Chapter 5

Cluster Agriculture Development Plan

Under RACP, the programme is being planned and implemented cluster-wise in different agro-climatic zones of the state. The major objective is to develop successful models which lead to enhanced productivity, profitability, with sustainability of agriculture based on the comparative advantage the state offers. Despite implementation of several schemes, there are several challenges faced by Agriculture in state, since it is largely dependent on monsoon. Future strategy has to depend on science and technology led agriculture which addresses issues on end to end basis i.e. from seed to production technologies to marketing and value chain. In order to insulate farmers from vagaries of monsoon and also fluctuation in market prices, the strategy is to achieve stability of production and high profitability. Therefore, in the project design integrated farming system with water use and marketing and processing and value chain development with cluster as a unit has been chosen so that the interventions planned lead to increased production and profitability keeping the resource base sustainable. Value chain approach is an end to end approach. In each of the cluster first underlying theme is conservation of water resources including its efficient utilization and selection of commodity that offers scope for development of value chain. In agriculture, emphasis is also on climate resilient agriculture, diversification of horticulture and enhancement of productivity of small ruminants wherever the population is sizeable.

The selection of clusters is based first on water resource base and then the predominant commodity offering scope for value chain and/or technology adoption that offers possibility of getting farmers higher income for their produce with less resource use. Initially, Dudu block was identified as an area of operation in Jaipur district which falls under semi-arid eastern plains. In Dudu one cluster namely Mokhampura representing rainfed area has been selected. In Mokhampura, moong and gram the dominant crops in Kharif and Rabi respectively which offer scope for value chain development have been selected. This selection is based on survey of the commodities grown in the area and discussion with the stakeholders in identifying constraints and the possible solution scenario. The principles on which the selections of 12 clusters have been done and the remaining will be finalized include:

Selection of Clusters

Cluster Selection and Preparation

1. The RACP will be implemented in selected locations in different agro-ecological zones (AEZ) in Rajasthan. Each AEZ in the state typically includes three or four districts. For each AEZ one or several commodities will be supported in a value chain approach. The same commodity can be supported across two and up to three AEZs. Commodities can include traditional crops (annual, perennial) cultivated in Rajasthan and for which an AEZ is believed to have a comparative advantage; or new crops for which a clear rationale and analysis exists that a comparative advantage can indeed be established over time. Small ruminant (Goat) development will be taken forward as a value chain in suitable AEZ.

2. Within an AEZ one District will be identified across which (for reasons of ease of implementation), two Clusters will be developed with a primary focus on improving water management across the four water sources, i.e., either canal water or ground water or harvested rainwater (watersheds) or conserved moisture in catchment. There would be up to 20 Clusters supported under the RACP. The principles for Cluster selection include: (1) Each Cluster provides for a demonstration or pilot on how to effectively support sustainable and profitable agriculture with a view towards potentially scaling up this model (if successful) in the future (outside of the RACP). For a Cluster to be “testable” it requires a defined theme, demonstration objective and research/development hypothesis that needs to be made explicit at the onset and supported through the definition of a results framework (key indicators, baseline and monitoring arrangements). (2) If multiple Clusters are identified within one Cluster (based on selected lead commodity), these Clusters will be implemented within the same District to facilitate implementation. (3) For each Cluster the relevant hydrological
catchment area will be identified which provides for the basis of water resource management activities. (4) Each Cluster will comprise at least 10,000 ha of cultivation for the lead commodity under the Value Chain approach (which together with secondary crops may result in Clusters areas up to 20,000 or covering between 70 to 150 villages).

3. RACP activities in a Cluster will be implemented on the basis of a Cluster Agricultural Competitiveness Plan (CACP). The CACP is the outcome of a planning process that aims to (a) identify opportunities as well as constraints towards developing one or two value chains in which the community deem themselves to have a potential competitive advantage and to (b) select from a list of eligible project investments and within the funding constraints those public investments that will be enable the community to address constraints and enhance opportunities towards establishing identified value chains. The value chain proposed would envisage addressing broad sub-sectoral issues as well as help establish specific partnership arrangements between farmer groups or producer organizations with agribusiness companies.

4. Currently, Clusters have been selected, as follows:
   a. Cluster Agricultural Competitiveness Plans (CACP) of one cluster Mokhampura in Jaipur District has been prepared by PDCOR and is in state to be rolled out.
   b. CACP of all the remaining clusters shall be prepared by respective Line Departments in consultation with PIU which shall be at PMU level.

5. Some 5 Clusters remain to be identified which will take place early during the implementation of the RACP. This will allow GoR to gain initial experience in the preparation of CACPs, as well as to introduce a more demand driven selection process (as opposed to the initial rather top down approach). As such the current implementation arrangements provide for a framework to plan and implement CACPs.

6. In each cluster two areas representing rainfed farming and irrigated farming (Canal, surface or ground water) will be selected. The ground water area selection is based on aquifer approach and full aquifer is the boundary of project implementation. Rainfed areas are selected based on micro water sheds and contiguous watersheds will be taken.

7. The selection of cluster is also based on the identification of key commodities to be supported under value chain project. The same commodities can be supported across 2 or up to 3 clusters. The commodities include traditional crops (cereals, pulses, oil seeds, seed spices, vegetable, fruit crops- annual, perennial etc.) cultivated in Rajasthan and for which the cluster has comparative advantage or new crops or technologies for which a clear rationale and analysis exists for comparative advantage in respect of income and water use.

8. The livestock component would be restricted to small ruminants (Goat) development. This component shall be taken in clusters which have sizeable small ruminant population. The support to small ruminants will focus on improving productivity through breeding, feeding and health activities at the cluster level. Improved feeding will not only aim to optimize the use of crop residues, but also make better use of common property lands. This would also include formation of producer organization, development of infrastructure for alternate markets and market information for getting higher income.

9. Building end to end value chain for commodities including input management, technology dissemination, processing and value addition, marketing through aggregation, value addition facilitated by farmer organization and Producer Company.

10. The proposed are of operation of RACP may be 17 districts, with major focus on pilot areas of eastern parts of Aravalli and southern districts. The existing 12 clusters of RACP are to be retro-fitted as per the Four Waters Concept to include the upper catchments where ever feasible.
### Table No.1 Southern-Eastern Project Districts:

<table>
<thead>
<tr>
<th>District</th>
<th>Project areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chittorgarh</td>
<td>Orai and Bassi command areas and upper catchments.</td>
</tr>
<tr>
<td>Pratapgarh</td>
<td>Jakham LMC command areas and upper catchments.</td>
</tr>
<tr>
<td>Bundi</td>
<td>Gudha command areas and upper catchments.</td>
</tr>
<tr>
<td>Kota</td>
<td>Sangod catchment and irrigated area / tank systems.</td>
</tr>
<tr>
<td>Jhalawar</td>
<td>Ahoo command areas and upper catchments.</td>
</tr>
<tr>
<td>Banswara</td>
<td>Bulandi command areas and upper catchments.</td>
</tr>
<tr>
<td>Tonk</td>
<td>Area to be identified</td>
</tr>
<tr>
<td>Baran</td>
<td>Area to be identified</td>
</tr>
<tr>
<td>Dholpur</td>
<td>Area to be identified</td>
</tr>
<tr>
<td>Alwar</td>
<td>Bansur catchment along with the tank system to be identified.</td>
</tr>
<tr>
<td>Jaipur</td>
<td>Mokhampura along with the tank system to be identified/re-visited.</td>
</tr>
<tr>
<td>Ajmer</td>
<td>Pisangan catchment and irrigated area / tank systems (to be determined)</td>
</tr>
<tr>
<td>Sawai Madhopur</td>
<td>Bonli catchment and irrigated area / tank systems (to be determined)</td>
</tr>
</tbody>
</table>

