Cluster Agricultural Competitiveness Plan (CACP)

Surface Water Cluster Palayatha, Baran
Rajasthan Agricultural Competitiveness Project (RACP)

Theme: Surface Water, Block- Palayatha, District – Baran

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Preface

The World Bank has approved credit amounting to Rs. 832.50 crores for development of 17 clusters, each having area ranging from about 10,000 ha to 31,500 ha in eight agro-climatic zones across Rajasthan to address end to end solutions to farmer's problems in three main water regimes. These include watershed/rain-fed, surface/canal water and ground water regimes with certain specified desired selection criteria's.

The Cluster Agricultural Competitiveness Plan (CACP) is the outcome of a planning process that aims to (a) identify opportunities as well as constraints towards developing one or two or more 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 of those public investments that will enable the community to address constraints and enhance opportunities towards establishing and strengthening identified value chains. The value chains proposed would envisage addressing broad sub-sectorial issues as well as help establish specific partnership arrangements between farmer groups or Producer Companies with agribusiness companies.

The Cluster Agricultural Competitiveness Plan (CACP) comprises investments to be made on improving water use efficiency, technology transfer and provision market led advisory services for agriculture & horticulture development, livestock strengthening and management especially for small ruminants, market and value chains in the cluster.

The CACP of Palayatha Surface Water Cluster in Baran district has been prepared and an amount of Rs 3402.75 lakh will be invested during the project period to make the cluster and farmers competitive so that economic level of farmers in the cluster can be uplifted. Simultaneously, as well as agricultural productivity of the cluster can be optimized.

I personally appreciate the commendable efforts by ARAVALI, Jaipur, Mr. V. S. Singh, Consultant, ARAVALI and especially Dr. V. P. Singh, Jt. Director Agriculture (Agronomy), Project Coordinators, Specialists, ABPF Consultant and line departments who contributed much towards making this comprehensive document. I also appreciate all other people who supported in many ways to prepare the CACP in a short period.

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List of Abbreviations

ABPF	Agri Business Promotional Facility
AEZ	Agro-Ecological Zones
ARAVALI	Association for Rural Advancement through Voluntary Action and Local Involvement
ARS	Agriculture Research Station
ARSS	Agriculture Research Sub Station
ATC	Adaptive Trial Centre
BPL	Below Poverty Line
CACP	Cluster Agricultural Competitive Plan
CBO	Community Based Organizations
CFC	Common Facility Centers
CIG	Common Interest Group
DLIC	District-Level Implementation Committee
EMP	Environment Management Plan
e-NAM	e-National Agriculture Market
FAQ	Fair Average Quality
FCI	Food Corporation of India
FCSC	Farmer's Common Service Centre
FIG	Farmers Interest Group
FPO/FPC	Farmer Producer Organizations/ Farmer Producer Company
GIS	Geographical Information System
GoI	Government of India
GoR	Government of Rajasthan
GSS	Gram Seva Sahkari Samiti
ICM	Integrated Crop Management
ICT	Information, Communication and Technology
IMD	Indian Metrological Department
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
JV	Joint Venture
KSK	Kisan Sewa Kendra
KVSS	Kriay Vikrya Sahkari Samiti
LLW	Lady Link Worker
LSCD	Loose Stone Check Dam
MI	Micro-Irrigation
MMS	Minor Masonry Structure
MPT	Mini Percolation Tank
MSP	Minimum Support Price

MTA	Multi Task Association
MTG	Multi Task Group
NAM	National Agriculture Market
NCR	National Capital Region
NeML	NCDEX e-Markets Limited
NRSA	National Remote Sensing Agency
NSPOT	NCDEX Spot Exchange
OBC	Other Backward Cast
PC	Producers' Companies
PAD	Project Appraisal Document
PDO	Project Development Objectives
PG	Producer Group
PHM	Post-Harvest Management
PIU	Project Implementation Unit
PMU	Project Management Unit
PRA	Participatory Rural Appraisal
RACP	Rajasthan Agricultural Competitive Project
RAJHANS	Rajasthan Horticulture Nursery Society
RAJUVAS	Rajasthan University of Veterinary and Animal Sciences
RKVY	Rashtriya Krishi Vikas Yojana
RS	Remote Sensing
RSSC	Rajasthan State Seed Corporation
RTC	Rural Technology Centers
SC	Schedule Caste
SCPI	Sustainable Crop Production Intensification
SFAC	Small Farmers Agri Business Consortium
SHG	Self Help Group
SR	Small Ruminants
SRR	Seed Replacement Rate
ST	Schedule Tribe
TCS	Tata Consultancy Services
TGM	Technical Grade Material
TRA	Technical Resource Agency
UMP	Unified Market Platform
VCD	Vegetative Check Dam
WUE	Water Use Efficiency

Executive summary

The World Bank has approved credit amounting Rs.832.50 crores for development of 17 clusters, each having area ranges from about 10000 ha to 31500 ha in eight agro-climatic zones across the Rajasthan to address end to end solution of farmer's problems in three main water regime namely Canal Water/rainfed, surface/canal water and ground water having some specified desired selection criteria's.

The Palayatha index catchment (Canal Water) cluster has been selected under the project after several visits by the PMU coordinators; consultations with officials of the WD & SC Department Jaipur; Project Manager - WC DC, CAD (Kota), interactions with the local community and various value-chain actors. The area is predominantly rich in agriculture and livestock rearing. Surplus production is generally available in the area as dominant crops in the cluster include Soybean, Paddy, Black gram in Kharif and Wheat, Mustard in Rabi. Among horticulture crops, Garlic and Coriander are major crops. The fodder of these crops are also predominantly use as cattle feed in the region. Area under the horticultural crops is only 34.70% of the total agriculture land (8003 ha) but there is a scope to increase the area under these crops i.e. (vegetables: Brinjal, Chilli, Tomato & Okra vegetables and in Fruit crops: Guava and Lemon) by diversification of area from food grain crops to the horticultural crops. The area under Mustard has shown a decreasing trend over last few years. Local and cross-breed goat population also offers potential for both goat milk and meat. The cluster has been selected based on the basis of Canal Water approach. Therefore, improvement in water use efficiency would be achieved through Canal Water management and Agricultural productivity including agricultural & horticultural crops would be increased by way ensuring water availability by increasing conveyance efficiency of the canal system.

The cluster is located around 31 Kms from Baran district Headquarters and 30 Kms from Kota. The area of the cluster is spread over in 27 villages and 10 gram panchayats in Antah and Mangrol tehsil of Baran district. The total area of the cluster is 8003 ha. Total population of the cluster is 27564. Out of the total population female population is 48.24% and schedule caste (SC) population is 21.95% and 8.20% is schedule tribe (ST) population. Large farmers are 14.97%. It means about 86.03% farmers are small, medium and marginal farmers and require support for upliftment.

