHO) of Nalanda District

The DHO Nalanda is being credited today by the farmers for all his sincere effort to establish the organic farming federation in Nalanda. Three years back, he was aware how the farmers were exploited by the middlemen, commission agents, and traders and the farmers were at the receiving end. The DHO has set up an example for other districts today with all support from the DAO, DM, and other State govt. officials. The DHO initiated the federation on organic farming about a year back. Today there are 315 farmers groups. The buyers come from Patna, Mumbai, UP, Kolkata and purchase the produce on-farm as a result the federation is able to pay 15-20 percent more to the farmers than the local market rates.

The DHO mentioned that other than potatoes, onions, seasonal vegetables (cash crop of Nalanda region), there is potential for Beetle leaf (Pan), Floriculture and Mushroom. The Nalanda Beetle Leafs are sold in UP and north India as Banarasi pan with quality processing. The DHO soon plans to set up the Pan processing and packaging units in Nalanda so that the farmers can directly sell their leaves at premium rates. The Mushroom is cultivated by landless women of BPL families and so far it has a good potential in local market. When the women groups started cultivating, just to encourage them he would gift mushrooms to officials and guests. Similarly Chainpur block produces the best variety of organic guavas and he plans to get the produce certified. He mentioned that when the farmers directly go to sell their produce they get much better response than the traders. The marketing wing of the federation will soon sell organic vegetables in Patna. The DHO also mentioned that soon the department with support from the State will work out an agreement with COMFED, ATMA and JEEVIKA to sell packed mushrooms in every Sudha milk stalls.

His next step is to purchase pesticides or any agri-tools and equipments directly from the wholesale distributors. He mentioned there is a strong nexus between the distributors and the local intermediaries who act as agents. To explain, he cited an example if the manufacturer sells the product at Rs 100 as MRP, the rates of the product remains same till it reaches the distributor. But once it reaches the dealer and the local intermediaries the cost of the product increases to Rs 145. The farmer has no other alternative other than

buying it from him on the inflated price. If the farmers purchase the organic pesticides directly from the distributors through the federation then the savings can be passed on to the farmers as bonus.

Some of the suggestions mentioned by him to be followed for effective agri-business strategy in the state are the following:

1. Unless there is a collective effort by farmers they can never gain to benefit from organized marketing.

2. It is imperative for the state and district to initiate and make an effort to interact closely with farmers directly to address their issues. This will invariably also help them to organize themselves into active farmers groups. The department has only to facilitate the process initially.

3. Establishing cold chain facility in the state is another important step to benefit farmers in the long run.

4. Farmers will need inputs on grading, packaging and marketing.

6.5 The Kaushalya Foundation - An Experiment in Agri–marketing

Kaushalya Foundation was started in 2007 by professionals from IIM, Ahmedabad, the leading management institute of India, having wide experience in the field of development and agri-sector. In association with Women Development Corporation, Government of Bihar, it started its intervention to create opportunities of gainful and dignified self–employment for the families dependent on agriculture sector, especially disadvantaged section. The strategy of the Foundation was to re–orient the vegetable supply chain to reduce wastage, price spread, and lead time for vegetable to reach the consumers. Initially the Foundation got an overwhelming response from farmers, vegetables vendors and consumers. The number of farmers and vendors associated with the Foundation very soon increased to 3000 and 600 respectively.

Figure 13: The Vegetable cart of Kaushalaya Foundation in a residential locality in Patna

The Women Development Corporation (WDC), on its part was to provide human resource in the form of self–help groups to undertake sorting, grading, and packaging of vegetables at the institution level and vending at the retail market level. WDC was also to ensure the support of COMFED in providing vending space at its milk booths, so that those came to get milk also had the option of buying fresh vegetables. Initially, the arrangements went well but soon a kind of clash of interest started to create disturbances. The Foundation found self–help groups engaged in cleaning, grading, and packaging lacking in professional commitment, which in turn, affected the vending activities. Besides, WDC

also wanted members of SHGs to get engaged in vending activities for which the Foundation found them wanting in many ways.

In order to professionalize the vegetable supply chain the Foundation developed a strategy consisting of sensitizing its human resource on the value of collective action, team work, value addition, developing dedicated partnership and creative marketing strategy. Along with supply chain network in retail markets, direct home delivery services were also introduced. It was at the division of work level that the yawning gap between the Foundation and WDC started to appear. The Foundation thought that male vendors as sales and marketing personnel would be most appropriate to have. On the other hand, WDC insisted on giving opportunity to women members of SHGs to prove their skill in sales and marketing. Besides, the financial support committed by WDC to the Foundation on the one hand and facilities at the Sudha Milk Booths supposed to be provided by COMFED were getting embroiled in official procedures. In want of funds and facilities promised, the Foundation found its operations difficult to manage. They had no choice but to ease them out of the partnership and, like true entrepreneurs, try to be on its own.

Figure 14: Vegetable cart of an upcoming fresh fruit and vegetable group in Patna

The Foundation, however, is independently striving to strengthen the entire value chain and marketing of fresh vegetables. The current status of Kaushalaya Foundation in vegetable marketing may not appear to be very sound, however, it has helped in initiating many such enterprises in fresh fruit and vegetables in the state capital.

6.6 Mushroom Cultivation - An Initiative fraught with marketing fears

In Nalanda district, there are 1600 farmers groups, out of which 1200 groups are of women who are exclusively engaged in Mushroom cultivation. They produce around 50 quintals of Mushroom per month. Officers of ATMA bought total produce at the rate of Rs. 80 per kg initially and Rs. 60 per kg subsequently. They pay in cash and take the produce in bulk. Right from training in Mushroom cultivation to supply of seeds and purchase of produce is done by ATMA. This government led initiative is commendable to the extent that a new commercial crop has been brought in the fold of farming practices, and an additional source of income generating activity for women has been introduced. However, its excessive dependence on government support has started showing its impact. Around 300 groups have stopped cultivation for various reasons, non–availability of seeds, non-purchase of produce, no direct access to market, and limited market.

This government led initiative of Mushroom cultivation is fraught with so many fears as Ms.Sabita Devi of Kokalchak village under Noorsarai Block of Nalanda district put it- "The cultivation of Mushroom suits us well. It is a simple farming activity because not many physical efforts are involved. But the problem is we are not free to be on our own. We are like job workers. We do not know how to grade and pack our produce, how to do value addition, where to sell, from where to get seeds etc."

The anxiety and fear expressed by Ms.Sabita Devi were generic and need serious thinking about giving it a desired direction. Leaving other district towns apart, Patna, itself had a large enough market to get linked with the promotion of Mushroom cultivation. For, that sort of linkages alone would provide confidence and hope to women Mushroom cultivators.

6.7 Pan (Betel Leaf) Cultivators of Nalanda - In need of orientation in Value Addition

There are 56 Pan growing farmers groups in Nalanda most of them are located in Islampur Block. Around 90 percent of farmers in Borisarai village in Islampur Block are engaged in pan cultivation. This high concentration of pan cultivators required special on farm and marketing support services. As Mr. Laxmi Chand Chaurasia and Mr. Jamuna Prasad of Borisarai village put it - "Our major farming input is bamboo but that is not provided on subsidized rates. Our major problem is market which we are forced to access through local traders and in the process suffer losses on all counts – local transportation, pricing, and wastage. Our main market is in Varanasi where the final processing of pan leaves is done and then sent all over the country.

Of late government has provided us with wire nets to use in place of Bamboo mats. This has reduced wastage to a large extent. But nothing so far has been done for providing orientation in value – addition, proper packaging and developing market locally."The concern of pan growers was genuine and required a full package of government support instead of piecemeal in the form of substitute farm inputs made available from time to time. What the farmers insisted upon was applicable to all horticulture produce in general: information and support for getting best return for their produce.

6.8 Makhana crop in Madhubani

Makhana is a seasonal crop for four months between October to January. The crop cannot tolerate winter and the seeds have to be harvested and stored before monsoon. Last year there was good yield as compared to 2012. Some of the prominent Makhana clusters in Madhubai are Benipatti and Mahuapur blocks spread in around 10-15 acres of ponds. Mr BishweshwarSahni in Benipatti has a Makhana cooperative. Makhana rates fluctuate on weekly basis. Within a period of 15 days the market price fluctuated from Rs 270 per Kg to Rs. 190 per kg. The Madhubani Makhana is sold in Delhi, Agra, Kanpur and Amritsar to wholesale traders or processors. The Madhubani traders are in touch with the traders outside. Once the Makhana is sold outside the state, it is processed, packaged and sold in Pakistan and Arab countries where it has good demand. However, there is no demand for Makhana in whole of India it is mostly consumed in north and some parts of western India.

A trader finds it very hard to earn from trading Makhana since he has to keep paying at different points from the source to the final destination. A trader finally roughly earns Rs 200 instead of Rs 300. The Madhubani trader mentioned strongly about the need to eliminate all taxation levied by the state on Makhana trading. During transportation, 2.5 percent is charged as Mandi tax once it is transported outside Bihar, 1.5 percent goes into unloading charge, 4 percent is levied as sales tax, 1.5 percent as inter-state tax, 3 percent margin for the commission agent.

Figure 15: Different grades of Makhana

He mentioned that grading of Makhana seeds is done after harvest in 10-14 varieties. The graded seeds are first sun dried completely before heating. The heating of seeds is controlled in three different stoves with three regulated temperatures. Finally each seed is pressed manually which determines quality of the Makhana lava. This is further graded by the local trader in three varieties to fix price. Lowest variety is Rs 20 to Rs 30 per Kg. The graded Makhana Lava is then packed in gunny bags and each bag holds about 2 Kg Makhana. The best variety of Lava is sold for Rs 300. Due to inconsistent crops, only one-third lava pops out and almost two third is wasted. If 60 kg is fried then 26 kg is the lava output, which can be sold. The Makhana research institute is trying to bring out machines for harvesting of seeds, grading and making Makhana Lava.

Figure 16: Interaction with a Makhana Trader in Madhubani District

The research team also interacted with scientists of Makhana Research Institute, Dharbanga Dr. V.K.Gupta, Principal Scientist and Head (Plant breeding) and Dr.Indu Sekhar Singh, Senior Scientist (Soil Science)

They mentioned that other than Madhubani, Purnea and Katihar are the main Makhana producing districts. Supoul, Saharsha, Dharbhanga & Sitamarhi are other districts. In Purnea and Katihar Makhana is cultivated in low land of paddy fields as compared to ponds in Madhubani. In ponds, the production of Makhana is 12-16 quintals whereas in low field it is 25-30 quintals per hector. The reason behind, in ponds the Makhana crop has more variations as a result there is more loss during lava making, but in field the seeds are largely consistent in size.

Key bottle necks in Makhana cultivation for farmers:

1. Harvesting of Makhana seeds and lava making process.
2. During monsoon floods wash out the crop and the productivity is very less.
3. Adaptability to Makhana cultivation and farmers is not encouraging due to thorny plants. Not all farmers are willing to cultivate Makhana and are largely dependent on the traditional cultivators.
4. Due to heat and smoke during lava making process there are health hazards.