### Table No.2 North-Western Project Districts:

<table>
<thead>
<tr>
<th>District</th>
<th>Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Ganganagar</td>
<td>Z-distributary command areas.</td>
</tr>
<tr>
<td>Bikaner</td>
<td>Phoolasar distributary command areas.</td>
</tr>
<tr>
<td>Jaisalmer</td>
<td>Kheruwala distributary command areas.</td>
</tr>
<tr>
<td>Nagaur</td>
<td>Ladnu - Pilot taken under desert geography through Index Catchment approach</td>
</tr>
</tbody>
</table>

### Component for Development of CACP

(i) **Climate resistant agriculture**

A. Improvement of water-use efficiency  
B. Technology transfer and market led advisory services  
C. Livestock strengthening and management
(ii) Marketing and value chain

A. Agribusiness Promotion Facility (ABPF)
B. Pre-investment Advisory Support
C. Information and Market Infrastructure Support
D. Agribusiness Support

5.2 Preparation of CACP

1. A cluster is a geographical area that is marked by one or more of four main water sources (canal water, groundwater, rainwater, conserved moisture) and covers a particular agro-climatic condition in the state which is relatively homogenous across the cluster. Critically it is selected to develop and demonstrate the feasibility of water efficient agriculture as well as development of one or more value chain approaches. The beneficiaries of the project will primarily be smallholder farmers with actual or potential commercial outlook in the selected agro-climatic zones supported through collective action in achieving economies of scale.

2. CACP development and implementation would follow a demand driven participatory approach wherein a larger part of information gathering and analysis are carried out predominantly by consolidative value chain participants (producers, producer groups and producer organizations, traders, input suppliers, processors, transporters, agro enterprises, district, PRI, NGOs, universities & researchers) with the Line Departments facilitating and leading the value chain participants in selecting the value chains. In each of the cluster, the service provider will facilitate the process of consultation with the stakeholders and the value chain participants.

Commodity Selection:

3. CACP will be developed by applying end to end value chain analysis in order to develop an integrated program of activities to be supported under the project from production to marketing. The objective is to identify and address the critical constraints in a coordinated way thereby unlocking the potential of the value chain.

4. Once the constraints and possible solutions of the selected value chains are identified and validated, implementation of the CACP would be through a matching grant funded and operated by the project. This fund will be available on the basis of project proposals / business plans prepared by the “project beneficiaries” (farmers, farmer groups, other value chain participants who are eligible to receive funding under the project). These proposals / business plans are prepared by the project beneficiaries with the Line Departments and DPMU.

5.3 CACP Planning Process:

CACP for one cluster Mokhampura representing watershed area has been prepared in house and would be a model for preparation of other CACPs. For other clusters CACP development would be a bottom up approach involving different stakeholders in plan development. The exercise would be undertaken by participating Line Departments. The Line Department will undertake:

1. Undertake a base line socio economic survey of the cluster. Undertake a rapid analysis of the commodities (i) Staple foods crops (e.g. maize, pearl millet, sorghum, wheat etc.); (ii) Horticulture Produce (e.g. fruits, vegetables, flower, tuber crops, spices/condiments etc); (iii) Oil seeds (e.g. mustard, groundnut soybean etc); and (iv) Livestock (e.g. goat, sheep etc.), that are grown in the Rabi & Kharif in the Agro Eco zone through desk review. This is done to narrow the commodities to a long list of “potential commodities”. This would help the project to (a) to identify the commodities which have the potential for value chain development; and (b) provide a long list of commodities to the value chain participants in the identified cluster that could be taken up for further evaluation.

2. Undertake water resource assessment to understand the extent of available water resources in the given cluster (hydrological status and condition of the cluster) and also determine the demand and usage of the water resources for various sectors e.g. agriculture, domestic, industrial etc. This
assessment should help in identification of opportunities for water savings and increasing water productivity; support the decision process for water allocation; and general water audits etc.

3. make the inventory of existing water utilization related assets (dams/head works, canals, tanks, bore wells/tube wells etc.), including their water storage/delivery/extraction capacity,

4. based on the available utilisable water balance, if any, identify the sites/structures (tanks, wells, tube wells, canals etc., as applicable) for the utilization of the balance available water on sustainable basis, and prepare the detailed project report (including cost estimates/draft bid documents, time period and implementation arrangements) for completion of above mentioned identified water utilization structures,

5. study the existing methods of irrigation (flood irrigation, drip, sprinkler etc) from various existing water sources, area covered under irrigation and water use efficiencies from each of these sources/irrigation methods, the scope and potential of increase in the water use efficiency and the amount of potential water savings on account of said increased water use efficiency, and develop a detailed plan of action for the increase water use efficiency for its implementation in the cluster area,

6. Undertake detailed participatory analysis in the project cluster by bringing together all value chain participants with a strategic interest in the value chain development (farmers, private sector, public administration / state, district, PRI, service providers (NGOs), universities & researchers). Based on this analysis, jointly with the stakeholders, identify the commodities that would be supported for value chain development in the given cluster. Through the participatory technique commodities for the cluster (one for Kharif and one for Rabi) will be selected which offer comparative advantage and which meet the criteria for adoption.

7. Undertake a gap analysis about production of commodity crops selected from Kharif & Rabi, identify present constraints and solutions of those constraints specially in respect of increase in seed replacement rate, use of high yielding variety of crops, improvement in on farm water use efficiency, conversation of soil moisture and application of soil fertilizers based on soil test analysis, incorporation of organic residues after composting and development of integrated crop and livestock farming system. The focus would be on using varieties that are less sensitive over changes in climate and moisture stress. Post-harvest management strategy would receive due attention.

8. For the commodities identified through the participatory process, undertake detailed analysis through a value chain approach which will include, among others, the following: (a) Input management: Seed, fertilizers, chemicals (b) Main marketing channels from farm-gate through processing to final consumers (domestically and abroad) for each main commodity group. This includes determination and analysis of demand & supply, price formation, trading margins, costs, transport, storage and processing capacity, market efficiency, etc. – internationally and nationally, as relevant; (c) a view of future production and market prospects for both domestic and export markets; and (d) identification of main strategic constraints, opportunities, threats as regards these future prospects.

9. Gather information on the production, processing and marketing potential for the identified commodities in the cluster and quantify for each of the identified commodities the value chain linkage, its potential value-addition in terms of poverty reduction, income increases and livelihood improvements for smallholder’s farmers of the cluster.