The area is almost plain area and it is under the slope category upto 0-1.5% slope. Majority of the soil in the cluster 7603 ha out of total 8003 ha is black soil with soil depth of app 1100-1220 mm. The soil is characterised as medium quality with low in N and P. The level of micro nutrients like Zn, Fe, Bo and S are also very low and care has to be taken in the project for efficient nutrient management for various crops based upon the soil condition. The average rainfall of the cluster is around 835 mm. Temperature in the cluster varies from as low as 5^0 C in winter to 48^0 C in summer. The Kharif crops are cultivated based on the rain water received during the monsoon. Main source of irrigation is canal water but ground water is also used for lifesaving irrigation in the cluster. The average Pre-Monsoon depth to water in the year 2011-16 varies from 4.42 mts to 7.63 mts below ground level and Post-monsoon depth to water from 3.59 mts to 5.59 mts. During Pre-monsoon period in the long term, increasing trend of ground water levels of 0.13 m/year has been observed. Increasing trend of 0.07 m/year in ground water

levels of Post-Monsoon period has also been observed. Cropping intensity of the cluster is 154.29%. Out of it the cropping intensity of Kharif crops is 89.97% and in Rabi, it is only 64.33%, in horticultural Crops it is only 34.70% which is considerable area due to area in Coriander and Garlic crops. But in other horticultural crops it is negligible in Palayatha cluster. Consumption of fertilizers in the district in Kharif is very high i.e.179.43 Kg/ha against the state average & in Rabi seasons, it is only 112.49 Kg/ha, which is again higher than the state average. In totality the consumption of fertilizers in the district is 132.90 Kg/ha, again higher than the state average. The judicious use of fertilizers is now needed & the farmers have to be promoted to adopt package of practices and the apply fertilizers in the crops judiciously.

Total 66.825 MCM rains received during the monsoon in this cluster, whereas total 53.90 MCM is available from the canal system. Keeping these facts in mind, the final crop water requirement would be about 23.68 MCM which would be supplied from ground water system. The conjunctive use of canal and ground water is recommended in this cluster for avoiding development of perch water table and water logging condition

Palayatha has only 3 APMCs, which directly can have impact on the cluster. 1. Atru - 60 kms from the cluster, 2. Baran - 30 kms from the cluster, - Kawai Salpura, 80 kms from the cluster. Farmers sell their produce mostly in Baran main APMC irrespective of the season or type of crop. In some cases, village level traders also approach and buy the produce at farm gate itself.

Till date, the NGO (Jaipur Sewa Foundation) has mobilised 647 MTGs of Agriculture & Horticulture farmers and 60 MTGs of Goat rearers. The entire area is covered by 12 WUAs. It is also envisaged to form FPCs in the cluster which will be decided after further consultations with the community.

The cluster is classified as canal water cluster, and activities related to the rehabilitation and modernization of the canal & structures is being implemented by Water Resource department, while activities related to production are looked after by the department of Agriculture, Horticulture and Animal Husbandry GOR. The activities related to market and value chains will be addressed and implemented by Farmer Producer Company with the support of Agri-Business Promotion facility. Community mobilization, data collection and technical support to stakeholders will be given by the field level NGO operating in the cluster.

A scoring intervention-matrix consisting of parameters along with weights has been deployed for prioritisation and selection of commodities/crops for value chain intervention in the cluster. The four important parameters considered include : (A) Existing size of the crop considering cropped area, production and productivity of each crop (B) Potential for value addition (implying scope for increased value addition for local producers and processors) considering price spread until mandi as well as retail level, net profit in production, scope for processing in the state, scope in terms of extent of processing (primary, secondary & tertiary), growth in market demand (C) Risk assessment considering price volatility in the commodity (D) Others considering water requirement. On this basis Soybean wheat and garlic have been selected for value chain study and intervention. Some basic interventions for Goat value chain planned under the project are; establishment of one FPC, a Rural Technology Center. Horticulture development through various activities like introducing water saving techniques, promoting horticulture crops etc. has also been considered. There is a range of constraints apparently in the value chains leading to lower producers' incomes. These include multiple intermediaries; limited access to market information, limited value added processing units, inadequate capacity building initiatives for members, limited primary and secondary processing facilities, lower productivity and net yield in some crops, poor awareness in good package of practices, limited storage and primary processing facilities etc.

To address the issues of improvement of water use of efficiency, production constraints, poor access to market management etc. following appropriate investments would be done in the project area:

1. Climate Resilient Agriculture:

A. Improvement of water use efficiency:

This being the canal water cluster, rehabilitation and modernization of the canal network and structures would be done to improve the water use efficiency by reducing the conveyance losses during the operation. In addition to the above some expenditure on farmer's organizations and project management costs would also be done. The total tentative investment on these activities would be around Rs.1351.26 Lakh. The Water Resources department is responsible to implement these activities with the support of field staff, community groups and field NGO.

B. The activities of Technology transfer and market led advisory services in:

(I) Agriculture production (i) Promotion of efficient techniques of irrigation viz. drip and mini sprinklers to increase the irrigation efficiency, improve productivity and reduce cost of production (ii) Diversify the present wheat crop to barley with the aim to improve the irrigation water use efficiency and to develop a new value chain crop through demonstrations and capacity building (iii) Promotion of farm mechanization to reduce the cost of production (iv) Promotion of seed production to improve the SRR and the farmer income (v) Promotion of fodder production to reduce the gap of demand and availability of fodder for the animals (vi) Introduction of ICT based extension system for the quick reach of the solutions to the beneficiaries (vii) Establishment of FCSC to encourage the farmer organization of cluster for their own input arrangement and facilitate the value addition and marketing of agro-produce and (viii) Capacity building of the beneficiaries to achieve the PDO. An investment of **Rs.713.04 lacs** would be incurred on these aspects. The Agriculture department is responsible to implement these activities with the support of field staff, community groups and field NGO.

(II) Horticulture production (i) Demonstrations on production technologies for Fruit Cultivation, (ii) Demonstrations on production technologies for vegetable cultivation including assistance on green house, assistance on shade net house, (iii) Solar Pump Program, (iv) Post-Harvest Management (v) Horticulture Mechanization and (vi) Farmers training, Seminars, Exhibition Kisan mela etc. An investment of **Rs.632.20 lacs** would be incurred. The Horticulture department is responsible to implement these activities with the support of field staff, community groups and field NGO.

C. Livestock Strengthening & Management includes activities like:

(i) improve productivity (milk and weight gain) through investment in breeding, feeding and animal health services (ii) improving market access and local level small value addition (iii) supporting farmer advisory and training of the farmers, and training of existing Animal Husbandry Department's technical staff and (iv) Project management. An investment of **Rs.474.23 lacs** would be incurred. The Animal Husbandry department is responsible to implement these activities with the support of field staff, community groups and field NGO.