Suggestions to improve productivity and marketability of Makhana

1. With improved variety of Makhana cultivation the productivity would increase substantially and this will benefit the farmers.
2. Harvesting and lava machine has been developed recently and it will be sold after field-testing. This will help to solve the two key bottlenecks and encourage farmers.
3. The farmers need to be educated on good cropping system from single to three crops from vertical to horizontal. Two crops in a year should be encouraged either exclusively for Makhana. By having other crops in-between helps to generate nitrogen in the soil, which is good for Makhana, hence mixed cropping after Makhana with paddy and then wheat or cultivating mung-dal after Makhana will have positive results.
4. Madhubani farmers should be in a position to determine their own price collectively.
5. Good variety of Makhana can fetch Rs 600 to 800 per kg but the seeds cannot be stored now. The state needs to intervene to construct cold chains to store seeds. All seeds need not be taken for lava and it can be round the year activity for farmers.
6. Makhana has good export potential, the state should facilitate for the benefit of the farmers.

6.9 Rythu Bazaar of Andhra Pradesh

Direct marketing of agricultural produce by producers helps in reducing intermediaries and makes the producer directly in-charge for selling his/her produce. This helps in increasing the financial returns to the farmers as well as better customer satisfaction.

Rythu Bazaars in Andhra Pradesh is one of the most successful and replicable models for direct marketing of agricultural produce in the country. Typically, a Rythu Bazaar provides facilities to farmers for selling their produce directly to consumers under a proper administrative structure and government protection. Currently, there are 106 Rythu Bazaars operating in Andhra Pradesh.

Key Stakeholders and their responsibilities:

1. **Agricultural Marketing Department:** It oversees the implementation of the entire program

2. **Joint Collectors**: Joint Collectors are responsible for the effective functioning of Rythu Bazaars in their respective districts. They are responsible for all appointments of concerned officials and to ensure proper coordination of the concerned officials

3. **Estate Officers (EO):** The EOs are responsible for the upkeep and maintenance of the Rythu Bazaars. They allot shops, fix prices and ensure proper day-to-day functioning.

4. **Horticulture Consultants:** They are responsible for identifying, motivating, and ensuring regular attendance of farmers so that the farmers are able to make use of the services provided. They provide pre- and post- harvest consultancy to farmers.

5. **Agriculture Officers:** The Agriculture Officers coordinate and assist Estate Officers and Horticulture Consultants.

6. **Farmers:** They sell their produce at Rythu Bazaar

7. **Department of Women and Children in Rural Areas (DWCRA) SHGs:** They sell products as a group in the Rythu Bazaar.

Coverage: Generally, a Rythu Bazaar caters to 10 to 15 villages providing marketing support to 250 farmers and 10 SHGs of the DWCRA.

Process: The villages are selected by a team consisting of Mandal Revenue Officers, Horticulture Consultants and Agriculture Officers. Every seller at the Rythu Bazaar is issued a photo identity card that includes details like name, address, products grown, and size of land. This identity card is issued with the objective to avoid entry of intermediaries. Only a person with a valid photo identity is allowed to sell his/her produce in the Rythu Bazaar. Shops are allocated to the farmers daily on a first come first serve basis.

Location: Rythu Bazaars are located on government land identified by the District Collectors. The land has to be an acre in size and should be located at an area that is convenient for both farmers and consumers.

Infrastructural Facilities: Rythu Bazaars have provisions for transportation, electricity and water supply. They also have sheds and toilet facilities for farmers, facilities for cleaning of agricultural produce, grading and sorting, weighing, packaging, storage, parking, telephone, internet and fax. These facilities enhance the farmers' work environment. They save time in terms of transportation as well as provide farmers with basic facilities to take care of their produce.

Price Fixing: The prices for products to be sold at the Rythu Bazaar are fixed every morning by the Estate Officers of a district in consultation with a committee set up for the purpose. The committee also comprises of three farmers from each Bazaar. It works on the rule that the price should be around 25 per cent more than the wholesale price and 25 per cent less than the retail price. The guiding principle is that if the prices in Rythu Bazaars are higher than the local retail market, there is no incentive for consumers to come to the Bazaar and, on the other hand, if the prices are fixed lower than the wholesale market rates, there is no incentive for the farmers to sell their produce in the Rythu Bazaar. Generally, the Maximum Price is fixed and is termed as Board Price and the

farmer has a choice to sell the price below the Board Price, however, the produce cannot be sold at higher than Board Price by the farmers.

Online Price Information: An online market information system has been developed to keep officials at all the Rythu Bazaars updated about current prices and to help consumers make informed choices. A consumer can refer to the prices online and, thus, prevent over-charging by the farmers

Monitoring & Governance: Each Bazaar is under the management of an Estate Officer and a Horticulture Consultant along with an Agriculture Officer who all report to the Joint Collector. While, the Horticulture Consultant and Agriculture Officer are primarily responsible for identifying, educating and motivating farmers about the concept and advising them to make the best use of their land, the Estate Officer is responsible for general administration, including issuance of identity cards and price fixation. These officers are given periodic training from time to time to help them perform their roles efficiently. Frequent impromptu inspections are held by the Joint Collector and other members of committee to ensure that all officers in-charge are performing their duties efficiently. The senior officers interact with farmers and consumers to get their feedback and complaints about the Bazaar. Based on this feedback, they issue fresh orders to the officials of each Rythu Bazaar to look into matters of concern.

The online market information system also acts as a check and balance tool to ensure that consumers are not cheated and that all farmers sell their produce at uniform, predefined prices. It keeps officers updated with current prices and the proceedings at all Rythu Bazaars

Financial Resources: The expenditure of setting up and maintaining a Rythu Bazaar is met from funds made available by the Agricultural Produce Market Committee under the State APMC Act as well as the funds collected via leasing of stalls to millers and SHG groups, parking charges, lease from canteen etc.

Project Information Memorandum

7. Project Information Memorandum – AIDIP Investment Project

7.1 Introduction

The objective of AIDIP investment project is to set up modern integrated value chain infrastructure for horticultural produces in the state with the participation of private sector. This would involve participation of new players along with existing players in the supply chains of horticultural produces and integrate them into new, ordered and more efficient structures that employ the use of improved infrastructure and systems.

It may be noted that Bihar does not have state regulated agricultural market infrastructure after the APMC Act was repealed by the Government of Bihar in 2006. There were about 100 main wholesale agricultural markets in the state, 54 of them being of relatively larger size, before the repealing of APMC Act. Many of these market yards had both space and need of modern storage and handling facilities. It was thought initially therefore that these market yards were best positioned to provide opportunity for setting up of requisite infrastructure along the value chains. Therefore, the focus of AIDIP investment project in the state was on setting up specialised facilities, for reducing wastages and adding value to horticultural produces, at these market yards along with modernization of these markets.

In the first phase of AIDIP, two integrated value chains (IVCs) were proposed to be set up over 11 market yards. While one IVC included selected market yards in the districts of Muzaffarpur, Vaishali, Darbhanga, Samastipur and Begusarai, the second IVC included selected market yards in districts of Nalanda, Patna, Gaya, Bhojpur, Buxar and Rohtas.

The project implementation model envisaged a Public- Private Partnership (PPP) structure. As per this model, Expression of Interest was to be invited from potential investors for creating IVCs at identified market yard lands, in line with proposed facilities in Detailed Project Report, on Build, Operate and Transfer (BOT) model. The investors were to be provided capital grant through a competitive bidding process and they were to build and operate these facilities during the concession period of 20 years, before handing them back to state government.

However, the Government of Bihar later made following changes in the implementation model:

(i) Maximum capital grant to the private sector investors to be reduced from 70% to 35% of the project cost, with no requirement of sharing of 30 % of gross revenue as earlier envisaged;

(ii) Land for IVC projects to be brought in by private sector investors and not by the state government as earlier envisaged.

The above changes have necessitated preparation of this Project Information Memorandum (PIM) which would reflect these project modifications and may be used by the state government for inviting potential investors.

7.2 Revised Land Requirement, Project Cost and Means of Finance Assumptions:

The above decision would lead to the following changes in the project structure and assumptions:

- **Project locations and land Requirement:** The project locations would be in the same districts as earlier selected market yards. Regarding land requirement, as mentioned above, earlier market yards were to be used for setting up IVC facilities and therefore land area was taken as available at various selected market yards. However, land requirement would come down significantly now and would be required only for setting up IVC facilities proposed earlier at various project sites. Land size has been accordingly adjusted based upon the constructed area of the proposed value added infrastructure for perishable items. In order to calculate the new land area, it has been assumed that the total project land requirement at various locations would be approximately 1.6 times of the area required for developing the proposed facility, with remaining land being used for internal road, parking and other basic infrastructure facilities.

  This would be the minimum land area required for setting up the proposed facilities at the new site locations. It is being envisaged that these facilities may be termed as "mandatory", even as private investors may be allowed to develop additional facilities with acquisition of additional land area through their own funds.

- **Proposed Facilities:** As mentioned above**,** private investors would be expected to construct the value added infrastructure for perishables as proposed earlier in Detailed Project Report such as cold pack houses (with pre-cooling and cold store facilities), cold stores, ambient pack houses, ripening facilities, dry warehouses etc. at the new site locations as these facilities have been proposed based on detailed field surveys, need assessment and analysis of viability of these facilities. Any additional facilities may be added by the private investors at these locations in a phased manner, depending upon their own business plans.

- **Land Cost** Earlier, it was assumed that the project would be using the land of existing APMC market yards, therefore, the land cost was not taken into consideration while calculating the total project cost. However, now as the land for the proposed facilities would be arranged by the private investor(s), therefore land cost would be part of the total project cost in the new proposed model.

- **Means of Finance:** It was earlier proposed that the private investor's equity contribution would be 30% of project cost, with remaining fund (70% of project cost) to be provided by GoB (20% of the 70% from own sources and the remaining 80% of 70% as loan from ADB). In the revised means of finance, the equity contribution by private investors is assumed as 20% of project cost. The contribution from State Government is taken as 35% of project cost (contribution from own sources at 20% of 35% and loan from ADB at 80% of 35%). The remaining (45% of project cost) amount is assumed to be raised by private investors as debt from Banks/ Financial Institutions.

  Also, in the new proposed model there would not be any requirement of revenue sharing with the state government.

  Based on the above changes in the project structure and assumptions, the revised details of two IVCs would be as follows:

7.3 Key Operating Assumptions: Muzaffarpur and Patna-Nalanda region

The key operating assumptions underlying the project's business plan are described below.

7.3.1 Operating Cost Assumptions:

The overall operation for all the facilities has been assumed at 300 days per annum.