10. By looking at detailed price build-up from stage to stage of agriculture value chains, the analysis should specifically help identify key bottlenecks/constraints and changes that need to take place to realize competitiveness potential. If some cost accounts for a large share of total value, or is significantly higher than an equivalent national / international benchmark, then new policies or investments focused on reducing that cost need to be identified and elaborated.

11. Prepare a value chain map for the shortlisted commodities that would include among others, (a) key segments and activities within the chain where performance lags behind and this poor
performance or inefficiencies severely undermine the competitiveness of the entire value chain; (b) bottlenecks that affect the capacity of the farmers, private sector and other value chain participants to compete e.g., a lack of infrastructure, cumbersome procedures and facilities, technical barriers etc; (c) establishing monetary costs of interventions and proposed activities and investments and identifying good practice cases to support the recommendations to address the issues.

12. Horticulture: Undertake feasibility of diversification to horticulture (vegetables, fruits, floriculture, and protected cultivation) for increased income with less use of water. Suggest alternate cropping pattern that give higher income with less use of water. Detail of area, cost and benefits may be indicator.

13. Undertake assessment of small ruminants in the cluster and suggest production improvements through breeding, improved nutrition and health cover.

5.4 Activities for Water Resource Management

The challenge in rainfed areas is to improve rural livelihoods through participatory watershed development with focus on integrated farming systems and value chain for enhancing income, productivity and livelihood security in a sustainable manner. In rainfed situations soil and water conservation, watershed development and efficient water management are the key to sustainable development of rainfed areas.

Guiding Principles

Equity and Gender Sensitivity: Watershed Development is to be planned as levers of inclusiveness. a) improving access of the poor, especially women to the benefits, b) enhancing role of women in decision-making processes and their representation in the institutional arrangements and c) ensuring access to usufruct rights from the common property resources for the resource poor. Social mobilization, community organization, building capacities of communities in planning and implementation, ensuring equity arrangements etc. need intensive facilitation. Involvement of primary stakeholders is at the centre of planning, budgeting, implementation, and management of watershed projects. Community organizations will be closely associated with and accountable for implementing project activities.

Capacity Building and Technology Inputs: Considerable stress should be given on capacity building of functionaries to enhance their knowledge and skills and develop the correct orientation and perspectives thereby becoming more effective in performing their roles and responsibilities. Remote sensing data would be utilized for finalizing contour maps for assessment of run-off and for identifying structures best suited for location of projects.

1. Preparing detailed resource development plans including water and soil conservation or reclamation etc. to promote sustainable livelihood at household level.
2. Common property resource management and equitable sharing.
3. Preparing Detailed Project Report (DPR)
4. Undertake engineering surveys, prepare engineering drawing and cost estimates for any structure to be built.

Preparation of DPR: DPR preparation is a crucial activity at the cluster level and will be done in consultation with Watershed and Soil Conservation Department for the cluster. It is necessary to capture the entire database of DPR in a systematic manner as a structured document at the initial stage itself. DPR preparation requires a strong PRA exercise and comprehensive beneficiary level database separately for private land and community land development with linkages to the cadastral database. This will facilitate spatial depiction of the action plan. The DPR should include, among other things, the following:

- Basic Information on Watershed including rainfall, temperature, location including geographical coordinates, topography, hydrology, hydrogeology, soils, forests, demographic
features, ethnographic details of communities, land-use pattern, major crops & their productivity, irrigation, livestock, socio-economic status etc.

- Details of expected/proposed User Groups & Self Help Groups, master tables for private land / common land activities, contribution to watershed development funds, information on soil and land-use, existing assets related to water harvesting, recharging and storage etc. needs to be provided plot-wise.

- Description of Proposed Interventions (physical and financial, including time-table of interventions) along with technical details and drawings certified by the WDT.

- Detailed Mapping exercises.

- Expected Outcomes and Benefits, especially with respect to livelihoods for different segments, benefits to women and regeneration/conservation of resources, etc.

This DPR will be a part of the MIS from which details will be arranged into various layers on GIS as a monitoring, management, accounting and analytical tool besides serving as a source of information and a link to the state level data cell in the SLNA.

**Ground Water**

Groundwater is a natural resource whose occurrence and distribution are more easily identified within the boundaries of a Hydrological Unit. Although in India decisions about its use are in the hands of individuals who own the land where it occurs, it is a typical common property resource and as such, its sustainable management requires cooperative management and shared benefits. In technical terms, sustainable management of groundwater means extracting only the water received by an aquifer through natural annual rainfall recharge and other artificial recharge structures, if any. Over-exploitation occurs when extraction exceeds recharge. Collection of rainfall data and measurement of well discharge and water levels are necessary for the assessment of the quantities that can be extracted on an annual basis.

Over exploitation of groundwater particularly in hard rock areas, caused steady decline in its level and most of the dug wells and high numbers of deep bore wells have gone dry, affecting large numbers of small and marginal farmers. It is being increasingly realized widely that unless some effective steps are taken to conserve and manage groundwater, the very livelihood of numerous farmers may jeopardized.

Induced recharge through open well, check dams and percolation tanks and induced recharge through gravity and injection wells will form core activities for augment supply for recharge of aquifer. Demand side approach will focus on awareness among farmers to understand their groundwater system adequately so that they could make informed decisions about their water use. Thus, the burden of control of extraction would be transferred to individuals in communities who know the “why and how” and act based on sound information.

Hydrological database, using GIS platform will be developed for uses of Groundwater Management Committee. Development of a Geographical Information System (GIS) platform, staff training on GIS and Global Positioning System (GPS), scanning and digitization of geo-referenced information for production of thematic maps will form core of technology.

Farm families will be enabled for adoption of alternative agricultural practices suiting the availability of groundwater.

Community based institutions established for alternative management of groundwater resources with equal representation/participation of men and women.

Demand side of groundwater management and building capacities of users to adopt a more environmentally and economically sustainable agriculture involving vermi-compost, green manuring, bio-fertilizers, mulching, border crops, proper spacing, inter-cropping, use of botanical extracts, alternate furrows, ridges and furrows and improved irrigation methods. The ultimate aim would be modifying cultivation practices and reducing cost of external inputs.
Emphasis will be also be on empower farmers with knowledge and skills to measure recharge and draft of groundwater, sensitize farmers on the need for collective action, sharpen farmers’ ability to make critical and informed decisions on crop plans and sensitize farmers on new ways of thinking. Presently farmers are using sprinkler but there is no measurement of how much volume of water is used, R&D study will help farmers understand the total number of pumping hours required to achieve application of the desired depth (volume) of water to a particular plot and crop.

Overall strategy will help farmers in making individual decisions on which crops to grow and respective acreages based on the availability of groundwater, with beneficial impact on the sustainable use of a commonly shared resource. Gender mainstreaming and equity in women’s participation in various activities such as training and capacity building and targets of 50% of women’s presence in GMC will help in ensuring women role in water management.