2. Market and value chains activities include like:

The value chain and marketing infrastructure will be developed in the cluster with the support local community for three crops which are Soybean, Wheat and Garlic. Accordingly, the Farmer Producer Company and individual beneficiaries would be supported through (i) institutional cost for functional support, (ii) Value chain for FPCs and capital expenditure for individual agri-preneurs. Total 4 units under FPC and 4 units for individual agri-preneurs can be supported under the project. A tentative investment of **Rs.232.00 lacs** would be incurred during the project period on these activities which includes the cost of Goat value chain development in Livestock strengthening and management component. The Project Management Unit (PMU),

Agriculture & Horticulture department are responsible to implement these activities with the support of field staff, community groups, ABPF Consultants and field NGO.

The intervention plan in the selected commodities in the light of critical constraints may be viewed as follows:

Wheat:

SN	Constraints	Action	Action By
1.	**Production**		
1.1	Role of weather (Temperature and rainfall) in crop production in immense key months being January and February	To provide weather forecasting facility to help minimize the climatic risk	DoA
1.2	Farmers end up paying higher for Seeds, fertilizers and pesticides if procuring from retailors	Setup of FPC and FCSC to take all marketing licenses to provide inputs to farmers at right time at right price and quality	DoA, RACP, ABPF
2.	**Post-Harvest**		
2.1	Farmers unware about quality parameters like moisture, foreign material, immature grains, weevils etc. Inadequate infrastructure for grading/sorting/drying and storage at village/cluster level.	To make aware about quality parameter of wheat, a common facility centre should be established at cluster level with sorting, grading facility to ensure higher returns to the farmers.	RACP, ABPF
3.	**Processing**		
3.1	Not aware of special license option to source directly from farmers /FPOs.	Well planned strategy is to be decided to make food processors aware about the license.	DoA
3.2	Less value addition product and its volume available in market	To promote entrepreneur start up for wheat value added product where there is surplus production	RACP, ABPF
3.3	Wheat processors are not aware of schemes of the GoI Including CLCSS, cluster Development scheme or “Sampada” for technology upgrading.	Print and visual media could be an effective way to cascade the information to the target audience.	MOFPI

Garlic:

Sr.No.	Constraints	Action
1.	**Production**	
1.1	Limited knowledge of garlic production technologies and inadequate availability about improved & good quality varieties of garlic among producers	To promote both table purpose varieties and processing purpose varieties
2.	**Post-Harvest**	
2.1	Contractual harvesting of garlic	Setting up alternate channel to sell directly through PC to processor or large retail shops like Walmart, Big Basket
2.2	Due to same harvesting time prices collapses and hence storage/pack house option could help reduce distress sale.	Storage facility/ mini cold storage for farmers as part of FCSC
3.	**Processing**	

3.1	Lack of precooling and cold storage facility in the cluster

Setting up pre cooling and/or cold storage facility as part of FCSC or individual enterprise or start ups. Explore the solar option on this.

3.2	Limited processed product available in the market which limits the marketing potential of the commodity	Facilitate the entrepreneur development to set up small scale processed product like garlic powder, paste, peeled garlic
3.3	Lack of proper washing and cleaning facility	To make farmer aware about quality parameter of garlic for processing like value added products; washing facility as part of FCSC

Soybean

Sr.no	Constraints	Action
1.	**Production**	
1.1	Low income generating black soybean are favoured by the farmer community and not HYV yellow soybean	PCs to undertake input sourcing activities under the joint umbrella of FCSC to facilitate
2.	**Post-Harvest**	
2.1	Dearth of adequate storage facilities for the producers	Establish storage facilities by PC as a part of FCSC
2.2	Limited access to market intelligence about price arrivals of the soybean in different markets	Market intelligence system to be developed in FCSC
3.	**Processing**	
3.1	Lack of facilities for oil testing to determine the content in produce resulting in increased price yield to farmers	Oil content testing facilities as part of FCSC
3.2	Inadequate processing unit of soybean such as soymilk processing unit, soya chunks, soy paneer.	Facilitate start up in secondary producing from amongst PCs or individual entrepreneurs
3.3	Lack of any cleaning grading unit of soybean	Establishment of quality sorting and grading by along with facilities for packaging & vehicle to facilitate transportation through FCSC

Goat:

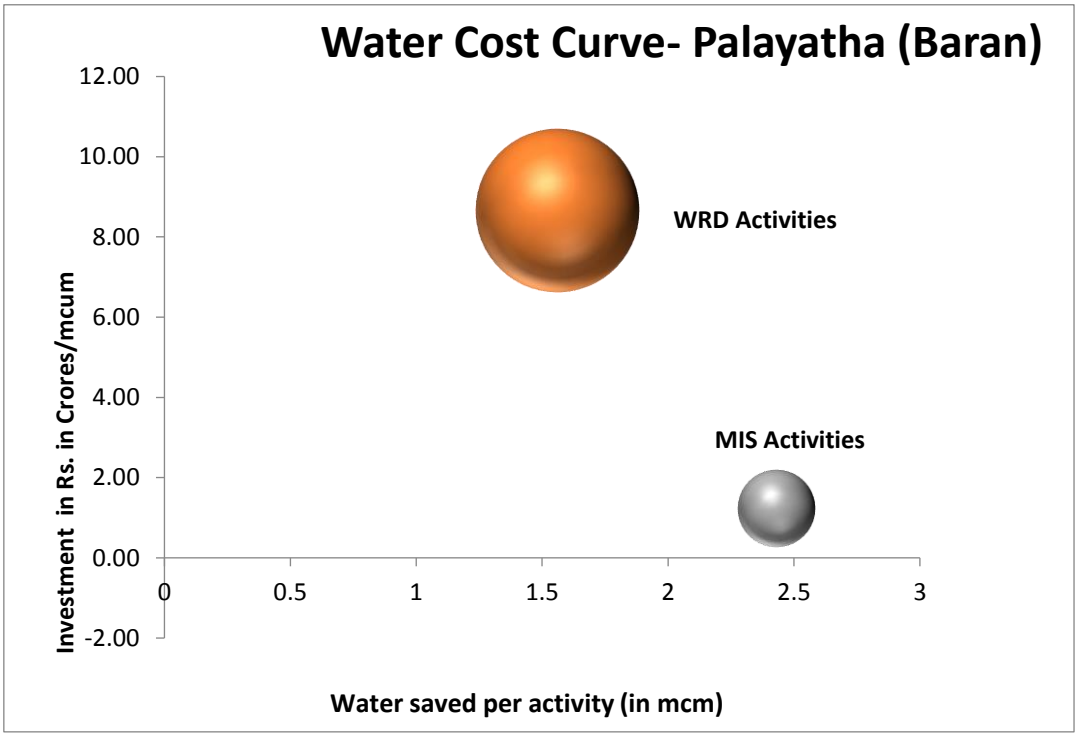
S.no	Constraints	Action	Action By

1	Production		
1.1	Most of the available animals are non-descriptive resulting in low yield of milk/meat	Distribution of bucks of good variety, primarily by RAJUVAS.	DH
1.2	Farmers do not take proper care of the goats	Training on improved goatry practices including housing, feeding, grazing etc.	DH
1.3	Mortality of goats	Rural Technology Center for providing health care services and promoting rural employment	DH
2	Marketing		
2.1	Non availability of milk supply chain	Piloting goat milk collection, value addition and market linkage through FPC to be formed in Bundi cluster	DH, FPC, ABPF
2.2	Non availability of live goat marketing infrastructure	Promotion of goat marketing through FPC in Bundi cluster	DH, FPC, ABPF
2.3	Non availability of community institution for goat rearers	Promoting a goat specific FPC	DH, FPC, ABPF