7.3.2 Power & Fuel Costs

The total connected load of the facilities for all locations in Muzaffarpur region is estimated at 685 KVA and in Patna- Nalanda region at 1220 KVA. The power tariff has been assumed at Rs 4.85 per unit for agro based industry in Bihar. The details of power load assumptions for the facility are given below:

Table 7: Power Load Assumptions

Facilities	Assumption
Pack house Cold Chain	50 KVA/ 15 MT
Fruit Pulping plant	75 KVA/ 2 MTH
Warehouse	40 KVA/ 5000 MT
Cold store	150 KVA/ 5000 MT
Ripening Chamber	40 KVA/ 40 MT

Table 8: Location-wise Power requirement

Muzaffarpur region		Patna- Nalanda region	
Locations	Power Load (KVA)	Locations	Power Load (KVA)
Muzaffarpur	355	Bihar Sharif	230
Hajipur	130	Patna	230
Darbhanga	40	Gaya	190
Dalsinghsarai	80	Arrah	190
Begusarai	80	Buxar	190
Total	**685**	Nokha	190
		Total	**1220**

The table below explains the annual power consumption cost of proposed facilities at full capacity:

Table 9: Annual power consumption cost in Muzaffarpur region

Rate/KW (Rs)	4.85
Load (KVA)	685

Proportion-running on power	75%
Avg. Load Factor (%)	70%
Annual Consumption (KWH)	863100
Annual cost of Power (Rs Mn)	**4.19**

Table 10: Annual power consumption cost in Patna-Nalanda region

Rate/KW (Rs)	4.85
Load (KVA)	1220
Proportion-running on power	75%
Avg. Load Factor (%)	70%
Annual Consumption (KWH)	1537200
Annual cost of Power (Rs Mn)	**7.46**

If the project runs at full capacity, the power consumption cost would be about Rs. 4.19 Mn in Muzaffarpur region and Rs. 7.46 Mn in Patna-Nalanda region, though the actual consumption would depend on the utilization of the facilities. On an average it has been assumed that the proposed facilities would run for 8-10 hrs a day as some of the cold facilities like fruit processing unit would run for more than 8-10 hrs a day and others like pack house would run for not more than 8 hrs per day.

Taking into account the current power supply scenario in the state it has been assumed that the facilities would run on DG sets for about 2 hrs/day. The average fuel cost for DG set is assumed at Rs. 50/litre.

7.3.3 Water Cost

Daily water requirement in both the IVCs is estimated to be 0.20 million litres/day each for all the locations combined in that IVC. The charges are assumed to be Rs 30/KL.

7.3.4 Employee Cost

The employee cost has been estimated by considering the man power requirement for managing the facility. The project will be managed by the private investor(s),

who will maintain and operate the facilities in the project. This includes management and 2 hour maintenance of the plant and machineries, security, etc. So, a team of technical engineers, support staffs and security personals will be required.

The details of manpower in Muzaffarpur region and their average costs are given in the following table:

Table 11: Manpower details and average costs for Muzaffarpur region

Grade/ Employee	Number	Salary/ pm (RS)	Total (Rs)
Managers	5	20000	100000
Technical Supervisors	5	20000	100000
Operators	15	10000	150000
Maintenance	15	6000	90000
Account	5	8000	40000
Security	15	4000	60000
Support Staff	15	3000	45000
Total Employee Cost (Per Month)	**75**		**585000**

*Increment in salary is assumed at 5% p.a for 1st five years of operations.

The details of manpower in Patna-Nalanda region and their average costs are given in the following table:

Table 12: Manpower details and average costs for Patna-Nalanda region

Grade/ Employee	Number	Salary/ pm (RS)	Total (Rs)
Managers	6	20000	120000
Technical Manager	6	20000	120000
Operators	18	10000	180000
Maintenance	18	6000	108000
Account	6	8000	48000
Security	18	4000	72000
Support Staff	18	3000	54000
Total Employee Cost (Per Month)	**90**		**702000**

*Increment in salary is assumed at 5% p.a for 1st five years of operations.

7.3.5 Cost of Maintenance

The cost of maintenance has been assumed as 1.0% of value of plant & machinery, buildings, land & site development and miscellaneous fixed assets. The maintenance cost will increase by 2.5% every year due to aging of assets.

7.3.6 Cost of Insurance

The cost of insurance has been assumed as 1.0% of value of plant & machinery, buildings and miscellaneous fixed assets.

7.3.7 Admin & Marketing Overheads

Private investor(s) would be largely responsible for only the management and maintenance of the facilities and users/traders would be doing necessary marketing arrangements for their operations. Initial tie ups are needed for better capacity utilization of the facilities. Most of the promotional/marketing expenses will be incurred up front with only small recurring expenses afterwards. Hence during operations, marketing and business development expenses will not be significant for the project. The major overheads for the project will be travelling costs, statutory (like audit etc.) costs and communication expenses etc. So, the admin & selling overhead costs have been assumed @ 2.0% of revenue in line with the industry norms for such facilities.

7.4 Financial Assumptions: Muzaffarpur and Patna-Nalanda region

7.4.1 Taxes

Income Tax rate is assumed to be 32.45% flat (Prevailing Corporate Tax Rate). Income tax is calculated on PBT after adjusting for the difference between the depreciation calculated according to Companies Act, 1956 and Income Tax Act, 1961.

7.4.2 Depreciation Rates

Depreciation has been calculated by straight-line method, as per the Companies Act, 1956, for book purpose, whereas for tax purpose (As per Rule-5 of Income Tax Act, 1961), written down value method is employed. The rates of depreciation are in tune to the rates that are used in cold storage and warehousing industry. The depreciation rates used for different assets are given below:

Table 13: Depreciation Rates

Depreciation Rates	Book Depr	Tax Depr
Plant & Machinery	10.34%	15.00%
Miscellaneous Fixed Assets	10.34%	15.00%
Buildings	3.34%	5.00%

The plant & machinery includes refrigeration and cooling systems used for operation of facility, sorting-grading equipments, crates, pallets etc. The noncore equipments like water supply system, transformers etc. are included in miscellaneous fixed assets. Buildings include, building for ripening facility, ambient and cold pack-houses and for dry warehouse storages.

7.5 Revenue Assumptions: Muzaffarpur and Patna-Nalanda region

7.5.1 Rental assumptions

Based on the discussion with market players (service providers, food processors, users, traders and wholesalers) the rental charged for various facilities is tabulated below:

Table 14: Rental charges assumptions

Facilities	Charges/ Unit	Unit of Charge
Ambient pack houses	45	Rs/sqm/month
Fruit Processing Plant charges	2800	Rs/MT
Banana Ripening Facility	1500	Rs/MT
Pack house-Cold Chain		
Sorting/Grading/Packaging charges	1650	Rs/MT
Pre-cooling charges	800	Rs/MT
Warehouse	75	Rs/sqm/month
Crates	12	Rs/cycle/crate
Weighbridge	5	Rs/MT
Logistics	40	Rs/Km
Cold Store	275	Rs/MT/Month
Onion Store	300	Rs/MT/Season

The rentals charged for these facilities are comparable to the prevailing market rates.

7.5.2 Capacity Utilization

The estimated capacity utilizations are shown in the table below:

Table 15: Estimated Capacity Utilizations

Year	Year 1&2	Year 3&4	Year 5 &6	Year 7 and onwards
Capacity Utilization				
Ambient facilities	60%	70%	80%	80%
Cold facilities	50%	60%	70%	80%
Logistics & Handling facilities	60%	70%	80%	80%

The capacity utilizations have been assumed conservatively for cold facilities starting at 50% in the first year.

7.6 Muzaffarpur District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure in Muzaffarpur is as follows:

Land Area (in acres)	7.0
Proposed Facilities	
Pack house-Cold Chain	750 sqm (15 MT/day)
Fruit Pulping plant (2 MT/ Hr)	900 sqm (2 MT/ Hr)
Pack house- Ambient	750 sqm (35 MT/day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store-5000 MT	2700 sqm
Onion store- 500 MT	540 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

A layout of cold storage, cold chambers and ripening facility is attached in the last.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	10.49	0.19
	2	Land Development	17.48	0.32
	3	Buildings	91.03	1.65
	4	Plant Machinery & Equipments	105.24	1.91
	5	Utilities & other fixed assets	27.10	0.49
		Sub Total (A)	**251.35**	**4.62**

B		Preliminary and Pre-Operative Expenses	12.57	0.22
C		Contingencies	21.69	0.39
D		Margin Money for Working Capital	2.02	0.03
		Total Project Cost (A+B+C+D)	**287.63**	**5.23**

- *Land cost has been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facilities	Rs. (Mn)
Pack house-Cold Chain	6.75
Fruit Pulping plant (2 MT/ Hr)	6.48
Pack house-Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-5000 MT	40.50

Onion store	5.40
Ripening chamber	3.50
Total	**91.03**

The building construction rate for fruit pack house (cold chain) has been estimated to be Rs.9000/sq. m whereas rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store has been assumed at Rs. 10000/sq. m. The lumpsum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration system-25 MT	2.50
Refrigeration potato store	36.00
Precoolers-5 MT	1.80
Sorting grading line-3 MT/hr	9.00
Pulping line	30.00
Ripening equipments	4.50
Pallets	1.08
Crates	2.25
Pallet Movers	0.08
Weighing scales-500 kg	0.30
Sorting grading tables	0.18
De-sapping tables	0.75
Refer vehicles-7 MT	12.00
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**105.24**

The cost wise major components of the project are refrigeration equipments for potato cold stores (Rs. 36 mn), pulping line (Rs. 30 mn) and refrigerated trucks (Rs. 12 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	3.60
Power supply system	22.00
IT system	1.00
Furniture	0.50
Total	**27.10**

The power load for the project and capacity of DG sets has been estimated to be 355 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	80.54	28%
Capital Grant support-Government of Bihar	20.13	7%
Equity-Private Investor	57.53	20%
Debt	129.43	45%
Total	**287.63**	**100%**

7.7 Vaishali/ Hajipur District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure in Hajipur is as follows:

Land Area (in acres)	4.0
Proposed Facilities	
Pack house-Cold Chain	750 sqm (15 MT/day)
Pack house- Ambient	750 sqm (35 MT/day)
Warehouse-5000 MT	2300 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.37	0.09
	2	Land Development	8.96	0.16
	3	Buildings	38.65	0.70
	4	Plant Machinery & Equipments	38.34	0.69
	5	Utilities & other fixed assets	5.30	0.09
		Sub Total (A)	**96.63**	**1.75**
B		Preliminary and Pre-Operative Expenses	4.83	0.08
C		Contingencies	8.23	0.15
D		Margin Money for Working	0.78	0.01

		Capital		
		Total Project Cost (A+B+C+D)	**110.46**	**2.01**

- *Land cost has been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 50.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facilities	Rs. (Mn)
Pack house-Cold Chain	6.75
Pack house-Ambient	5.40
Warehouse-5000 MT	23.00
Ripening chamber	3.50
Total	**38.65**

The building construction rate for fruit pack house (cold chain) has been estimated to be Rs.9000/sq. m whereas rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains has been assumed at Rs. 10000/sq. m. The lumpsum cost of pre-fabricated banana ripening

chamber of 40 MT capacity has been taken as Rs. 3.5 million. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration system-25 MT	2.50
Precoolers-5 MT	1.80
Sorting grading line-3 MT/hr	9.00
Ripening equipments	4.50
Pallets	1.08
Crates	2.25
Pallet Movers	0.08
Weighing scales-500 kg	0.30
Sorting grading tables	0.18
De-sapping tables	0.75
Refer vehicles-7 MT	12.00
Normal Pickup vehicles	0.90
Normal trucks-15 MT	3.00
Total	**38.34**

The cost wise major components of the project are refrigerated trucks (Rs. 12 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	2.40
Power supply system	2.50

IT system	0.20
Furniture	0.20
Total	**5.30**

The power load for the project and capacity of DG sets has been estimated to be 130 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	30.93	28%
Capital Grant support-Government of Bihar	7.73	7%
Equity-Private Investor	22.09	20%
Debt	49.71	45%
Total	**110.46**	**100%**