**Surface Irrigation**

For investment in surface irrigation under command area, for improving water use efficiency, the focus would be on rehabilitation of distributary network, construction of Diggies and providing sprinkler and drip for saving in water in agriculture. Another approach would be to shift from high water low income crops to low water high income crops specially introduction of vegetables and fruit plants. Efforts will be made to reduce conveyance losses on and off farm. Efficient system of water management will be implemented in the area which includes use of drip and sprinkler in the area for increasing productivity and production. Demonstrations will be laid and during first phase of the project and further expansion of the area will be undertaken later. The coverage would be such that there is sizable savings in irrigation water. Rehabilitation of distributaries and minors will be undertaken for saving in seepage loss.

5.5 **Technology Transfer and Market led Advisory Services**

5.5.1. **Agriculture**

While developing CACP, the focus would be on selecting activities for identified commodity for value chain and new technology adoption for alternative crop/ diversification which would be promote sustainability of natural resources and bring income enhancement. Following intervention/ activities would form core of strategy.

- **Soil Testing:** Analysis of soil samples annually and supply of soil health cards to the farmers.

- **On-farm Demonstrations:** Integrated crop management (ICM) demonstrations package of practices for a particular crop from land preparation to harvesting of the crop (including use of seed of improved high yielding varieties/hybrids, seed treatment, soil test based application of fertilizers (including use of organic manures, bio-fertilizers like Azetobacter, Rhizobium, PSB)) and micronutrients, weed control, integrated pest management (including use of bio-pesticides, and bio-rational pesticides), efficient methods of on-farm water management, use of mulches, carrying out all cultural practices , low cost methods for improving on-farm water use efficiency such as alternate furrow irrigation, paired row irrigation, use of crop residues as mulches for reducing evaporation loss, Demonstrations on other crops which are grown in a cropping sequence with the value chain crop with the objective of improving water use efficiency, diversification to low water requiring, high value and other crops, reducing water foot print, promoting resource conservation technologies, popularizing climate smart agricultural practices.

- **Field Days:** For dissemination of the improved technologies demonstrated in the ICM demonstrations

- **Adoption support:** Quality seed of high yielding crop varieties, adoption support in terms of 50% cost of seed (for sowing one acre of crop)

- **Seed Production:** Demonstration technology empowerment of the farming community for production of quality seed of high yielding varieties of self-pollinated crops
• **Post-Harvest Management:** Promoting farm level drying, cleaning, grading and post-harvest management of the harvested produce, provision of low cost plastic sheets for protection against damage by rain and water.

• **Adaptive Trials:** On-farm testing of the promising emerging technologies ready for on-farm validation and testing.

• **Farmer Training:** Training and capacity building programs for farmers and farm women for adoption of knowledge-based crop husbandry and natural resource management/conservation practices for increasing productivity, enhancing diversification to high value and low water requiring crops/practices for reducing water foot print of agriculture, enhancing farmer incomes and improving rural livelihoods

• **Exposure visits:** Exposure visits for farmers within the state and outside the state

• **Training of Service Provider Staff:** Training programs for staff of the service providers about the project design, implementation arrangements, technical areas of crop production, post-harvest management and related aspects.

### 5.5.2 Horticulture

• **On-farm Demonstrations:** Integrated crop management (ICM) demonstrations on the vegetable/fruit/protected cultivation in the cluster

• **Field Days:** For dissemination of the improved technologies demonstrated in the ICM demonstrations on vegetables/fruit/protected cultivation.

• **Adoption support:** Quality seed of high yielding crop varieties of vegetables, adoption support in terms of 50% cost of vegetable seed (for sowing one acre of crop)

• **Protected Horticulture:** Support for protected horticulture

• **Post-Harvest Management:** Promoting farm level washing, cleaning, grading, packing and post-harvest management of the harvested vegetable/fruit produce.

• **Training of Vegetable/Fruit Growers:** Training and capacity building programs for farmers and farm women for adoption of knowledge-based crop husbandry and natural resource management/conservation practices for increasing productivity, enhancing diversification to high value and low water requiring crops/practices for reducing water foot print of agriculture, enhancing farmer incomes and improving rural livelihoods.

• **Exposure visits:** Exposure visits for vegetable/fruit growers within the state and outside the state.

• **Training of Service Provider Staff:** Training programs for staff of the service providers about the project design, implementation arrangements, technical areas of crop production, post-harvest management and related aspects.

### 5.5.3. Market led Advisory Services

Provisions to be made for the following services at the Cluster level.

• Marketing prices

• Price forecasting information.

• Agri-watch – Mobile Services

• Information Kiosk

• Farmer’s visits

• Training

• Extension
5.6 Livestock strengthening and management

1. **Small Ruminants** - The livestock component of RACP will demonstrate in a number of clusters how goat productivity and incomes from goat production can be significantly enhanced. The focus is on goat production due to several reasons: firstly, demand for goat meat is increasing (of the 40,000 head of Rajasthan livestock slaughtered daily nearly 60% are goats) and secondly, goats are kept by tribals and managed by women and so there is opportunity for the RACP to support livelihoods development of the most vulnerable. There is significant opportunity to improve profitability given that fact that markets are unorganized and animal productivity is low. While goats are found throughout the state (although production systems differ somewhat between the more arid western areas of the state as compared to the east) there are districts of higher number and concentration. Where RACP clusters are selected based on water access the livestock component will focus on goat where there is both population and density of goats. Initially the first cluster being considered for goat production is Osian in Jodhpur district.

2. This will be achieved by 1) improving market access and value addition and 2) improving productivity through breeding, feeding, animal health, and 3) capacity building supporting farmer advisory and training of the farmers, training of existing AHD and new SP2 staff and establishment of small local support units (called Regional Technology Centers). In addition to these cluster focused components, fourthly 4) a cross-cutting component is proposed which variously cuts across clusters and builds not only the capacity to deliver the project, but has the potential to improve livestock services delivery in the state.

3. The potential for impact will arrive from increased profit to farmers by getting a higher price for their goats (through access to market information and value chain development through sale of meat, but also products like manure, hair, and hides); increased sale of goats due to reduced mortality and higher fecundity; and increased productivity (due to better breeding, feeding and health). Women in particular will benefit as currently they provide the labor for goat production but are often excluded in marketing. Economic and financial impact calculations will benefit from further clarity on the proposed production cycle in terms of number of farmers targeted, goats and bucks to be produced, marketed etc.

5.7 Marketing and Value Addition

Undertake detailed participatory analysis by bring together all value chain participants with a strategic interest in the value chain development farmers, private sector, public administration (state, district, PRI), service providers (NGOs), universities & researchers. Based on this analysis, jointly with the stakeholders, identify the commodities that would be supported for value chain development in the given cluster. Though it is expected that the identified commodities for the cluster will be from the “long-list” of commodities, the participatory analysis process should be flexible enough to take up commodities that are not present in the long-list.