The comparison of investment (in Rs crores per mcm) is a useful tool for assessing data to understand the relative effectiveness and cost of the full spectrum of approaches to improving water security. When coupled with realistic assessments of operational risk, such comparisons can also help policy makers and investors to improve water-sector productivity.

In the case of Palayatha cluster, there are majorly two water saving activities taking place viz activities of Rehabilitation & modernization activities of WRD and the micro-irrigation system (MIS) activities of Agriculture and Horticulture department. Both these activities save water up to the extent of 1.56 mcm in project period and 2.43 mcm per year respectively. When the investment per unit of water saved is calculated, it is found that MIS activities are able to conserve more water at lower investment of Rs.1.24 crore per mcm of water saved per year. Thus, it could be said that MIS activities like installation of drips and sprinklers for the agricultural and horticultural crops has far reaching impact in the span of a year.

Activities undertaken to save water	Water saved- per year in mcm	Investment- Rs crores/mcm	Total investment- Rs crores
WRD activities	1.56	8.66	13.51
MIS Activities	2.43	1.24	3.01



Total Investments in Cluster

So a total investment of **Rs. 3404.86 lacs** is proposed to be incurred in the cluster during the project period to make the farmers and cluster competitive to get improvement in water as well as agricultural productivity and better market access.

S. No.	Department	Components (Rs. Lakh)				
		Climate Resilient Agriculture	Market & Value Chains	Farmer's Organization and Capacity Building	Project Management and M&E	Total
1	Water Resource management	1244.46	0.00	96.80	10.00	**1351.26**
2	Agriculture	559.88	232.00	144.67	10.62	**947.17**
3	Horticulture	585.20	0.00	36.00	11.00	**632.20**
4	Livestock	417.99	15.00	27.98	13.26	**474.23**
	Total	**2807.53**	**247.00**	**305.45**	**44.88**	**3404.86**

The above table reveals that total investment amounting to **Rs.3404.86 lakh** would be incurred during the project period by March 2019 against activities related to improving water use efficiency, technology transfer and market led advisory services, livestock strengthening & management, market & value chains, farmers organization and capacity building, project management, along with monitoring & evaluation to make the cluster's farmers and production competitive to increase water and agricultural productivity.

Out of the total investments, 82.46% would be incurred on the first component, i.e. Climate Resilient Agriculture, 7.25% on Market and Value Chains, 8.97% on Farmers Organization & Capacity Building and 1.32% investments would be incurred on 4th Component i.e. Project Management & M&E.

The procurement of agricultural inputs /materials would be done as per the procurement manual of RACP. However, procurement of seed would be done from Rajasthan State Seed Corporation (RSCC) / National Seed Corporation or any other States Seed Corporations and Agricultural Universities of Rajasthan. Other inputs including fertilizer, pesticides, weedicides etc. would be procured from Kray Vikray Sahkari Samiti (KVSS) / Gram Sahkari Samiti (GSS) or other local institutions from where Agriculture & Horticulture Departments procure them for their programmes. Planting material for fruit cultivation would be procured from RAJHANS. Spot purchasing would be adopted for Goat procurement.

After all these investments in the cluster, it is expected that water availability in the area would be increased significantly and productivity of water would also be increased. The farmers of the cluster will be in a position to increase productivity of the crops at least by 5% per year up to a desired level and the Farmer Producer Company will be empowered to do business and will setup required infrastructure to get the highest benefit from the crop production.

Chapter – 1: Context and Background

The World Bank has approved credit amounting to Rs.832.50 crores for development of 17 clusters, each having area ranging from about 10,000 ha to 31500 ha in eight agro-climatic zones across the Rajasthan to provide end to end solution to farmer's problems in three main water regimes namely Canal Water/rain-fed, surface/canal water and ground water, having some specified desired selection criterion.

The Project Development Objective (PDO) is to establish the feasibility of sustainably increasing agricultural productivity and farmer incomes through a distinct agricultural development approach by integrating agriculture water management and agricultural technology, farmer organizations and market innovations in selected locations across the ten agro-ecological zones of Rajasthan. The aim is for the state to help farmers get more rupees per unit of water in compensation for farmers using fewer units of water.

The guiding principles i.e. (a) sustainable and efficient use of water resources, including improved on-farm water use efficiency, reduced water-intensive cropping patterns, and using the resultant savings of water from agriculture sector for economic purposes outside of agriculture in support the state's water policy objectives; (b) increased private sector participation in the development of value chains in processing and marketing in support of the state's agro-processing and agri-business policy; and (c) improved public sector capacity in delivering agriculture support services are to be ensured through the investments.

The Key performance indicators (KPIs) (a) reduction in water used in agriculture; (b) increase in water use efficiency in agriculture; (c) increase in agricultural productivity; (d) increase in gross margins from crops and livestock products; (e) increase in the share of producer price in wholesale price; and (e) farmer satisfaction with project deliverables will also be measured under the project.

There are four components under the project: Component 1: Climate Resilient Agriculture; Component 2: Markets and Value Chains; Component 3: Farmer Organization and Capacity Building; and Component 4: Project Management, Monitoring and Learning. Implementation of the four components will take place over the project period and across selected clusters in the state. The project will be taken up in seventeen (17) clusters across the eight agro-ecological zones (AEZ) and would implement a location-specific menu of approaches and interventions would be discussed in the CACP. Each cluster will have a defined theme and demonstration objectives and accordingly cluster specific menu of investments are to be proposed for implementation in the cluster during the project period.

After restructuring the project, it was decided that planning and implementation of the project would be done by line departments in place of Service Providers (SP) as decided at the time of signing of the agreement and community mobilization at cluster level would be done with the support of Field NGOs. Dy. Director Agriculture, Jila Parishad, at district level has been designated as District Project Manager and his office has been designated as office of the District Project Management Unit (DPMU). All concerned offices of the line departments at district level would be Project Implementation Agencies for planning and implementation of project activities in the cluster. There is District Level Implementing Committee (DLIC) will

be responsible for coordination and implementation at district as well as at cluster level. District Collector is chairperson of the committee, DPM, DPMU is member secretary and other district level officers / PIAs of the line departments are the members of the committee.