7.8 Darbhanga District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure in Darbhanga is as follows:

Land Area (in acres)	1.2
Proposed Facilities	
Pack house- Ambient	750 sqm (35 MT/day)
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	1.61	0.02
	2	Land Development	2.68	0.04
	3	Buildings	8.9	0.16
	4	Plant Machinery & Equipments	11.85	0.21
	5	Utilities & other fixed assets	4.10	0.07
		Sub Total (A)	**29.13**	**0.53**
B		Preliminary and Pre-Operative Expenses	1.38	0.02
C		Contingencies	2.48	0.04
D		Margin Money for Working Capital	0.22	0.01
		Total Project Cost (A+B+C+D)	**31.60**	**0.57**

- *Land cost has been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facilities	Rs. (Mn)
Pack house-Ambient	5.40
Ripening chamber	3.50
Total	**8.90**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The lumpsum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Ripening equipments	4.50
Crates	2.25
Weighing scales-500 kg	0.30

Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**11.85**

The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	1.20
Power supply system	2.50
IT system	0.20
Furniture	0.20
Total	**4.10**

The power load for the project and capacity of DG sets has been estimated to be 40 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	8.85	28%
Capital Grant support-Government of Bihar	2.21	7%
Equity-Private Investor	6.32	20%
Debt	14.22	45%
Total	**31.60**	**100%**

7.9 Samastipur/ Dalsinghsarai District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure in Dalsinghsarai is as follows:

Land Area (in acres)	3.5
Proposed Facilities	
Pack house- Ambient	750 sqm (35 MT/day)
Warehouse-5000 MT	2300 sqm
Onion store-500 MT	540 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.11	0.09
	2	Land Development	8.52	0.15
	3	Buildings	37.30	0.67
	4	Plant Machinery & Equipments	11.85	0.21
	5	Utilities & other fixed assets	3.60	0.06
		Sub Total (A)	**66.39**	**1.20**
B		Preliminary and Pre-Operative Expenses	3.32	0.06
C		Contingencies	5.58	0.10

D		Margin Money for Working Capital	0.50	0.01
		Total Project Cost (A+B+C+D)	**70.68**	**1.28**

- *Land cost has been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facilities	Rs. (Mn)
Pack house-Ambient	5.40
Warehouse-5000 MT	23.00
Onion store	5.40
Ripening chamber	3.50
Total	**37.30**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store has been assumed at Rs. 10000/sq. m. The lumpsum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Ripening equipments	4.50
Crates	2.25
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**11.85**

The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	1.20
Power supply system	2.00
IT system	0.20
Furniture	0.20
Total	**3.60**

The power load for the project and capacity of DG sets has been estimated to be 80 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	19.79	28%
Capital Grant support-Government of Bihar	4.95	7%

Equity-Private Investor	14.14	20%
Debt	31.81	45%
Total	**70.68**	**100%**

7.10 Begusarai District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure in Begusarai is as follows:

Land Area (in acres)	3.5
Proposed Facilities	
Pack house- Ambient	750 sqm (35 MT/day)
Warehouse-5000 MT	2300 sqm
Onion store-500 MT	540 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.11	0.09
	2	Land Development	8.52	0.15
	3	Buildings	37.30	0.67
	4	Plant Machinery & Equipments	11.29	0.20
	5	Utilities & other fixed assets	4.60	0.08
		Sub Total (A)	**66.83**	**1.21**
B		Preliminary and Pre-Operative Expenses	3.34	0.06
C		Contingencies	5.63	0.10
D		Margin Money for Working	0.50	0.01

		Capital		
		Total Project Cost (A+B+C+D)	**71.18**	**1.29**

- *Land cost has been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facilities	Rs. (Mn)
Pack house-Ambient	5.40
Warehouse-5000 MT	23.00
Onion store	5.40
Ripening chamber	3.50
Total	**37.30**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store has been assumed at Rs. 10000/sq. m. The lumpsum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Ripening equipments	4.50
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**11.29**

The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	1.20
Power supply system	3.00
IT system	0.20
Furniture	0.20
Total	**4.60**

The power load for the project and capacity of DG sets has been estimated to be 80 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	19.93	28%
Capital Grant support-Government of Bihar	4.98	7%

Equity-Private Investor	14.24	20%
Debt	32.03	45%
Total	**71.18**	**100%**

7.11 Patna District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Patna is as follows:

Land Area (in acres)	6.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	2700 sqm (5000 MT)
Onion store- 500 MT	540 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	8.45	0.15
	2	Land Development	14.08	0.25
	3	Buildings	77.80	1.41
	4	Plant Machinery & Equipments	47.29	0.86
	5	Utilities & other fixed assets	13.10	0.23
		Sub Total (A)	**160.72**	**2.92**
B		Preliminary and Pre-Operative Expenses	8.04	0.14

C		Contingencies	13.80	0.25
D		Margin Money for Working Capital	0.96	0.01
		Total Project Cost (A+B+C+D)	**183.52**	**3.33**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-5000 MT	40.50
Onion store	5.40
Ripening chamber	3.50
Total	**77.80**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The lump sum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Ripening equipments	4.50
Electronics auction system	0.00
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**47.29**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	3.60
Power supply system	8.00
IT system	1.00
Furniture	0.50
Total	**13.10**

The power load for the project and capacity of DG sets has been estimated to be 230 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	51.38	28.00%

Capital Grant support- Government of Bihar	12.85	7.00%
Equity-Private Investor	36.70	20.00%
Debt	82.58	45.00%
Total	**183.52**	**100.00%**

7.12 Nalanda/ Bihar Sharif District

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Bihar Sharif is as follows:

Land Area (in acres)	6.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	2700 sqm (5000 MT)
Onion store- 500 MT	540 sqm
Ripening chamber- 10 MT/day	550 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	8.45	0.15
	2	Land Development	14.08	0.25
	3	Buildings	77.80	1.41
	4	Plant Machinery & Equipments	47.29	0.86
	5	Utilities & other fixed assets	13.10	0.23
		Sub Total (A)	**160.72**	**2.92**
B		Preliminary and Pre-Operative Expenses	8.04	0.14

C		Contingencies	13.80	0.25
D		Margin Money for Working Capital	0.96	0.01
		Total Project Cost (A+B+C+D)	**183.52**	**3.33**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-5000 MT	40.50
Onion store	5.40
Ripening chamber	3.50
Total	**77.80**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The lump sum cost of pre-fabricated banana ripening chamber of 40 MT capacity has been taken as Rs. 3.5 million. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Ripening equipments	4.50
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**47.29**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	3.60
Power supply system	8.00
IT system	1.00
Furniture	0.50
Total	**13.10**

The power load for the project and capacity of DG sets has been estimated to be 230 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	51.38	28.00%
Capital Grant support- Government of Bihar	12.85	7.00%
Equity-Private Investor	36.70	20.00%

Debt	82.58	45.00%
Total	**183.52**	**100.00%**

7.13 Gaya District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Gaya is as follows:

Land Area (in acres)	4.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	1080 sqm (2000 MT)
Onion store- 500 MT	540 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.77	0.10
	2	Land Development	9.62	0.17
	3	Buildings	50.0	0.90
	4	Plant Machinery & Equipments	42.41	0.77
	5	Utilities & other fixed assets	7.10	0.12
		Sub Total (A)	**114.90**	**2.08**
B		Preliminary and Pre-Operative Expenses	5.46	0.09

C		Contingencies	9.85	0.17
D		Margin Money for Working Capital	0.65	0.01
		Total Project Cost (A+B+C+D)	**125.09**	**2.27**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-2000 MT	16.20
Onion store	5.40
Total	**50.0**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**42.41**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	2.40
Power supply system	4.00
IT system	0.50
Furniture	0.20
Total	**7.10**

The power load for the project and capacity of DG sets has been estimated to be 190 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	35.02	28.00%
Capital Grant support- Government of Bihar	8.76	7.00%

Equity-Private Investor	25.02	20.00%
Debt	56.29	45.00%
Total	**125.09**	**100.00%**

7.14 Rohtas/ Nokha District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Nokha is as follows:

Land Area (in acres)	4.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	1080 sqm (2000 MT)
Onion store- 500 MT	540 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.77	0.10
	2	Land Development	9.62	0.17
	3	Buildings	50.0	0.90
	4	Plant Machinery & Equipments	42.41	0.77
	5	Utilities & other fixed assets	7.10	0.12
		Sub Total (A)	**114.90**	**2.08**
B		Preliminary and Pre-Operative Expenses	5.46	0.09

C		Contingencies	9.85	0.17
D		Margin Money for Working Capital	0.65	0.01
		Total Project Cost (A+B+C+D)	**125.09**	**2.27**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-2000 MT	16.20
Onion store	5.40
Total	**50.0**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**42.41**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	2.40
Power supply system	4.00
IT system	0.50
Furniture	0.20
Total	**7.10**

The power load for the project and capacity of DG sets has been estimated to be 190 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	35.02	28.00%
Capital Grant support- Government of Bihar	8.76	7.00%
Equity-Private Investor	25.02	20.00%

Debt	56.29	45.00%
Total	**125.09**	**100.00%**

7.15 Buxar District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Buxar is as follows:

Land Area (in acres)	4.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	1080 sqm (2000 MT)
Onion store- 500 MT	540 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.77	0.10
	2	Land Development	9.62	0.17
	3	Buildings	50.00	0.90
	4	Plant Machinery & Equipments	42.41	0.77
	5	Utilities & other fixed assets	7.10	0.12
		Sub Total (A)	**114.90**	**2.08**
B		Preliminary and Pre-Operative Expenses	5.46	0.09
C		Contingencies	9.85	0.17

D		Margin Money for Working Capital	0.65	0.01
		Total Project Cost (A+B+C+D)	**125.09**	**2.27**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-2000 MT	16.20
Onion store	5.40
Total	**50.0**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**42.41**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	2.40
Power supply system	4.00
IT system	0.50
Furniture	0.20
Total	**7.10**

The power load for the project and capacity of DG sets has been estimated to be 190 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	35.02	28.00%
Capital Grant support- Government of Bihar	8.76	7.00%
Equity-Private Investor	25.02	20.00%
Debt	56.29	45.00%
Total	**125.09**	**100.00%**

7.16 Bhojpur/ Arrah District Details

Land Area and Proposed Facilities

The revised land area and value added facilities/infrastructure proposed in Arrah is as follows:

Land Area (in acres)	4.0
Proposed Facilities	
Vegetable Pack sheds-Ambient	750 sqm (35 MT/ day)
Warehouse-5000 MT	2300 sqm
Potato Cold Store	1080 sqm (2000 MT)
Onion store- 500 MT	540 sqm

As discussed above, land areas have been calculated based upon the constructed area of the proposed value added infrastructure for perishable items. The above proposed facilities are the same as suggested earlier in the Detailed Project Report.