For the commodities identified through the participatory process, undertake detailed analysis through a value chain approach which will include, among others, the following: (a) Production constraints varieties availability yield gap, technology adoption, etc. Main marketing channels from farm-gate through processing to final consumers (domestically and abroad) for each main commodity group. This includes determination and analysis of demand & supply, price formation, trading margins, costs, transport, storage and processing capacity, market efficiency, etc. – internationally and nationally, as relevant; (b) a view of future production and market prospects for both domestic and export markets; and (c) identification of main strategic constraints, opportunities, threats as regards these future prospects.

Gather information on the production, processing and marketing potential for the identified commodities in the cluster and quantify for each of the identified commodities the value chain linkage, its potential value-addition in terms of poverty reduction, income increases and livelihood improvements for smallholder’s farmers of the cluster.

By looking at detailed price build-up from stage to stage of agriculture value chains, the analysis should specifically help identify key bottlenecks/constraints and changes that need to take place to
realize competitiveness potential. If some cost accounts for a large share of total value, or is significantly higher than an equivalent national / international benchmark, then new policies or investments focused on reducing that cost need to be identified and elaborated.

Prepare a value chain map for the shortlisted commodities that would include among others, (a) key segments and activities within the chain where performance lags behind and this poor performance or inefficiencies severely undermine the competitiveness of the entire value chain; (b) bottlenecks that affect the capacity of the farmers, private sector and other value chain participants to compete e.g., a lack of infrastructure, cumbersome procedures and facilities, technical barriers etc.; (c) establishing monetary costs of interventions and proposed activities and investments and identifying good practice cases to support the recommendations to address the issues.

Classify the solutions to the constraints as (a) “Off the shelf” solutions that are within project scope, (b) Possible solutions that are in the pipeline; (c) policy changes; and (c) Research needed.

A. “Off-the-shelf” solutions that are within the project scope could be categorized into (a) public goods investment; (b) club goods for which funding could be done to farmer groups / agribusiness in association / collaboration with farmers; and (c) private goods where funding could be given to farmers (individuals) through subsidy.

B. Possible solutions in pipeline would include those in the advance stage of research and development and in the process of field testing. Service provider need to list these solutions and describe its status and what is needed to for its field level implementation.

C. Identify and develop policy recommendations that can concretely improve the competitiveness of the agricultural value chains.

D. R &D: During the development of CACP R&D issues will be identified and flagged in respect of each of the three major activities being undertaken in RACP. The research and development part will be given/undertaken by concerned SAU/ICAR institute for which separate funding in the project mode shall be provided.

5.7.1 Community Mobilization

i. Detailed description and data on the status of farmer based organizations in the selected cluster. What are the major activities that are undertake by these organizations; is the organizational capacities of these FBOs weak to be gauged by like low member commitment, support and participation; very high levels of illiteracy; inadequate capitalization; a low scale of operations; weak and unprofessional management; as well as low levels of business management skills, internal controls, planning and monitoring capabilities; is the environment cluster supportive to the existence of such organizations.

ii. Situation analysis on the presence of NGOs, their past record; experience etc.

5.7.2 Marketing

In the context of agriculture and the farm economy the end to end approach for value chain and marketing need to be addressed to benefit the small and marginal farmers. First one being input marketing required for procurement of inputs and the other one output marketing which helps them to sell the products they produce at competitive prices.

- Input marketing:
  - Aggregation of demand gives the advantage of volumes for each of the inputs. This gives them bargaining power with the suppliers and transporters.
  - major inputs required for the agriculture are
    - Seeds
    - Fertilizers
- Micro nutrients
- Pesticides
- Water saving devices

- **Output marketing:**
  o Aggregation of produce (supply) gives them advantage of again, collective bargaining, negotiating power, transport economy and possibility of value addition and avoid distress sale. It also gives an opportunity to take advantages of linking to spot exchanges later.
  o Marketing of the produce can be done at various stages like commodity, value added commodity, processed products or packaged and branded products. Approaching the markets differ from a commodity to packaged product. Markets to be addressed are
    - Krishi Mandis
    - Corporate buyers
    - Whole sale, retail merchants
    - Distributors
    - Consumers

- **Addressing the Market Risk**
  o One of the ways to address the market risk is to provide choice to the farmer by giving alternate channels to sell his produce. This can vary from traditional market yards to the new e-platforms.
  o Market intelligence
    - Proximity of the markets access
    - Will be addressed by improving the logistics to the traditional markets or offering new alternate channels.
    - Ability to relate the mainstream markets (NCDEX, MCX)
    - Willingness of the farmer and access to the main stream markets will decide the provision of choice to the farmer
    - Data on commodity arrivals, quality parameters, facilities
    - Will be displayed at RTAHC/Aggregation Centers as planned in the project.
    - Data on transport options
    - As result of aggregation and segregations channels of transport can be developed with the stake holders in the value chain.
    - Information on payments, commissions, costs etc.
    - Can be collected and displayed at the RTAHC/POAC

- **Addressing the Price Risk**
  o Price risk can be addressed by the mechanism of Price discovery which can be strengthened over the project period. This includes information on prices at various alternate markets, price projection for the future, etc.
  o Price discovery
Cluster Agriculture Development Plan

- Is a process where in farmers are continuously given information on the current and future prices at different markets and he would decide at a point to conclude the deal to sell his produce.

- Provision of accredited warehouses which will help them to store the produce and sell at a convenient date. The farmers also can take warehouse receipts to meet their immediate need and avoid distress sale at lower prices.
  
  o As a partner in the total value chain
  
  - Will give the farmer an assured price as a contract with the final buyer with specific conditions.

- Mechanism to address the above issues
  
  o Mechanism of information Dissemination
    
    - SMS, Query Redressal system, Call centers, Price tickers, Community Radio Stations etc.
    
    - Collaborations to bring markets to farmers though commodity exchanges. Market-watch information at RTAHC.
    
    - Collaborations to build supply chains to the existing processors/retailers etc.

  All the above marketing efforts will give the farmers a choice of markets and chance to take informed decisions.

5.7.3 Analysis of Value Chain and Mapping

Value Chain Map: It provides a graphic representation of the structure of the value chain showing how products flow through the pre-production stage to the end customer providing a end to end integrated value chains. Every marketing channel as well as the stake holders in the value chain and map the value addition at each stage wherever possible. Detail of the process of identification and preparation of integrated value chain approach is given below.

Process of establishing a value chain:

Prior to the mapping of the proposed value chain it is important that we understand the existing process and establish the costs at various stages. This will serve as a bench mark and any reduction in the proposed integrated value chain approach will show the resultant increase in revenues and reduction in the costs and risks.

Stage I

Survey and data gathering for the value chain building in the clusters proposed.

1. Identification of crops that give critical mass in the cluster area selected.
2. Selection of the crops which provide scope for value addition in the cluster.
3. Study of value chain from pre-production to the end use of the product.
4. Identification of the stake holders and their interest to integrate into the value chain.
5. Detailed survey of infrastructure like Roads, Krishi mandis, electricity, Processing facilities and availability of markets.
6. Availability of support organization in that area for support services. R&D Centers, experimental farms, laboratories etc.