1.1. Brief Description of the CACP

The Cluster Agricultural Competitive Plan (CACP) is primary requirement of the cluster to be developed keeping in mind Project Development Objective (PDO). The CACP is divided in to eight chapters and whatever discussed in the chapter is being summarized as under:

First chapter includes context and the background, brief description of the CACP, objective of the RACP and rationale for selection of the cluster.

Second chapter consists of description of the cluster in terms of spatial characteristics, agro ecological characteristics, demography of the cluster, agriculture characteristics that includes agronomy, horticulture, Micro Irrigation Systems and Seed Replacement Rate. Further there is a description on livestock scenario in the cluster and market infrastructure that can have impact on the cluster.

Third chapter discusses the strategic contexts of choosing the Value chain crops for the cluster. The scoring matrix designed to select the value chain crop has been detailed out along with the parameters for the same. Thereafter, the inference is drawn from the scoring model in order to finally select the major value chain crops. Then the current marketing channels of the selected VC crops have been described. Similarly goat value chain has been discussed in the present context of the cluster with respect to goat milk, meat, leather, illustration of organized market channel and fodder requirement for the same.

Forth chapter includes opportunities and challenges in selected value chain/s along with summary of selected value chain crops that includes the constraints for the crops and the possible interventions.

Fifth chapter is related to the value chain investments to be done in the cluster under production and market and value chain sub component which includes rationale for these investments, non-water-use interventions in value chain, investments related to technology transfer and market led advisory services (agriculture & horticulture), livestock strengthening & management, interventions in market & value chains, value chain studies of identified commodities in the cluster of selected crops in the cluster, scouting of technologies and business ideas for such identified commodities, incubation services to agri-entrepreneurs, management and business training to FCSC and producer companies personnel, facilitating agri policies, linking producers groups to market, market infrastructure and reference business models of selected value chain crops, training and capacity building, market information services, cost estimate of investments, summary of proposed investments, brief description of implementing arrangements.

Sixth chapter is discussing about rain water management of the cluster to develop selected commodities as a pilot which consists description of surface water cluster, water budgeting including hydrological cycle, water budgeting exercise for the project area, water budgeting for the project area, calculations, objectives of the water management in surface water cluster, proposed activities in the surface water cluster including studies/Field Surveys, institutional activities, trainings, surface water development activities to be implemented, site specific plan & cost estimates of the activities, estimated cost of Investments under surface water management, implementation arrangement for all the planned activities in the area.

Seventh chapter includes social and environmental assessment of the proposed activities: social assessment of the proposed activities, the social assessment exercise has highlighted the following key social safeguard and social development issues, social inclusion strategies, social management plan under RACP and environment assessment of the proposed activities, environment management plan for crop intensification, environment management plan for water harvesting and water management, environment management plan for livestock

management activities, environment management plan for value chain activities, training plan for implementation of environment management plan (EMP), objective of training plan, training type, target groups & frequency.

Eighth chapter is consisting department and component wise consolidated investments plan to be incurred in the cluster.

The Cluster Agricultural Competitive Plan (CACP) is consisting of investments to be made on improving water use efficiency, technology transfer and market led advisory services in agriculture & horticulture development, livestock strengthening and management specially for small ruminants, market and value chains in the cluster.

1.2. Objectives of the CACP

The Cluster Agricultural Competitive Plan (CACP) is the outcome of a planning process that aims to (a) identify opportunities as well as constraints towards developing one or two or more 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 of those public investments that will enable the community to address constraints and enhance opportunities towards establishing identified value chains. The value chain proposed would envisage addressing broad sub-sectorial issues as well as help establish specific partnership arrangements between farmer groups or producer organizations with agribusiness companies.

1.3. Rationale of selection of the cluster

Keeping in view the principles of the cluster selection, the Palayatha cluster has been selected to achieve the Project Development Objective. The Palayatha cluster is a Canal Water cluster which is a hydrological unit. The Palayatha Canal Water cluster is situated in V Agro-climatic Zone (Humid South Eastern Plain). Palayatha is a Gram Panchayat headquarters of Antah Tehsil and Baran district. The cluster is located about 5-8 Km from Antah and 27 Kms from Baran district headquarters. The Palayatha Cluster in Baran district has been selected to be developed under the RACP after undertaking various field visits by the PMU coordinators and having consultations with the officials of Water Resource Department, Jaipur. This was approved from the competent level.

The area is predominantly rich in agriculture and livestock rearing. The average rainfall of this district is approximately 835 mm. As elsewhere discussed, total cropped area is about 8003 ha, out of which 7200 ha is in Kharif and 5148 ha is in Rabi season. Soybean crop is sown in about 6840 ha, Black gram in 288 ha & Paddy in 72 ha. In Rabi season, Wheat is being grown in 4368 ha & Mustard in 780 ha. Total 2777 ha i.e. 34.70% area is sown in horticultural crops. Out of it, major crop is Garlic and area of this crop is 2496 ha, area of Coriander is 156 ha and very small area is under other crops. Total area under the above crops makes a total cropping intensity of 188.99% (151,325 ha). The above crops which are sown in the cluster are also the main crops in the district. So, surplus production of major crops is generally available in the area.

The production of Soybean, Black Gram & other crops is being sold through unorganized local market and mandi of Antah, Baran and Kota. Apart from human consumption most of the produce of Soybean including other similar crops is being used for oil extraction and other uses, Black Gram is used for pulses. Hence looking to the enough demand of oil and pulses population of Baran district, there is a considerable scope of value addition in the crops. Similarly, Garlic and Coriander crops are useful for spices so these can be selected as the value chain crop in the cluster because these crops are having industrial value for development. Apart from this, the area being sown under less paying crops would be diversified into cultivation of high pay off crops of horticultural in future. These crops are significant for any Producer Company (PC), so these crops may be taken as the value chain crops in Palayatha Cluster.

Although there is not much area under other horticultural crops except Garlic and Coriander crops at present, the availability of good land and availability of canal water puts immense

opportunity for the cultivation of vegetables and fruits. The area is fairly suitable for fruits like Guava, Lemon & vegetables like Brinjal, Chilly, Okra, & Tomato Crops. Hence, some area under cereal & other crops would be diversified into the cultivation of these vegetables and fruits crops.

As the dairy is experienced quite successful business in the cluster, cultivation of fodder crops has an important role in the cropping pattern to the local farmers. Similarly, the Goat rearing is quite popular in this area. About 9227 numbers of goats are available in the villages of the cluster, so there is a significant scope of value chain of goat meat.

It can be concluded that the availability of sufficient land and underground water along with the proximity to Kota provides enough opportunity for the development of value chain crops and cultivation of vegetables and fruits, as well as scope of the value chain in goat meat production. Therefore, Palayatha is an appropriate cluster to be developed under the RACP.