Revised Project Cost

The component wise costs of the project are given below:

Items	Sr. No.	Description	Amount (Rs Mn)	Amount (Mn $)
A	1	Land*	5.77	0.10
	2	Land Development	9.62	0.17
	3	Buildings	50.0	0.90
	4	Plant Machinery & Equipments	42.41	0.77
	5	Utilities & other fixed assets	7.10	0.12
		Sub Total (A)	**114.90**	**2.08**
B		Preliminary and Pre-Operative Expenses	5.46	0.09
C		Contingencies	9.85	0.17

D		Margin Money for Working Capital	0.65	0.01
		Total Project Cost (A+B+C+D)	**125.09**	**2.27**

- *Land cost been assumed as Rs. 15 lacs /acre, however; it would vary from location to location in that district.
- All figures are in Indian Rs. and USD, currency exchange rate for US dollars has been taken as 1$= Rs. 55.00.

The above cost estimates for IVCs consist of construction of new value added infrastructure. The cost estimates of plant and machinery, civil work and basic infrastructure have been updated as per the industry standards.

Land Development

The land development cost includes the cost of developing the proposed facilities/infrastructure in the regions. Cost of land development includes boundary wall, internal roads, water supply, drainage facilities, parking etc. The average cost of development is coming at Rs 2.5 mn/acre.

Buildings

The estimated cost of construction for various buildings in the project is given below:

Facility	Rs. (Mn)
Pack house- Ambient	5.40
Warehouse-5000 MT	23.00
Potato Cold Store-2000 MT	16.20
Onion store	5.40
Total	**50.0**

The building construction rate for ambient pack house for fruit and vegetable has been estimated to be Rs. 7200/sq. m. The construction rate for dry warehouse for grains and onion store have been assumed at Rs. 10000/sq. m. The construction cost of potato cold store with pre-fabricated insulated building is estimated at Rs. 15000/sq. m. The rates are in tune to the industry standards and have been verified from different industry players.

Equipment

The details of the estimated cost of major machineries are provided below:

Facility	Rs. (Mn)
Refrigeration potato store	36.00
Crates	1.69
Weighing scales-500 kg	0.30
Normal Pickup vehicles	1.80
Normal trucks-15 MT	3.00
Total	**42.41**

The cost wise major components of the project are refrigeration for potato stores (Rs. 36 mn). The rates for plant, machinery and equipments are comparable to the industry standards and have been verified from different suppliers.

Miscellaneous Fixed Assets / Utilities

The details of the estimated cost of the miscellaneous fixed assets and utilities are provided below:

Facility	Rs. (Mn)
DG sets	2.40
Power supply system	4.00
IT system	0.50
Furniture	0.20
Total	**7.10**

The power load for the project and capacity of DG sets has been estimated to be 190 KVA each.

Means of Finance:

Components	Amount (Rs Mn)	Proportion (%)
Capital Grant support- Asian Development Bank	35.02	28.00%
Capital Grant support- Government of Bihar	8.76	7.00%
Equity-Private Investor	25.02	20.00%

Debt	56.29	45.00%
Total	**125.09**	**100.00%**

7.17 Consolidated Means of Finance: Muzaffarpur and Nalanda IVCs

Table 16: Consolidated Means of Finance: Muzaffarpur and Nalanda IVCs

	Earlier Proposed		Revised	
Components	**Amount (Rs Mn)**	**Proportion (%)**	**Amount (Rs Mn)**	**Proportion (%)**
Capital Grant support- Asian Development Bank	1548.96	56.00%	413.04	28.00%
Capital Grant support- Government of Bihar	387.24	14.00%	103.26	7.00%
Equity-Private Investor	829.8	30.00%	295.03	20.00%
Debt	0.00	0.00%	663.81	45.00%
Total	**2766**	**100.00%**	**1475.14**	**100.00%**

In the revised model, the requisite contribution from State Government would be Rs. 516.30 million. This would include a capital grant of Rs. 413.04 million from ADB, compared to Rs. 1548.96 million proposed earlier.

7.18 Financial Performance

The estimated financial projections for the **Muzaffarpur IVC** project are tabulated below:

Table 17: Estimated Financial Projections for Muzaffarpur IVC

(Rs Million)

Year	1	2	3	8	12	16	20
Capacity Utilization							
Ambient facilities	60%	60%	70%	80%	80%	80%	80%
Cold facilities	50%	50%	60%	80%	80%	80%	80%
Logistics & Handling facilities	60%	60%	70%	80%	80%	80%	80%
Revenue							
A. Ambient Facilities							
Rental- Pack House Ambient	1.01	1.01	1.18	1.35	1.35	1.35	1.35
Rental- Warehouse	4.14	4.14	4.83	5.52	5.52	5.52	5.52
Sub Total (A)	**5.15**	**5.15**	**6.01**	**6.87**	**6.87**	**6.87**	**6.87**
B. Cold Facilities							
Rental- Pack House Cold Chain	3.31	3.31	3.97	5.29	5.29	5.29	5.29
Rental Potato Cold Store	6.88	6.88	8.25	11.00	11.00	11.00	11.00
Rental-Onion Store	0.23	0.23	0.27	0.36	0.36	0.36	0.36
Rental-Ripening Chambers	11.25	11.25	13.50	18.00	18.00	18.00	18.00
Rental-Fruit Processing unit	10.75	10.75	12.90	17.20	17.20	17.20	17.20
Sub Total (B)	**32.41**	**32.41**	**38.89**	**51.86**	**51.86**	**51.86**	**51.86**
C. Logistics & Handling Facilities							
Rental- Logistic	77.76	77.76	90.72	103.68	103.68	103.68	103.68
Rental- Crates	15.39	15.39	17.96	20.52	20.52	20.52	20.52
Weighbridge	0.30	0.30	0.35	0.40	0.40	0.40	0.40
Sub Total (C.)	**93.45**	**93.45**	**109.03**	**124.60**	**124.60**	**124.60**	**124.60**
Revenue	**131.01**	**131.01**	**153.93**	**183.33**	**183.33**	**183.33**	**183.33**
Expenses							
Power & Fuel	6.02	6.02	7.03	8.03	8.03	8.03	8.03
Employee Cost	7.02	7.37	7.74	8.96	8.96	8.96	8.96
Water cost	1.01	1.01	1.18	1.35	1.35	1.35	1.35
Maintenance cost	4.83	4.95	5.07	5.74	6.33	6.99	7.72
Insurance	4.21	3.58	3.04	1.35	0.70	0.37	0.19
Admin & Selling Overheads	2.62	2.62	3.08	3.67	3.67	3.67	3.67
Total Expenses	**25.71**	**25.55**	**27.14**	**29.09**	**29.04**	**29.36**	**29.91**
EBITDA	**105.30**	**105.46**	**126.79**	**154.24**	**154.29**	**153.97**	**153.42**
Interest Long Term Debt (LTD)	38.07	36.49	32.26	11.10	0.00	0.00	0.00
Interest Working Capital borrowing	1.64	1.63	1.80	1.89	1.79	1.79	1.80
Depreciation	34.30	34.30	34.30	34.30	8.08	8.08	8.08
PBT	**31.29**	**33.05**	**58.44**	**106.95**	**144.41**	**144.09**	**143.53**
Tax	0.00	0.00	12.66	38.10	45.45	47.27	48.10
Net Profit (PAT)	**31.29**	**33.05**	**45.77**	**68.85**	**98.96**	**96.82**	**95.43**

In the above table, it is seen that in the first year of operations with mentioned capacity utilization, the revenue from the project is Rs. 131.01 million which increases to Rs. 153.93 million during third year and to Rs. 183.33 million during eighth year. The net profit to private developer would be Rs 31.29 million during first year of operation which increases to Rs. 45.77 million during third year and to Rs. 68.85 million during eight year of operation.

7.19 Major Financial Performance Indicators

Table 18: Major Financial Performance Indicators

Year	1	2	3	4	5	6	7
PAT margin	23.88%	25.22%	29.74%	29.88%	34.38%	34.85%	36.69%
Interest Coverage Ratio	2.65	2.77	3.72	4.25	5.75	6.88	8.93
DSCR	2.65	1.57	2.01	2.15	2.69	2.92	3.32
Average DSCR	2.40						
Project IRR	18.54%						

The above table shows the financial efficiencies of the project. The project has an average DSCR of 2.40, therefore; the project has enough cash flow available to meet annual interest and principal payments on debt. The project IRR is coming as 18.54%, which seems attractive from an investor point of view.

The estimated financial projections for the **Patna- Nalanda IVC** project are tabulated below:

Table 19: estimated financial projections for the Patna- Nalanda IVC project

(Rs Million)

Year	1	2	3	8	12	16	20
Capacity Utilization							
Ambient facilities	60%	60%	70%	80%	80%	80%	80%
Cold facilities	50%	50%	60%	80%	80%	80%	80%
Logistics & Handling facilities	60%	60%	70%	80%	80%	80%	80%
Revenue							
A. Ambient Facilities							
Rental- Pack House Ambient	1.22	1.22	1.42	1.62	1.62	1.62	1.62
Rental- Warehouse	6.21	6.21	7.25	8.28	8.28	8.28	8.28
Sub Total (A)	**7.43**	**7.43**	**8.66**	**9.90**	**9.90**	**9.90**	**9.90**
B. Cold Facilities							
Rental Potato Cold Store	24.75	24.75	29.70	39.60	39.60	39.60	39.60
Rental-Onion Store	0.45	0.45	0.54	0.72	0.72	0.72	0.72
Rental-Ripening Chambers	4.50	4.50	5.40	7.20	7.20	7.20	7.20
Sub Total (B)	**25.20**	**25.20**	**30.24**	**40.32**	**40.32**	**40.32**	**40.32**
C. Logistics & Handling Facilities							
Rental- Logistic	77.76	77.76	90.72	103.68	103.68	103.68	103.68
Rental- Crates	12.42	12.42	14.49	16.56	16.56	16.56	16.56
Weighbridge	0.36	0.36	0.42	0.48	0.48	0.48	0.48
Sub Total (C.)	**90.54**	**90.54**	**105.63**	**120.72**	**120.72**	**120.72**	**120.72**
Revenue	**123.17**	**123.17**	**144.53**	**170.94**	**170.94**	**170.94**	**170.94**

Expenses							
Power & Fuel	10.65	10.65	12.42	14.20	14.20	14.20	14.20
Employee Cost	8.42	8.85	9.29	10.75	10.75	10.75	10.75
Water cost	1.11	1.11	1.30	1.49	1.49	1.49	1.49
Maintenance cost	7.41	7.60	7.79	8.81	9.72	10.73	11.85
Insurance	6.51	5.53	4.70	2.09	1.09	0.57	0.30
Admin & Selling Overheads	2.46	2.46	2.89	3.42	3.42	3.42	3.42
Total Expenses	**36.57**	**36.20**	**38.39**	**40.75**	**40.67**	**41.15**	**42.00**
EBITDA	**86.59**	**86.96**	**106.14**	**130.19**	**130.27**	**129.79**	**128.94**
Interest Long Term Debt (LTD)	58.18	55.76	49.29	16.97	0.00	0.00	0.00
Interest Working Capital borrowing	1.84	1.82	1.96	1.93	1.79	1.79	1.80
Depreciation	50.93	50.93	50.93	50.93	13.49	13.49	13.49
PBT	**-24.36**	**-21.54**	**3.96**	**60.36**	**115.00**	**114.51**	**113.66**
Tax	0.00	0.00	0.00	24.16	35.46	38.28	39.56
Net Profit (PAT)	**-24.36**	**-21.54**	**3.96**	**36.20**	**79.54**	**76.23**	**74.10**

In the above table, it is seen that in the first year of operations with mentioned capacity utilization, the revenue from the project is Rs. 123.17 million which increases to Rs. 144.53 million during third year and to Rs. 170.94 million during eighth year. The net profit to private developer would be Rs 3.96 million during third year of operation which increases to Rs. 36.20 million during eighth year and to Rs. 79.54 million during twelfth year of operation. However, with the increase in capacity utilization of all proposed facilities, net profit would be positive from first year of operations as discussed in the Sensitivity analysis.