Stage II

Process of building proposed integrated agricultural value chains:

Three major categories of intervention possible in
• **Commodities with limited scope for post-harvest value addition.**
  o The intervention would be limited to pre- production, production and post-harvest up to grading and sorting of the commodity. May include drying wherever applicable. Investments would be required in the areas of sorting, grading and drying equipment to the drying yards.

• **Commodities with high scope of post-harvest value addition.**
  o The intervention will also include processing, packing in bulk and in micro packing. Investments required will be higher for establishing processing facilities and packing facilities.

• **Livestock where value addition is possible during production and building traceability**
  o The project will not be involved in the processing of meat and meat products. Investment will have to be made in establishing the traceability and health of the animals like vaccination and scientific rearing.

**5.7.4 Building value chains for agricultural commodities:**

1. Soil survey and sampling and building soil health cards
   1.1 . Assess the nutrient requirement and thereby reducing the fertilizer cost.*
   1.2 . Long term fertilizer planning for the crops planned for the agro climatic zone in the project.

2. Purchase of inputs
   a. Seeds
      i. Selection of variety suiting the agro climatic zones and water consumption
      ii. Make available quality seed with proper germination
   b. Fertilizers
   c. Micro nutrients
   d. Pesticides.

   Estimate the cost saving by bulk purchases and likely increase in the yield and quality improvement due to other inputs wherever possible.*

3. Preparation of the field and sowing methods
   a. Plant population
   b. Sowing method. Raised bed planting.

   Estimated yield increase, increase in production to be estimated and mapped*

4. Production stage:
   a. Good Agricultural Practices
   b. Pest management
   c. Crop monitoring
   d. Reduced pesticide usage.
   e. Estimate the reduction in the cost of inputs and increase in the yield*

5. Irrigation management.
   a. Use of efficient water usage methods
b. Reduced irrigation

c. Water saving including reduction in evaporation losses

Estimate the saving at this stage *

6. Post-harvest and waste management.
   a. Stage of harvest
   b. Reduction of damage during harvest
   c. Reduction in waste
   d. Use of mechanical harvesting
   e. Efficient usage, disposal of byproducts estimated increase in revenue, reduction of costs.*

7. Post-harvest handing, storage, drying, cleaning
   a. Scientific storage methods
   b. Community storage
   c. Warehousing and avail warehouse finance
   d. Estimate the cost reduction due to waste reduction and storage*

8. Cost reduction through bulk transport up to storage / processing

9. Sorting and grading
   a. Grade the arrival depending on the variety to make it uniform
   b. Grade the produce according to the buyer’s specifications

10. Market intelligence and Price discovery
    a. Make available the market prices of three “Mandi Prices” as market information
    b. Make available future prices through price tickers – helping the producers to make decision on selling
    c. Providing the spot exchange terminal or accredited warehouse thereby reducing the transport cost
    d. Estimate the increase in revenue.*

11. Packaging in Bulk for bulk consumers and retail pack for retail consumers.
    a. Even the products which offer limited value addition possibilities , packing to the requirements of large retail chains is a good option for higher price recovery for the producers
    b. Packing facility can pack the product of that cluster and also the other products required by the retailer but produced elsewhere.
    c. Additional Price realized can be captured for value chain mapping*

12. Processing into value added commodity or into processed products
    a. Processing options to be evaluated and identify the best possible processing technology and plant suitable to the region and the product.
    b. Establish the processing plant in consultation with buyer so that the quality parameters met to the buyer’s satisfaction.
    c. Train the local team and the producer co to invest in the processing facility.
d. Before the processing on their own, producer co should run commercial quantities on lease basis, before they invest full amounts.

e. Packing of the final product can be in name of the buyers or to his specifications

f. Branding and distribution to the local markets can be planned once the process is stabilized.

g. Costs and gains to be estimated in processing and packing*

All the intervention with a * mark represents the possibility of value mapping either in increase of revenue or reduction in costs for the farmer /producer organization.

i. Logical flow for the value chain process and mapping the value chains.

| Stake holders in the value chain | Department of Agriculture, Horticulture, Irrigation, Watershed Banks | Farmersco-operative Producer organisation | Agribusiness Promotion Facility Implement suppliers Input Suppliers | Agriculture University R&D Centers KVKs | Commodity Exchanges / Spot Exchange | Private sector players Retail chains | Processors Traders Packers Local market players | Branding Advertising Distribution | Logistics cold chain
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1

5.8 Social and Environmental Issues

While preparing CACP, SP1 will take into account guidelines for social and environmental framework which are available as a part of PIP. Gender mainstreaming and benefits to small and marginal farmers will be core of the development strategy.

A template for preparation of CACP is given at annexure at the end of this chapter.

5.9.1 CACP Implementation Process

Once the CACP is prepared by Line Department and approved by DPMU / PMU, the responsibility for implementation of the plan will be with Line Department. For Community Mobilization, there
would be a field level NGO capable of supporting cluster on community mobilization, agriculture and horticulture development, small ruminants programme, on field water management and formation of FGs and PCs. The capacity building of the staff of Line Department will be done by either SAU or organization having expertise in community mobilization, extension education and other skills required to be imparted to Line Department. Implementation cycle for CACP is likely to be 48-60 months and comprise of two cropping seasons each year spread over four to five years.

The procurement for goods and services required for the each cluster shall be arranged by DPMU. The monitoring of implementation of various activities in each of the cluster shall be done by DLICs. The representative of the participating departments shall be responsible for overseeing the work in the area of their domain at each cluster. The coordination function for implementation of cluster activities at district level shall be carried out by the DLIC.

**Capacity Building and Technical Back Stopping:** Implementing agencies in the public sector such as State Agriculture Universities, agriculture research institutes, ARAVALI (Association for Rural Advancement through Voluntary Action and Local Involvement) and/or ACCESS would be engaged to provide technical backstopping for the activities planned specially demonstrations, advice and capacity building of personnel of Line Department and officers from the concerned line departments. Backstopping organizations will develop and provide training modules to Line Departments thereby ensuring standardization / consistency in implementation approach across clusters. Front Line Demonstrations will be organized by the KVK in the district.
Template for Cluster Agricultural Competitiveness Plan Development

Apart from Mokhampura, the CACP for each of the remaining 17 clusters shall be prepared by the participating Line Departments following the principles and guidelines detailed in this template. CACP for Mokhampura cluster has been already prepared would serve as role model. The detailed template for preparation of CACP is given below:

Chapter 1: Strategic context and rationale for selecting the value chain

Justification for selecting the crop for value chain development; this should have description and data pertaining to – area under the commodity/crop, its productivity, comparison with national average productivity, consumption pattern; what are the general constraints faced by the producer, reasons of low productivity of the selected commodity in Rajasthan. List major districts that are producing the selected commodity, their area, production and productivity – to include past five years trend for all these factors, compare the productivity with (a) national average, (b) with potential yield. Potential for development of value chain.