Chapter -2: Description of the Cluster

2.1. Spatial characteristics

The command area of the cluster is spread in over 27 villages and 10 Gram Panchayats of Antah and Mangrol Tehsils and one Nagar Palika, Antah in Baran district. Out of 27 villages, 24 villages & 6 Gram Panchayats in Antah Tehsil and 5 villages and one Gram Panchayat are in Mangrol Tehsil of Baran district. The list of villages and Tehsil is being presented as Annexure 2.1Total length of the system is 87.32 Km. The name and area of the Gram Panchayats and villages covered in the Project area along with the index map of cluster are presented in Annexure 2.1.

2.1.1. Land Use Pattern of the Cluster

Total cultivable command area (CCA) of the cluster is 8003 ha and 5819 ha from the total area is the Irrigated command area (ICA).

2.1.2. Current status of Connectivity

At present there is unorganized market in the cluster and farmers sell their produce in the local markets. The Antah & district mandies (markets) are located just 10 & 35 km from the cluster respectively. It is located 35 Kms from Baran district and 10 Km Antah Block and 280 Kms from Jaipur.

2.2. Agro-ecological characteristics

2.2.1. Soil Slope and Soil types

The slope of the Palayatha project area ranges from the 0 to >1.5%. The area is almost plain area and it is under the slope category of up to 0-1.5% slope. The category wise and micro Canal Water wise slope area is being summarized presented as under:

Table 1: Soil slope of the Palayatha Project area

Sr. No.	Slope percentage	Area in hectares
1.	0 to 1.5 %	8003
	Total	**8003**

(Source: Assessment during Field Survey**)**

The soils of the district are alluvial in nature and are generally non-calcareous. Its color varies from dark brown to black. This type of soil generally occurs in plains. Most of the soil of the project Area is very good and black in color and clay to clay loam in texture. The soil of the some pockets of the cluster is sandy to sandy loam in texture. Topography of the Project Area is almost plain. The soil profile of the project area is being presented summarized as under:

Table 2: Soil Profile of Palayatha Cluster

Sr. No.	Major Soil Classes	Area in hectares
1.	Clay soil	8003
	Total	**8003**
	Soil Depth :	
Sr. No.	**Depth (cm)**	**Area in hectares**
1	> 45.00	8003
	Total	**8003**

(Source: Assessment during Field Survey**)**

The Soil fertility level of the Project Area is presented as under:

Table 3: Soil fertility level of the Palayatha Cluster

Soil fertility Status	Kg/ha	Recommended
N	180-200	280-480
P	17-33	56-70
K	202-380	336-400
Micronutrients	**PPM**	**Recommended**
Zn	Very Low	0.6-1.0
Fe	Low	4.5
Boron	Low	8-10
Sulphur	Low	10-15

(Source: Agriculture Dept, Baran**)**

The analysis of soil data given in the above presented table shows the need to improve and maintain the soil fertility. Soil health card to every farmer, in every crop season is proposed to be provided, which will include the recommendation for application micro nutrients and fertilizers as well as organic manures.

2.2.2. Rainfall Pattern in Project Area

The region falls under humid climate. The period from mid of June to September is the monsoon season, followed by the months October to mid-November constitutes the post monsoon or the retreating monsoon. The project area falls under Agro Climatic Zone V (Humid South Eastern Plains).

The average rainfall of the cluster area is 835 mm which has been used for calculation of water budgeting and similar other aspects. (Refer Annexure 2.10)

2.2.3. Temperature

Summers are very hot and dry and winters are very cold. The maximum temperature during summer rises as high as 48°C while minimum during winter reaches as low as 5°C. The summer season prevails from March to mid of June after which the rainy season starts with the onset of monsoon rains lasting till the end of September. During the May / June months, the mean daily temperature is about 40°C.

2.2.4. Source of Irrigation

The rainwater is also the main source of ground water recharge in the cluster. In Palayatha cluster the main source of irrigation is canal water but ground water is also used for lifesaving irrigation in the cluster. The source (method) of ground water/extraction and related details as well as area irrigated is being presented as under:

Ground Water Status in Palayatha Cluster

In addition to canal water, the ground water is a secondary source of irrigation. About 960 ha area is irrigated in the cluster. Out of this an area of 120 ha is irrigated from dug wells, 840 ha area is irrigated from deep tube wells. Almost 305 days of the year water is available in wells and in dug wells, ground water is available only for about 250 days. The functional depth of ground water is ranging from 100 – 130 mts.

Table 4: Ground water staus in Palayatha

S. No	Source	No.	Functional depth (mts)	Dry	Depth of water (mts)	Area irrigated (ha)	Water availability (days)
i)	Dug wells	120	100-130	115	90-110	120	250
ii)	Deep Tube Wells	455	100-130	60	90-110	840	305
	Total/ Average					**960**	**250-305**

(Source: Field Assessment and Agriculture department, Antah)

2.3. Demographic Characteristics

The Palayatha cluster comprises of ten (10) Gram Panchayats & one (1) Nagar Palika having twenty-seven (27) villages. The villages falling in the Project Area are characterized by canal water i.e. the only source of irrigation; poor infrastructure development and water distribution is not being done on equitable basis.

2.3.1. Population

The total population of the cluster is 27564, out of which the female population is 48.24%. The population has scheduled caste (SC) population as 21.95% and 8.20% as scheduled tribe (ST) population as presented in the table below.

Table 5 Population Details of Palayatha cluster

Male	Female	Total	SC	ST
14266	13298	27564	6049	2259
51.76%	**48.24%**	**100.00%**	**21.95%**	**8.20%**

(Source: Field Assessment and Agriculture department, Antah)

2.3.2. Socio-economic condition of the cluster

The cluster has poor infrastructure development; low literacy levels and high level of migration, which is predominantly observed during times of drought. Although, the farmers have larger landholding, there is scope to improve their net realization from the crop cultivation. The tables given below presents that most of the farmers are either small, BPL or marginal farmers. Large farmers are 14.97% which means about 86.03% farmers require support for upliftment. During the implementation of the project activities the involvements of all farmers/households have to be ensured whether these are from lower backward and other weaker classes or upper classes. Refer Annexure 2.3.