7.20 Major Financial Performance Indicators

Table 20: Major Financial Performance Indicators

Year	1	2	3	4	5	6	7
PAT margin	0.00%	0.00%	2.74%	7.28%	21.54%	25.34%	31.41%
Interest Coverage Ratio	1.44	1.51	2.07	2.37	3.26	3.92	5.12
DSCR	1.44	0.85	1.11	1.19	1.51	1.63	1.86
Average DSCR	1.33						
Project IRR	11.10%						

The above table shows the financial efficiencies of the project. The project has an average DSCR of 1.33, therefore; the project has enough cash flow available to meet annual interest and principal payments on debt. The project IRR is coming as 11.10%; this would increase with an increase in the capacity utilization as discussed in the sensitivity analysis.

7.21 Sensitivity Analysis: Muzaffarpur IVC

The sensitivity analysis has been given below to see the effect of different levels of capacity utilization on the project. The various levels of capacity utilization of all proposed facilities have been tested. The sensitivity analysis of financial performance indicator (IRR) of the project with respect to capacity utilization is given below:

- Project IRR with following scenario: 21.00%

Year	Year 1&2	Year 3&4	Year 5 &6	Year 7 and onwards
Capacity Utilization				
Ambient facilities	70%	80%	90%	90%
Cold facilities	60%	70%	80%	90%
Logistics & Handling facilities	70%	80%	90%	90%

- Project IRR with following scenario: 23.00%

Year	Year 1&2	Year 3&4	Year 5 &6	Year 7 and onwards
Capacity Utilization				
Ambient facilities	80%	90%	100%	100%
Cold facilities	70%	80%	90%	100%
Logistics & Handling facilities	80%	90%	100%	100%

Analysis of the above tables shows that with the increase in capacity utilization of the proposed facilities of the project, the project equity IRR would also increase, therefore; the project is highly attractive from bidder/developer's perspective.

7.22 Sensitivity Analysis: Nalanda- Patna IVC

The sensitivity analysis has been given below to see the effect of different levels of capacity utilization on the project. The various levels of capacity utilization of all proposed facilities have been tested. The sensitivity analysis of financial performance indicator (IRR) of the project with respect to capacity utilization is given below:

- Project IRR with following scenario: 13.00%

Year	Year 1&2	Year 3&4	Year 5 &6	Year 7 and onwards
Capacity Utilization				
Ambient facilities	70%	80%	90%	90%
Cold facilities	60%	70%	80%	90%
Logistics & Handling facilities	70%	80%	90%	90%

- Project IRR with following scenario: 14.50%

Year	Year 1&2	Year 3&4	Year 5 &6	Year 7 and onwards
Capacity Utilization				
Ambient facilities	80%	90%	100%	100%
Cold facilities	70%	80%	90%	100%
Logistics & Handling facilities	80%	90%	100%	100%

Analysis of the above tables shows that with the increase in capacity utilization of the proposed facilities of the project, the project IRR would also increase. Also, with the increase in capacity utilization of proposed facilities upto 100% in a phased manner, net profit to private investor would be positive from first year of operation, therefore; the project is attractive from bidder/developer's perspective.

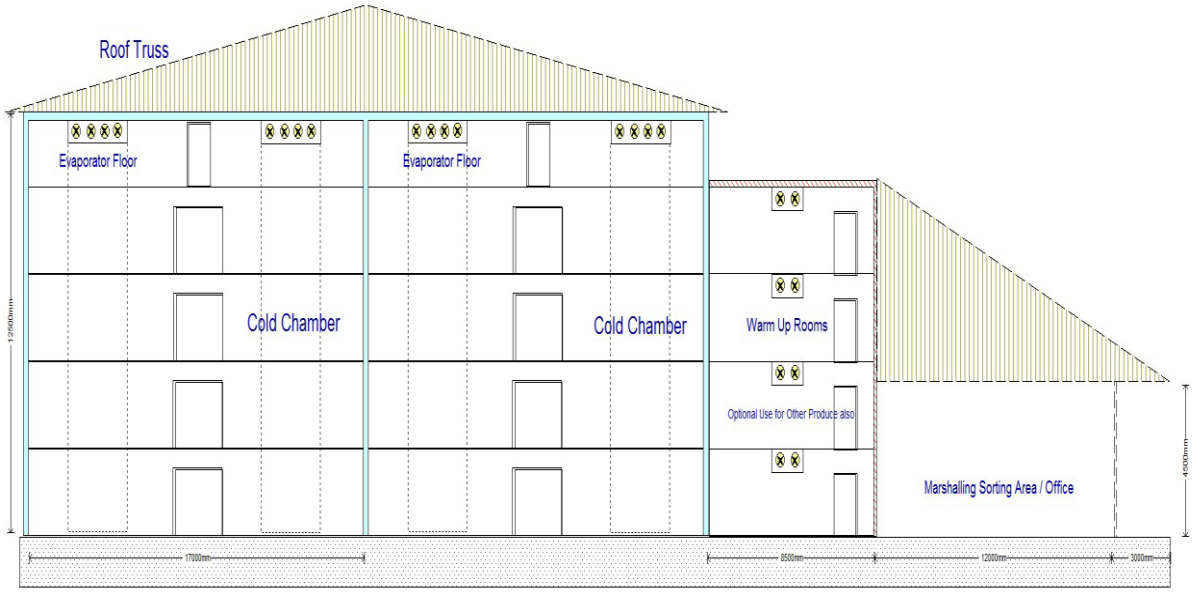
7.23 Sensitivity Analysis: Muzaffarpur & Patna- Nalanda IVCs

The sensitivity analysis has been done to see the effect of power scenario in the state. It has been assumed that the facilities would run on DG sets for 4 hrs per day instead of 2 hrs per day. This would increase the fuel cost and hence; project IRR would drop to 18.15% in Muzaffarpur region and 10.61% in Patna- Nalanda region.

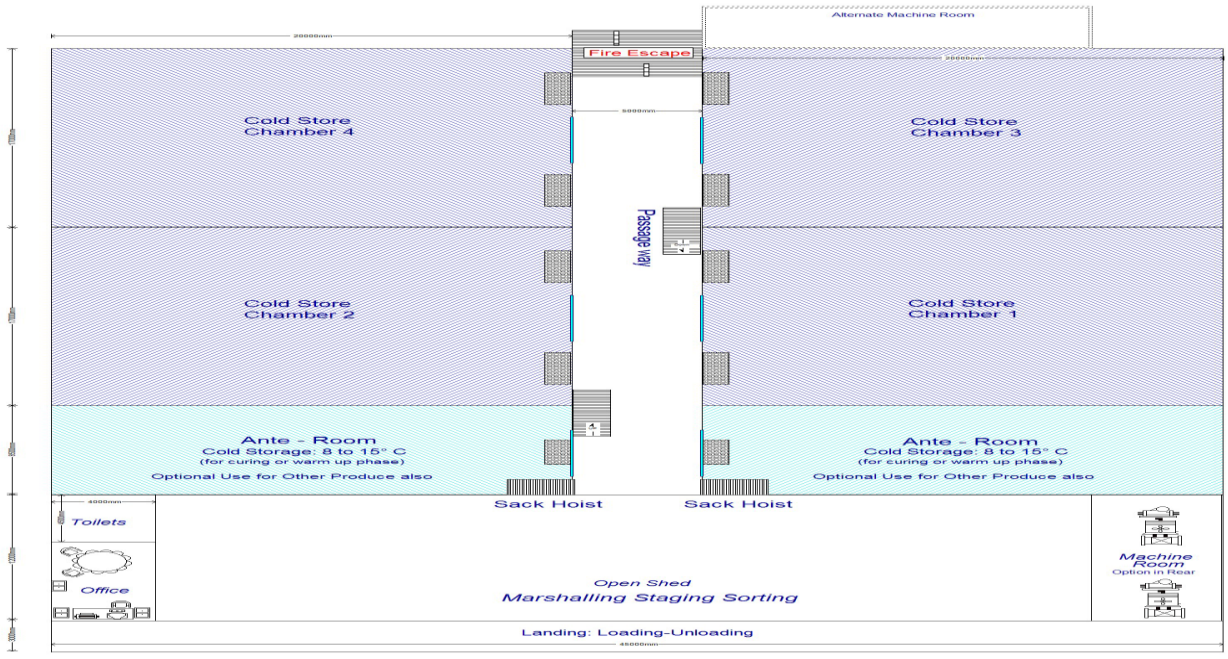
7.24 Layout

These are the tentative layouts of the Cold storage, Cold Chambers and Ripening facility proposed to be set up in the IVCs.

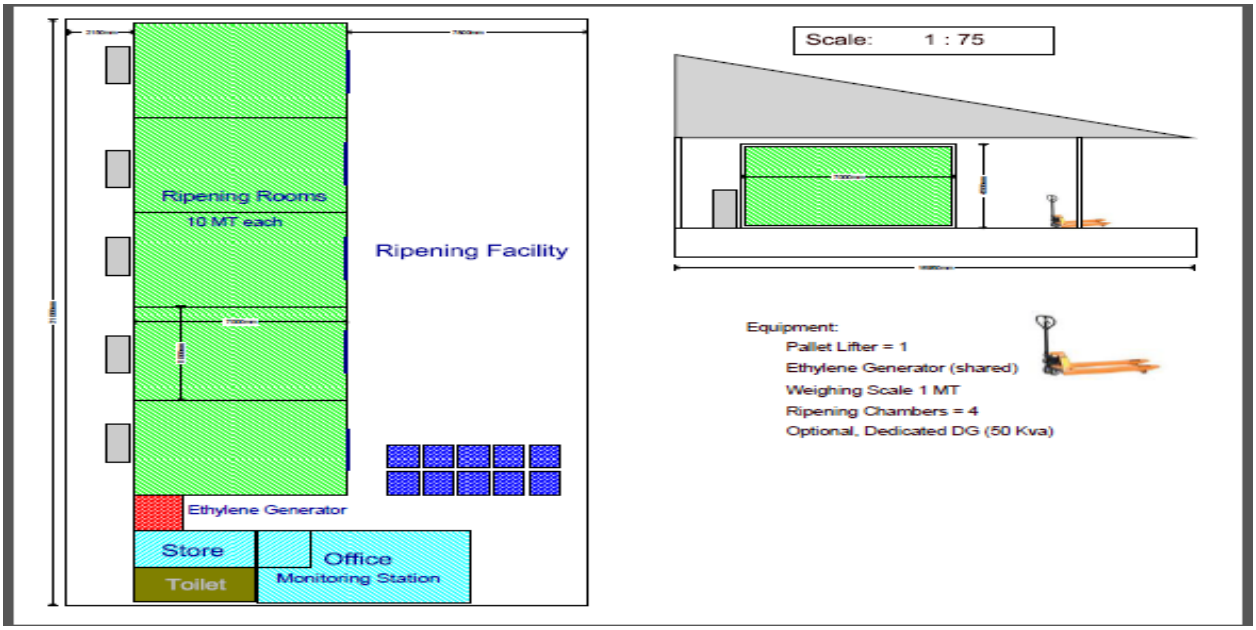
Cold Storage



Cold Chambers



Ripening Facility



Draft AIDIP Scheme

8. Draft Scheme for Implementation of AIDIP in Bihar and Details of Investors' Meet for AIDIP Investment Programme

8.1 Background & Objectives of the Scheme

a. Agribusiness Infrastructure Development Investment Programme (AIDIP), a joint initiative of Asian Development Bank with Government of Bihar, is primarily aimed at development of integrated value chains (IVC) for horticultural produces in the state, through private sector participation. This would involve participation of new entrepreneurs along with existing entrepreneurs in the supply chains of horticultural produces and integrate them into new, ordered and more efficient structures that employ the use of improved infrastructure and systems.

b. In the first phase of AIDIP, two integrated value chains (IVCs) are proposed to be set up over 11 districts in the state. While one IVC would be located in the districts of Muzaffarpur, Vaishali, Darbhanga, Samastipur and Begusarai, the second IVC would be in the districts of Nalanda, Patna, Gaya, Bhojpur, Buxar and Rohtas. In due course, other IVC locations would be identified in the state.

c. The expected outcome is increased price realization for farmers with reduction in wastages, capacity building of the farmers and significant direct and indirect employment generation.