Chapter 2: Description of the Cluster (both macro and cluster)

Describe in detail the characteristics of the Agro Ecological Zone (AEZ), with specific reference to the selected cluster; this should have description and data pertaining to – soil types, rainfall pattern, source of irrigation, major cropping pattern……

Chapter 3: Water Resources management of the cluster

1. Description of Aquifer / Watershed / Canal command (as applicable)
   - Geographical, geological & hydrological details of the aquifer / watershed / canal command
   - Number of villages in the aquifer / watershed / canal command
   - Present area under various crops
   - Aquifer / watershed / canal command Map along with list of villages
   - Any other relevant details

2. Water Resources Availability & Utilization in the Aquifer / Watershed / Canal command (as applicable)
   - Assessment of available water resources in the aquifer /watershed (based on the rainfall data collected from the rainfall stations of Revenue Department/IMD/ WRD for the longest possible period) / canal command
   - Annual utilization of water resources in the aquifer /watershed / canal command
   - For Ground Water: Present annual withdrawal of ground water, based on the rainfall data collected from the Rainfall Stations of Revenue Department/IMD/ WRD for the longest possible period; Annual utilizable (dynamic) ground water availability
   - For Watershed: Having due regard to the current water flows to the downstream watershed/area, assess the surplus water available in the watershed which can be utilized within the watershed on annual basis
   - For Canal Command
   - Other relevant details

3. Objectives of the Water Management Aquifer / Watershed / Canal command (as applicable)
- To develop a community managed sustainable ground water use model at the aquifer level for various water uses in the aquifer area; / To develop a community managed sustainable water use model at the watershed level for various water uses in the watershed area / for canal water or surface water

- Any other supplemental objective

4. **Proposed Activities in the Aquifer / Watershed / Canal command (as applicable)**

4.1 **Studies/Field Surveys**
- Baseline survey
- GIS mapping
- Social assessment survey
- Economic and demographic survey
- Any other relevant studies

4.2 **Institutional Activities**
- Formation & fostering of Gram Panchayat Level Ground Water Management Committees (GPLGWMCs) / Watershed Level Committees (WLCs) / Water User Association (WUAs)
- Formation & fostering of Aquifer Level Ground Water Management Association (ALGWMA) / Dy level WUAs?
- Any other institutional activities

4.3 **Trainings**
- NGO engagement for formation and fostering of GPLGMWACs and ALGWMA / WLCs and community mobilization
- Continuous training of GPLGMWACs and ALGWMA / WLCs / WUAs
- Trainings of functionaries/govt. officers and other stakeholders.
- Exposure Visit of GPLGMWACs and ALGWMA / WLCs / WUAs and other stakeholders in the country where such initiatives are under implementation
- Any other relevant studies/consultancies.

4.4. **Physical Activities (as applicable)**
- Construction of piezometers in aquifer area
- Installation of Rain gauge stations in aquifer area
- Construction of ground water recharge structures (such as check dams/dugout ponds/anicuts/sub-surface barriers/roof top rain water harvesting etc.) in the aquifer area
- Construction of office buildings for GPLGMWACs and ALGWMA / WLCs / WUAs
- Providing of computers/allied equipment/furniture/measuring devices to the GPLGMWACs and ALGWMA
- Construction of water harvesting structures
- Restoration of existing community ponds
- Construction of cross-drainage/drainage works
- Construction of farm ponds
- Any other relevant activities
4.5 **Demand-side Management Activities**
- Provision for promoting water efficient irrigation techniques such as sprinklers and drips etc.
- Measurement of ground water extraction in the aquifer (tubewells wise)
- Any other relevant activities

4.6 **Staff/Operational Support**
- Requirement of staff (on contractual basis)
- Requirements of equipments/goods/vehicles and their operational expenses for implementation of various activities in the aquifer area.

5. **Cost Estimates**
- The cost estimates should be prepared based on latest Schedule of Rates, as applicable
- The estimate should also provide for physical contingencies and price contingencies
- The cost estimates should be prepared keeping in view the project period of five years.
- Cost estimates are required to be worked out (i) activity wise, as well as (ii) category wise [i.e. (I) Works (II) Goods & Equipments (III) Consultancies & Trainings. (IV) Incremental Operating Costs]

6. **Phasing of Activities.**
- Phasing of all the planned activities in the aquifer area need to be done for 5 year project period.
- Based on the above activities phasing, year wise requirement of funds should also be indicated.

7. **Implementation Arrangement.**
- Implementation Arrangement for all the planned activities is required to be clearly described with necessary details.

**Chapter 4: Production**

**E. Overview on the commodity / crop identified for value chain development in the cluster**

i. Description and data pertaining to – area under the commodity/crop, its productivity, comparison with state, national average productivity,

ii. Trends in production, area under the crop, productivity – description and illustration using graphs

**F. Description of production system of the selected commodity in the cluster**

i. Production system: Type of production system (smallholder farming, medium/large-scale farming), smallholder farming could cover a broad spectrum of farm models, including traditional agriculture systems, improved rain-fed cultivation, intensive irrigated agricultural systems

ii. Production process
   a) Seed management
   b) Variety used
   c) Seed source
d) Soil & its preparation; soil management practices

e) Planting / sowing season

f) Fertilizer application practices (both organic and inorganic)

g) Pest and diseases that are prevalent in this cluster

h) Harvesting processes

i) Yield

j) Post-harvest handling processes

iii. Cost of production and cost benefit analysis, assumption taken

iv. Utilization of the production

k) Household consumption

l) For seed purposes

m) Losses

n) Surplus of market

G. Analysis of farmer Farmer-Based Organizations (FBOs) in the cluster

i. Detailed description and data on the status of farmer based organizations in the selected cluster. What are the major activities that are undertake by these organizations; is the organizational capacities of these FBOs weak to be gauged by like low member commitment, support and participation; very high levels of illiteracy; inadequate capitalization; a low scale of operations; weak and unprofessional management; as well as low levels of business management skills, internal controls, planning and monitoring capabilities; is the environment cluster supportive to the existence of such organizations

ii. Situation analysis on the presence of NGOs, their past record; experience etc

Chapter 5: Marketing

A. Post-Harvest Value Addition

i. Preliminary grading and cleaning – is this activity done by the farmers or by other intermediaries of the value chain

ii. Other value addition activities – e.g. drying, processing etc. – who does it

B. Marketing Channels and Functionaries in the market chain and their services:

i. Description of the marketing channels: The marketing channel between producers and consumers comprises several different levels. Describe the various marketing channels that are present for the commodities movement from the farmer to primary market, secondary market to domestic consumers and exporters (e.g. one of the marketing channels for pulses could be Farmer/Producer → village trader → commission agent → dal miller → wholesaler → retailer → consumer). Determine which one of the marketing channel is a predominant channel? Explore if there are instances where the processors are directly buying the produce from the farmers? What are the factors / criteria that influence the farmer’s choice of a particular marketing channel for e.g. timely payment could be an important criterion for farmers that influence the adherence of a farmer to a particular channel, there could be many such criteria.

ii. Service provided by the market intermediaries: What are the services provided by the intermediaries, is there a significant development of marketing network – consisting of traders, processors, logistics, storage providers etc - developed near the production center? What is the role played by this network? (e.g. typically commission agents from the APMC market plays a significant role in the value chain like storage of the produce,
distribute / sale to processors, invests huge working capital – for making payment to the farmers, at times advancing to processors etc and they take hung margins in the value chain since one of the biggest constrains faced by these traders is the payment default risk since they end up financing both the farmers and the processors).