Table 6 Household Details of Palayatha cluster

BPL household	Land Less	Small Farmer	Marginal Farmer	Large Farmer	Total household	SC household	ST household
1828	484	2114	1902	792	5292	1162	434
34.54%	**9.15%**	**39.95%**	**35.94%**	**14.97%**	**100.00%**	**21.96%**	**8.20%**

(Source: Agriculture Department, Palayatha Cluster

2.4. Agriculture-related livelihood characteristics

Agriculture is the chief contributor towards the economy of the district. Baran district occupies an important place in the agricultural production of the state. It falls in V Agro-Climatic Zone (Humid South Eastern Plain) as discussed earlier. The total geographical area of the district is 6,99,461 hectares which is about 2.04% of the state. Out of this, the net area sown is 3,53,008 ha. Out of this the rainfed area is 3,26,515 ha and irrigated area is 3,32,524 ha. At the same time, some area is also cropped twice a year with the help of irrigation and hence the total cropped area is 659039 ha. So, the cropping intensity of the district is 187% against the state average of 143%. A total area of around 3,32,547 hectares is being irrigated by canals (68051 ha), tanks (9469 ha), 28270 tube wells & 28394 wells (2,34,896 ha) and other sources (20108 ha) in the district.

2.4.1. Cropping Pattern of Agricultural Crops

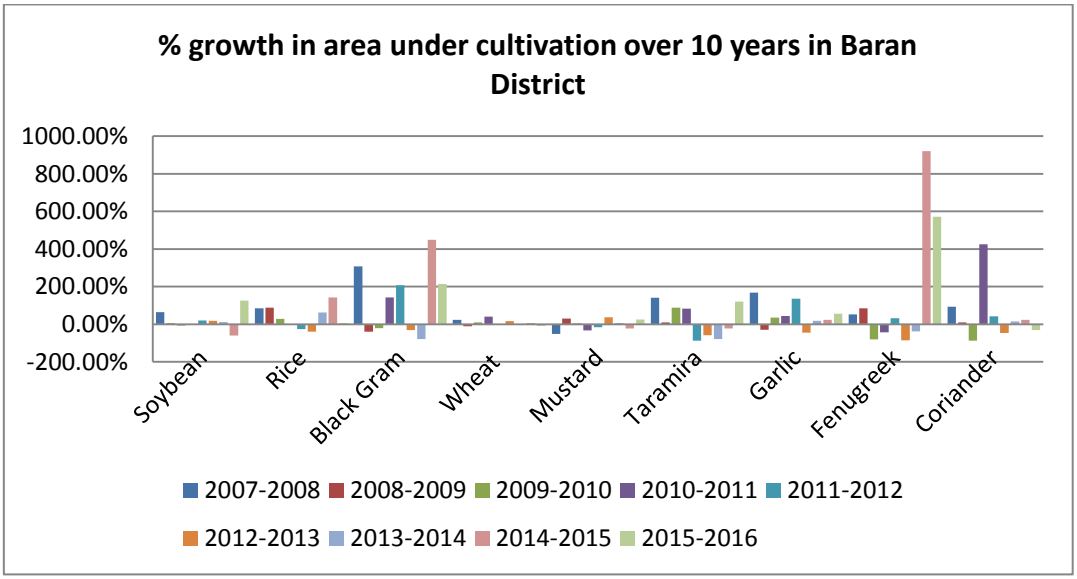
A number of crops are grown in Baran district but in view of Palayatha cluster crops like Soybean, Black Gram, Paddy etc. crops are sown in about 4,78,226 hectares in the Kharif season which is 3.11% of state's Kharif area (1,53,69,717 ha). In the Rabi season Mustard, Wheat, Taramira etc. crops are cultivated in about 2,51,937 ha which is 2.71% of state's Rabi area i.e. 93,08,039 ha. The spices crops mainly grown in the district are Garlic, Fenugreek, Coriander, etc. and cultivated in about 69,764 ha area. Thus, the total cropped area of the district is 7,99,927 ha. The prime sources of irrigation are canals, tanks, wells and tube wells.

The major crops grown in the cluster are Soybean & Black Gram in Kharif while Mustard, Wheat, Garlic etc. are grown during Rabi season. The assessment is carried out on the crops at the State and district level. The crops are being grown in the cluster based upon the cropping pattern of last 10 years (from 2006-07 to 2015-16) has been compiled from the data forwarded by Agriculture department (Refer Annexure 2.2, 2.14) There is almost constant cropping pattern in Kharif crops over 10 years area in the state as well in Baran district except Garlic and Black Gram crop, in which 1057.13% and 3842.83% respectively increase over ten years in the district against 280.44% and 176.73% respectively increase in state. This increase is due to extra coverage of rainfed areas under this crop because of good rains, good market rate etc. Area has been increased not only under Garlic and Black Gram crop but also other crops, whereas area has been decreased in Mustard & Taramira crops i.e. (-) 45.23% and (-) 81.10% respectively.

The Soybean is being grown in 23.57% and Black Gram in 2.75% area of the district compared to the state average. Among Rabi crops Wheat is being grown in 4.73% area, Mustard in 3.78% area, & Garlic in 25.03% of the district area over the state average.

As per the figure given below, it is clearly visible that soybean crop area was increased by 65.21% in district in year 2007-08 and crop area showed the growing trend till 2013-14 but whereas it has showed slight decline in the trend in year 2014-15. The major rabi crop grown in the district is wheat, this crop has shown stable growth. Garlic is one of the major rabi crop and it is crop which has shown every year growth in the area, the major growth in area was 168.35% in year 2007-08. The reason for increase or decline in the area is due to market prices, demand & supply and water availability.

Figure 1: Percentage growth in area under cultivation over 10 years in Baran District



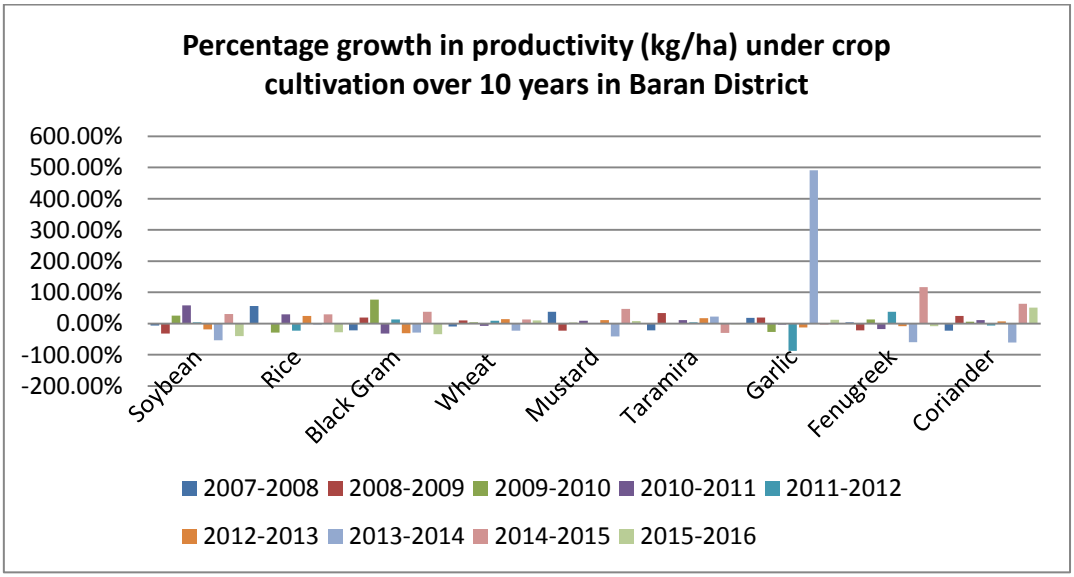
(Source: Data analysis by ABPF)

Due to unexpected occurrence of rains during the concern season, the area may have reduced or increased under the said crops. It has been established from the data that the crops are well established in the state as well as in the Baran district because of their suitability in the area for production.