8.2 Salient Features of the Scheme

a. AIDIP Scheme would provide capital grant assistance to private investors for creating modern infrastructure facilities for horticulture produces, including need based marketing infrastructure. The facilities to be funded under the Scheme may primarily include pack houses, cold stores, collection centres, marketing infrastructure and other cold chain infrastructure.

b. The land area required for establishing the proposed IVCs is estimated to be between 5- 10 acres, though the actual requirement of land would depend upon the business plan, which may vary from region to region.

c. Land for the project shall be purchased / arranged by the investors. The registered value of such land would be taken as part of the project cost and contribution/share of the promoters.

8.3 Pattern of Assistance

a. The benefits under this Scheme would be available to all categories of private investors. The Scheme shall provide capital of 35 % of the eligible project cost which would include cost of land but would not include Margin Money for Working Capital and Contingencies. However, cost of land for calculating eligible project cost will be restricted to 10 percent of project cost in rural areas and 20 percent in Municipal areas.

   In addition, the benefits of the New Industrial Policy, 2011 of the State Government would also be available for the projects sanctioned under this scheme.

b. The project cost for the purpose of this Scheme would include:

   I. Post- Harvest Infrastructure: It may include setting up of sorting/grading facilities, collection centers, pack houses, cold chain facilities including IQF, reefer vans, ripening chambers and Controlled Atmosphere (CA) chambers.

   II. Marketing Infrastructure: It may include setting up of market sheds, auction platforms and other associated infrastructure including trade center, display center etc.

   III. Physical and Environmental Infrastructure: It may include internal roads, drainage, water supply, sewerage, power supply including captive power plant, effluent collection, treatment & disposal, hazardous waste management facility etc.

   The facilities mentioned above are only illustrative and the project may cover any other need-based facility that is vital for sustainability of various post harvest infrastructure facilities.

8.4 Eligibility & Funding

a. The assistance under the Scheme would be available to individuals, Partnership firms, and all entities registered under Companies Act, 1956. In case of farmers groups, co-operatives may also be considered eligible. In addition, foreign entities would also be eligible under the Scheme, subject to existing FDI rules of Government of India.

b. The applicant needs to bring in at least 20 % of project cost, including cost of land, as equity contribution.

c. The net worth of the applicant/promoters should be at least 1.5 times of the proposed equity in the project.

d. The applicant with suitable experience in handling of horticultural produces would be given preference.

e. The capital grant assistance under the Scheme would be 35% of the eligible project cost

8.5 Implementation Process

a. Application Process: Investors, if they meet the criteria for assistance under the Scheme, have to submit a detailed project report to State Government which would be considered for approval.

b. The promoters would have to undertake following activities during the project implementation:

- Procurement of land
- Submission of Project Report/Business Plan
- Financial Closure of the project
- Obtaining all necessary statutory clearances, including environmental clearances
- Designing and construction of the value added facilities
- Operation & Maintenance

c. The State Government is likely to engage a Technical Assistance Group (TAG) for implementation of the Scheme. The selected TAG would assist the State Government in following activities under the scheme:

I. Marketing of the Scheme

II. Assistance in selection of applicants through appraisal of project reports

III. Drafting Memorandum of Agreement to be signed with the investors

IV. Assistance in Monitoring and Supervision of projects

V. Assistance in release of grant to investors as per milestones defined

8.6 Release of Funds

Once the project receives the Final Approval of the Approval Committee (AC), the grant support would be released by the State Government to the applicant investors as per the following schedules subject to fulfilment of the related conditions stated below, by the applicant:

1. First Installment of 20 percent of total grant under the Scheme would be released subject to fulfilment of following criteria:

   I. Establishment of No-lien Account with any Scheduled Commercial Bank.

   II. Submission of documents in lieu of proof of possession of land for all project locations along with construction schedule.

   III. Bank Loan Disbursement of at least 20 percent of the approved term loan amount.

   IV. Expenditure certificate from Chartered Accountant confirming expenditure of at least 20 percent of applicant's equity contribution out of the eligible project cost.

2. Second Installment representing 30 percent of approved grant assistance would be released to the applicant subject to fulfilment of following criteria:

   I. Utilization Certificate for the grant released as 1st installment.

   II. Expenditure certificate from Chartered Accountant confirming expenditure of at least 50 percent of applicant's equity contribution out of the eligible project cost.

   III. Bank Loan Disbursement of at least 50 percent of the approved term loan amount.

3. Third Installment representing 30 percent of approved grant assistance would be released to applicant subject to fulfilment of following criteria:

   I. Utilization Certificate for the grant released as 2nd installment.

   II. Expenditure certificate from Chartered Accountant confirming expenditure of 80 percent of applicant's equity contribution out of the eligible project cost.

   III. Bank Loan Disbursement of at least 80 percent of the approved term loan amount.

4. Fourth and final Installment representing 20 percent of approved grant assistance would be released to applicant subject to successful completion of project and commencement of operations. The criteria for completion of project are as follows:

   I. Utilization Certificate for the grant released as 3rd installment.

   II. Commencement of operations.

8.7 Project Monitoring and Evaluation

The State Government will periodically review the progress of the projects under the Scheme. The TAG would devise a suitable project monitoring system and shall furnish monthly reports/returns to the State Government on the progress of the approved projects. In so far as interpretation of any of the provisions of these guidelines is concerned, the decision of the State Government shall be final.

8.8 Investors' Meet for AIDIP Investment Programme

8.8.1 Background and Objective

The Technical Assistance (TA) programme of ADB for Advanced Project Preparedness for Poverty Reduction (Institutional Development for a Value Chain Approach to Agribusiness in Bihar) has been designed to address institutional and capacity constraints which may obstruct reforms to agricultural marketing and thus facilitate establishment of modern integrated value chains (IVCs), a key objective of AIDIP investment project.

The initial AIDIP implementation model had envisaged setting up these IVC facilities at identified market yard lands by private investors on Build, Operate and Transfer (BOT) model. The investors were to be provided capital grant through a competitive bidding process and they were to build and operate these facilities during the concession period of 20 years, before handing them back to state government.

However, the Government of Bihar later made following changes in the model :

- Maximum capital grant to the private sector investors to be reduced from 70% to 35% of the project cost, with no requirement of sharing of 30 % of gross revenue as earlier envisaged;
- Land for IVC projects to be brought in by private sector investors and not by the state government as earlier envisaged.

The main objective of this meeting organized by project consultant IL&FS Cluster Development Initiative Ltd. (IL&FS Clusters) on 26th February in Patna was to discuss the Project Information Memorandum (PIM), reflecting these changes in the operational model, and also proposed Draft Scheme for AIDIP investment project in Bihar and seek inputs from potential investors before finalizing this Scheme.

8.8.2 Expected Outcome

While the PIM formed part of Draft Final Report submitted under the TA Program to ADB and Government of Bihar, the Investors' Meet provided a platform to discuss various aspects of proposed operational model and scheme with potential investors in IVC projects in Bihar. For the newly constituted AIDIP PMU of the state government, which was present in the meeting in full strength, it was expected to bring out suggestions that would help in finalizing of the Scheme to meet expectation of investors.

8.8.3 Proceedings of the Meeting

The meeting was chaired by Mr. Ajay Yadav (I.A.S.), Mission Director, State Horticulture Mission and Project Director, PMU. The meeting started with IL&FS Clusters, welcoming all the participants and informing them about the agenda of the meeting.

Mr. Ajay Yadav, spoke about the potential and challenges in the agriculture sector in the state in general and the horticulture sector in particular. In the main he dilated on the following main issues:

1. Arguing that agriculture is the mainstay of Bihar's economy and around 80% of population depends on it, he explained the importance of agriculture in the context of Bihar. He further said that Bihar is blessed with different agri-produce which is being produced in various parts in the state like paddy, wheat, maize, Makhana fruits & Vegetables etc. It is precisely as an acknowledgement to the vast potential of agri-sector in state that Govt. of Bihar has launched the Agricultural Road Map to boost the sector.

2. Informing about the Road Map, he said that it pays attention to not only production, but also to basic infrastructure (roads and energy), productive infrastructure (e.g. irrigation), marketing, storage, processing, and research and education etc. The Road Map also proposes to bring in investment of Rs. 1500 billion over a period of 5 years. In order to achieve growth target of

different agri/horticulture produce as proposed in this Road Map, different govt. scheme are already functional, for example, several schemes of the Horticulture Mission.

3. He informed that out of the total proposed investment of Rs. 1500 billion, investment on infrastructure for storage, processing and marketing (Market infrastructure) together accounts for 17.5% i.e. Rs. 262.59 billion. The major portion of investment on market infrastructure includes investment from private sector whose contribution has been envisioned to the tune of 66 percent. The government role here would be to only act as facilitator.

4. The Project Director also highlighted action points to be executed like promoting organic farming on large scale, developing integrated value chain to enable value addition of agri produce, developing aggregation facility etc. He concluded by calling upon all the participants who are associated with agrimarketing to share their experience so that their valuable inputs can be considered in policy making.

After Mr. Yadav spoke, a presentation on PIM and the draft AIDIP Scheme was made by financial and PPP expert for TA Programme and Vice President, IL&FS Clusters, **Mr. Ravi Ranjan Mishra.** Mr Mishra began his presentation by outlining the importance of AIDIP. He argued that the project has immense importance for a state like Bihar since the repeal of APMC Act in the state has left a huge void in the field of agri-marketing. He informed the gathering about the background in which GoB decided to repeal the APMC act. He argued, that as far as the intention behind the decision to repeal the APMC was to eliminate the various layers of middlemen and get fair price to the farmers is concerned the decision can be lauded, however, the unfortunate aspect is that no viable substitute for agri-marketing could emerge. This has created a huge void in the area of agri-marketing besides relegating all the APMC yards to a state of dilapidation. Dwelling on PIM he informed the participants of the salient features of AIDIP scheme, objective of scheme, pattern of assistance, eligibility and funding criteria, implementation process, release of funds & project monitoring and evaluation.