iii. Explore how best this unorganized sector can be converted to an organized sector – if the market services rendered by these intermediaries are minimal like transportation, limited storage etc. – this will augur well for the project because there is a possibility of “collapsing” the value chain and the farmer groups take up some of the market service without exposing to undue market risks. If working capital requirement and storage needs are serviced by the market intermediaries - is there a possibility of warehouse receipt development both for farmers and processors, along with linkages with commodity exchanges; are there firms are involved in vertical integration and national branding - can the project facilitate this integration strategies to effectively reduce marketing costs as well as boost producer realization.

iv. Understanding buyer’s preference: Buyers (brokers, traders, wholesalers, retailers, consumers) are generally looking for certain characteristics that would influence their buying decision for e.g. Is there a preference of bigger size, what is the influence of colour, shape, cooking quality etc.? These will have an implication in for the crop varieties that would be introduced in the project cluster. Is there an premium paid by the buyers for a produce that are free from dust, pest & diseased affected grain, discoloration free, lower moisture content etc., if yes, project can invest in post-harvest technologies that meet the market requirement for drying and cleaning.

C. Market information services:
   i. Description on the sources of market information: Numerous layers exist in the marketing chain between farmers and consumers. Determine if the present market information system is able to provide transparent information especially to the producers with regard to price information.

   ii. How does the producer get information regarding potential market channels, payment requirements, packaging, quality and other information that required by a producer to make a successful sale; what are the sources for such information; to what extent these sources are able to meet the requirement (gap analysis)

D. Processing:
   i. Processing network: Where are processors of the selected commodity located, inside the state or outside? Prepare a database of the processors. If they are predominantly outside the state – what are the reasons for this? Is there a disincentive for the processors to setup processing plants within Rajasthan, what are these?

   ii. What are the main methods of processing, which is the predominant processing method? What is the average plant capacity, capacity utilization, recovery rates etc.? What are the main by products and where is it used.

   iii. What are the constraints faced by the processors (could be product cleanness, finance, power, margin pressure due to multiple intermediaries between producer and processors etc.)? If the problems related to product cleanness – project can design clean production techniques and incorporate it in the demonstrations, training of producers in clean harvest, drying, grading etc.? Can buyback arrangements be organized between processors and producer groups by the products?

Chapter 6: Analysis of major constraints to the value chain

B. Value Chain Map: to provides a graphic representation of the structure of the value chain showing how products flow through the primary marketing channel as well as alternative channels.
C. **SWOT analysis** including Marketing costs and margins including farmers share in wholesale price

D. **Production constraints and possible solution:** Description of activities to be undertaken to increase the farm level productivity and at encouraging smallholder farmers to grow varieties that meet quality standards of the market. Each of the activity proposed should relate to the constraints identified during the analysis and participatory discussions with the stakeholders.

**Example:**

**Constraint - 1:** Predominant use of unimproved cultivars with low genetic potential due to {describe the reasons – low seed replacement rate, very limited availability of improved seeds etc.}

Solution: Introduction of newer varieties through technology screening that takes into account, among others (a) suitability of the varieties for the given cluster; (b) meets the requirement of the market; and (c) ensuring that there is adequate and timely supply of the selected varieties.

**Key Activities:**

- Frontline demonstrations at the farmers field to demonstrate newly released crop production and protection technologies and its management practices in the farmers’ field under different farming systems of the cluster in close collaboration with KVKs, Universities.
- Field demonstrations of proven technologies with an aim to promote a single practice or multiple practices based on the outcome of the participatory analysis. Details to be provided for the process of (a) demo farmer selection; (b) site selection; (c) package of practices to be demonstrated; (d) field days; (e) harvesting; (f) training; (g) record keeping etc. Description of the types of demonstrations to be undertaken (this should reflect the constraints identified); number of demonstrations; etc.
- Community level seed multiplication – {can be an important tool to meet the requirement of seeds (especially the timely delivery under rainfed conditions) and also becomes critical if the newly introduced variety gets acceptance with the grower and the market}. Description on Choice of crop / variety; source of seed; training of seed producer; quality control; cleaning, packaging and marketing of seeds; certification; sustainability issues
- Certified seed production under contract to seed company.
- Training to extension workers, exposure visits – that are focused are addressing the constraints identified.

E. **Marketing Constraints and possible solutions:** Description of activities to be undertaken to mitigate the various marketing constraints identified during the analysis and stakeholder consultation. Each of the activity proposed should relate to the constraints identified during the analysis and participatory discussions with the stakeholders.

**Constraint - 1:** Numerous layers exist in the marketing chain between farmers and consumers leading to reduction in the quality of the product due to excessive handling and the demand signal is lessened due to the multiple middlemen separating producers and wholesale buyers; hence smallholders are not aware about the quality and type demands in end markets.

**Constraint - 2:** Post-harvest crop losses due to inadequate and poor-quality storage; limited storage facilities; leading to constrained access to finance post-harvest leads to distress sale by the producers.

**Solutions:**

- Through collective action (farmer based organizations – FBO), farmers take on additional roles creating efficiency and minimizing players; activities to be taken up by the producers would include grading, bulking and transport. Also, FBOs develops formal and informal contacts with other producer groups on the one hand, and private sector
suppliers of agricultural inputs and crop processing equipment, traders, and industrial purchasers of agricultural products on the other hand.

- Facilitating linkages between the producer, warehousing companies (possibly in collaboration with commodity exchanges) and banks for storage and accessing warehouse credit.
- Developing alternate marketing channels.

**Key activities:**

- Establishment of Business Development Services to cater to the needs of the FBO.
- Training the leaders and members of FBOs on managerial techniques, leadership skills, and record keeping. Also on how to use new technology, such as new equipment, seed varieties, and other production inputs.

F. **Processing Constraints and possible solutions:** Description of activities to be undertaken to mitigate the various processing constraints identified during the analysis and stakeholder consultation. Each of the activity proposed should relate to the constraints identified during the analysis and participatory discussions with the stakeholders.

Chapter 7: **Project activities to improve the performance of the selected value chain**

A. **Institutional activities**
   i. Formation of Farmer Based Organizations
   ii. Any other institutional activities

B. **Physical activities – examples**
   iii. Demonstrations
   iv. Exposure visits
   v. Training and capacity building
   vi. Post-harvest support

C. **Policy interventions**

D. **Cost estimates**

E. **Phasing of activities**

F. **Brief description of the implementation arrangement**

Chapter 8: **Crop diversification to support water savings and generate enough income**

A. Overview on the crops identified
B. Analysis of the water used of the identified crop
C. Financial analysis
D. Proposed Activities
   i. Institutional Activities
   ii. Physical Activities
E. Cost Estimates
F. Phasing of Activities
G. Brief description of the Implementation Arrangements

Chapter 9: **Environment and Social Assessment**