He made a detailed presentation on PIM and explained assumptions for proposed IVC projects like land area, facilities, building cost, equipments cost etc. The details of total project cost of Rs. 583 Mn for Muzaffarpur IVC and Rs. 891.56 Mn for Biharshariff IVC was presented and discussed. The financial models developed for both the value chains (Muzaffapur & Biharshariff) were also shared containing operating, revenue and other financial assumptions.

Means of finance for both the value chains was also discussed highlighting the proportionate share of contribution that would come in the form of grant from Asian Development Bank and Government of Bihar, equity contribution from private investor and debt component from bank or any financial institution.

In addition, he also discussed the financial performance by presenting the future financial projections and key performance indicators like financial ratios for both the value chains.

However, it was stressed that the costs taken for working out these models are indicative and may vary depending on the components planned by investors in a particular IVC. Also, facilities presented were only for illustration purpose and any additional facilities may be added by the private investors at these locations in a phased manner, depending upon their own business plans.

Some of the salient points of the draft AIDIP scheme presented were following:

- The proposed Scheme would provide capital grant assistance to private investors for creating modern post-harvest infrastructure facilities for horticulture produces, including need based marketing infrastructure.
- The facilities to be funded under the Scheme may primarily include pack houses, cold stores, collection centres, marketing infrastructure and other cold chain infrastructure.
- The land area required for establishing the proposed IVCs is estimated to be between 5- 10 acres.

- Actual requirement of land would depend upon the business plan, which may vary from region to region.
- Land for the project shall be purchased / arranged by the investors.
- The registered value of land would be taken as part of the project cost and contribution/share of the promoters.
- The Scheme may provide capital of 35 % of the eligible project cost which would include cost of land but would not include Margin Money for Working Capital and Contingencies.
- Cost of land for calculating eligible project will be restricted to 10 percent of project cost in rural areas and 20 percent in Municipal areas.
- The benefits of the New Industrial Policy, 2011 of the State Government may also be available for the projects sanctioned under this scheme.

Next, **Mr. Awesh Jain** from Ruchi Soya Industries Limited (RSIL), a leading edible oil manufacturer in India with a major project recently operational in Bihar, made a presentation on live case study explaining how RSIL developed integrated value chain in case of Soyabean crop in Madhya Pradesh. Extending his discussion, he further elaborated about the model wherein Ruchi Group has created Service Centers for farmer education, agri-produce purchase, improved seeds sale, fertilizer & micronutrient sales etc. Also, open auction of agri-produce for better transparency & improved price realization has been initiated by them. He said that Edible Oil Extraction & Refining Plants complete the value chain. RSIL also has Manufacturing facilities of Soya Food that includes–Soya edible oil, Textured Soya Protein (TSP, Soya Chunks, Granules, and Mini Chunks) Soya Sattu Soya Dal, Analogue Animal Feed Grade Products – De-Oil Cake (DOC). Thus, these facilities (Technology, Infrastructure, and Market) enabled integration of the backward and forwards linkages.

Stating importance of developing integrated value chain in Bihar, he said Bihar food basket is rich in Carbohydrate but lacks fats (Oils) and Protein. So soyabean is

such crop which can fill this duel deficit. Already RSIL has a plant in Madhya Pradesh producing Soya Dal made up of wheat, soybean and maize in the ratio of 30:30:30. It is also planning to set up another plant in Bihar and hence effort would be made to develop an Integrated Value Chain here.

He also stressed on developing captive power plant which is based on Biomass and Solar, as capital subsidy on power equipment may not fully overcome operational power cost issues, if facilities are required to run on diesel generator sets. In this context, he also sought a state government policy for "Power Banking", which would allow the industries to deposit their surplus power with state government and use it later on need basis.

Mr. K.P.S Keshari, President, Bihar Industries Association, and a leading food processing entrepreneur of Bihar later contributed to the discussion and gave following suggestions to be considered before finalizing AIDIP Scheme :

1. The cost of land to be considered for eligible project cost and grant calculation may not be capped and should be in sync with current circle rate. He advocated that with cost of land getting prohibitive in Bihar, there should not be any land cost limitations for calculating eligible grant assistance.

2. Net-worth with cap of 1.5 times of the proposed equity in project may also act as a limitation in Bihar as most state entrepreneurs may not be able to meet this criterion.

3. There is a need to develop authentic database for agriculture in the state so that entrepreneurs can make realistic business plans for agri-marketing.

4. There is a need to increase the power subsidy to the tune of 75% of cost of power equipment as projects under AIDIP scheme will be mostly located in rural areas which are deprived of power facility.

Mr. Satyajit Singh MD, Shakti Sudha, another food processing entrepreneur and CII (leading industry association) representative, put forth following suggestions:

1. To promote agro-industry in Bihar, integrated value chains should be developed so that cheaper raw materials can be made available to the entrepreneurs.

2. He also advocated for reconsidering and increasing cap on eligible land cost for projects to at least 50% of actual land cost.

3. He though also stressed on possible difficulties in procuring land by private investors and felt that the state government should take responsibility of allotting land, more so as there are large chunks of unutilized land in the premises of erstwhile APMC yards and otherwise with the Department of Agriculture.

4. He also recommended releasing funds under AIDIP Scheme in two installments instead of 4 installments proposed in draft Scheme.

Mr. Bhola Nath Jha, a large litchi grower, stressed on subsidizing packaging materials for horticultural produces. According to him, the cost per unit of these packing materials is equal to cost of finished product. He also lauded plans for developing pack houses and other facilities under AIDIP project, calling it need of the hour.

Finally, the meeting concluded with thanks to all the participants and with an assurance that their view points would be seriously considered by the state government while finalizing AIDIP Scheme.

8.8.4 Some Select Photographs of Investors' Meet






8.8.5 List of Participants

Sr. No.	Name	Company/District	Contact No.
1	Bheem Singh	Trader/Buxer	993421964
2	Ashutosh Pandey	Farmer/Bhojpur	8877573595
3	Radhysayamji	Sakaldeep cold store	9430623061
4	Janardan singh	Trader/Buxer	9939871674
5	Prabhat kumar	Trader/Buxer	9835268202
6	Rajeev kumar	Trader/Buxer	9470616486
7	kashi Kant	Patna	Farmer
8	Sanjay Singh	Farmer/Buxer	8038038222
9	Pawan Kumar	Trader/Jahanabad	9256729005
10	Namdev Singh	Farmer/Jehanabad	9939265277
11	Rajesh Kumar	Trader/Hajipur	9302526272
12	Chandra Prarkash Chaubey	Technical Person	8863828221
13	M.Hari Menon	BMGF, Bengaluru	9939391288
14	S.N.mishra	GoB,Deptt.of hoticu.	Marketing
15	Sarvjet kumar	GoB,Deptt.of hoticu.	9431818927
16	R.K.Kedia	Radhe Krishna Indus./ Muzaffarpur	9334910514
17	Rakesh Kumar Kashyap	Farmer/Patna	9570220305
18	Bholanath singh	Farmer/Muzaffarpur	9931460708
19	Barjesh Sahay	Farmer/Muzaffarpur	9430014939
20	Gurishankar	Farmer/Muzaffarpur	
21	Dr. Ajay Kumar	Dr. Director, Horticulture	9431818925
22	Krishna Kumar	Gaya	9431477402
23	Dilip Kumar	Patna CII	9934979700
24	Pramodh Kumar	Muzaffarpur	9831007728
25	S. Indepas Ahsai	Bosh	9334097233
26	Satyender kumar	Ruchi Soya	9771490634
27	Sandeep Kumar	Do	9504392641
28	Bipin Bihari Dubey	Ms.Dev Shiva Agro Ltd.	8292616908
29	Upender Choudhari	Ram Pukar Cold Store	7488487222
30	Ankit Srivastaua	Paras Agro Food	9971044715
31	deepak Sriwastav	do	9334142803
32	Sudhanshu kumar	Samstipur	9934917017
33	Prem Nath Singh	do	9431675929
34	Madhu Ananad	Patna	9709302144
35	Danjay Singh	Ramadhar singh cold store	9430293447
36	Anil Kumar	Chapra	9431216231
37	Sweta Ranjan	Mars	9386346609
38	Prinka kumari	Do	Do

39	soni kumar	Do	Do
40	Rani Ranjan	Do	Do
41	Om Prakash singh	Rohtas	9430548218
42	Ashok Singh	Do	Do
43	Sujit Kumar singh	Do	9431485554
44	Ashutosh Pandey	Buxer	94316821888
45	Radha Krishna	Rohtas	9431426752
46	Mohan Singh	Do	Do
47	Ranjan Kumar	Farmar	8083432709
48	Mohan kumar	Mohan cold store	do
49	D. Banerjee	Goden dairy	9431743689
50	Mr. Shah Ikbal	CEO. Keshwa	8577777777
51	Mr Alam	Do	Do
52	Digvijay Singh	Farmar	9905627996
53	Abhishek	Ashok Raj Rice Mill	Monusingh068@gmail.com
54	Rajiv Pratap Singh	Amrapali Biotech	8294294331
55	K.P.S. Keshri	Amrapali Foods	
56	Martand kumar	Mortand	9835202219
57	Ashok Kumar Ray	do	9934510744
58	Awesh Jain	Rsfl	9820236309
59	Anil Kumar	Manju Cold store	9334114249
60	Prabhat kumar	SGM	9835268202
61	Krishna Mishra	Buxer	9934219624
62	bipin Singh	Buxer	9504708151
63	Abhilasha singh	MARS	9006480661
64	Rajiv ranjan	Rostas	9471235273
65	Santosh kumar	Patna	8008935729
66	Ashok singh	Kaimur	do
67	Binod Kumar Singh	Boxer	9430573996
68	Hare ram Panday	FIC/ Buxer	9939948539
69	Achay kumar		9798013101
70	K.V. Denesh	Consultant, ADB	9449067245
71	Kaushal kumar Ray	Consultant, ADB	9430290990
71	Mr. Ajay Yadav	Director, Horticulture	
72	Dr. A. K. Krishnakumar	Team Leader, TA Program	
73	Mr. Ravi Ranjan Mishra	Financial Expert, TA Program	
74	Shri Amitabh Bhattacharyya	IL&FS Clusters	
75	Shri Santosh Kumar Singh	IL&FS Clusters	
76	Ms. Rani Ranjan	IL&FS Clusters	
77	Saurav Sinha	IL&FS Clusters	

78	Gunanand Shukla	IL&FS Clusters	
79	Sanjay Kumar	IL&FS Clusters	
80	Rakesh Chaubey	IL&FS Clusters	
81	Anirban Ghosh	IL&FS Clusters	
82	Sumit Kumar	IL&FS Clusters	
83	J.K. Singh	IL&FS Clusters	
84	Dilip Pathak	IL&FS Clusters	
85	Rajesh Kumar	IL&FS Clusters	
86	Raj Kishor Sharma	Motihari	Farmar
87	Kedal Singh	Rohtas	Farmar
88	Sharwan Paswan	Patna	Kishan
89	Kishor sharan Pandey	Mokama	Kishan
90	sohan Ray	Farmar	9473102456

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