The state was having first rank in the case Mustard crop in both years (2012-13 & 2013-14). Similarly, the state was having 5th rank in the Wheat crop, in the year 2012-13 and 4th rank in the year 2013-14. (Refer Annexure 2.10)

As per the figure given below, the growth in productivity of soybean and black gram is shown as 58.67% and 77.39% respectively in cluster in year 2010-11 and 2009-10 the reason behind the huge deviation was due to year 2009-10 was a drought year and crop failure cases may be more. In terms of rabi crops, wheat crop has shown maximum growth in year 2011-12 with 14.78%, whereas garlic has shown 491.26% growth in year 2013-14, which is recorded as maximum in last 10 years.

Figure 2: Percentage growth in productivity (kg/ha) under crop cultivation over 10 years in Baran District



2.4.1.1. Overview of the crops identified in Palayatha Cluster

The Palayatha cluster is situated near the Palayatha, so nomenclature of the cluster is based on the name of Palayatha village of Baran district. The improvement in water use efficiency would be achieved through Canal Water management and Agricultural productivity including agricultural & horticultural crops would be increased by way ensuring water availability by increasing conveyance efficiency of the canal system. As far as cluster area is concerned, the total command area is 8,003 ha and a total of 27 villages which includes 5 Gram Panchayats in the cluster.

2.4.1.2. Category wise Cultivated Area in Palayatha Cluster

The use of remote sensing and Geographical Information System (GIS) along with participatory Rural Appraisal (PRA) has been done to assess the irrigated and rainfed area. The total cultivated area of the cluster is 8,003 ha and the total households in the cluster are 5292. The category wise cultivated area in the Palayatha cluster is being presented in Annexure 2.3.

The table presented clearly indicates that large farmers are 14.97% whereas small and marginal farmers are 39.95% and 35.94% respectively. The total cultivated area of the cluster i.e. 8,003 ha comes under irrigation. Out of the total area, 54.60% belongs to OBC category, 36.87% to general class whereas 5.01% and 3.51% belongs to SC and ST respectively.

2.4.1.3. Status of Cropped area of Agricultural Crops in the Palayatha cluster

As mentioned above, the major field crops of Kharif are Soybean and Black Gram, whereas in Rabi, Garlic, Mustard, and Wheat are important crops in Rabi season in Palayatha cluster. Kharif crops are mostly grown on the basis of Monsoon rains. However, lifesaving irrigation is provided during the dry spells wherever irrigation facilities are available. The crop wise area under these crops is being presented in Annexure 2.4

The table data presented in Annexure 2.4 clearly shows that Kharif crops are sown in 89.97% area whereas Rabi crops are sown in 97.46% area during the year 2015-16. Thus there was a total cropping/intensity of only 187.43% during the year 2015-16 in the cluster which is nearly equal to the district average i.e. 187% but higher than the state average of 143%. There is a still gap in the total area and area sown in the Rabi season; it means there is a scope to enhance use of drip irrigation system in the area for bringing the unsown area into drip irrigation.

As far as crops are concerned, there is a scope to reduce the area of high water requiring crops and increase the area of those crops which requires less water and relative water use efficiency is more. Similarly, in Kharif the area under Soybean crops has to be increased because these crops are having the value chain importance so the same can become economic crops in the area. Likewise, Garlic & Wheat crops have also importance for value addition so the same may be selected for the value chain.

2.4.2. Cropping Pattern of Horticultural Crops

The area under horticultural crops is less in comparison to agricultural crops. Looking at the potential of the state as well as the district, area is increasing under horticultural crops i.e. fruits and vegetables crops. So efforts need to be made by the concerned department to promote area under these crops.

There is a scope to increase area under horticultural crops and efforts need to be made by the concerned department. In case of Palayatha cluster the spices crops like Garlic & Coriander, vegetable crops like Brinjal, Chilly, Tomato & Okra and fruit crops like Guava & Lemon fruit crops are encouraging for the Palayatha cluster.

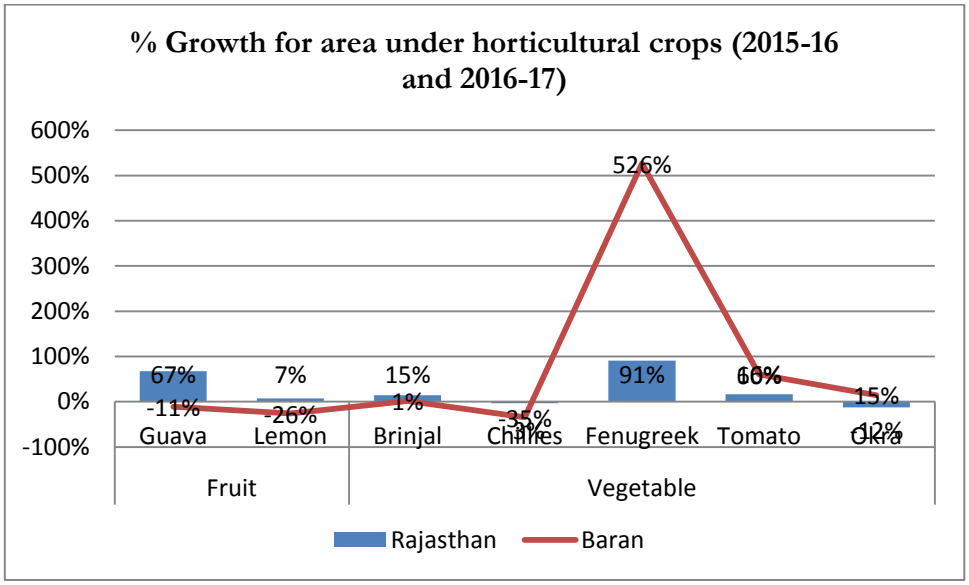
2.4.2.1. Year and Crop wise area of horticultural crops in Rajasthan and Baran district

The horticultural crops (other than Coriander & Garlic spice crops), Brinjal, Chilly, Okra & Tomato vegetable crops and Guava & Lemon fruit crops are suitable for the area. The Garlic

and Coriander spice crops have been taken as the value chain crops but in the other crops there is no scope to take them as the value chain crop in the cluster due less production and area. Even the horticultural crops have to be promoted through crop demonstrations in the area for the benefit of the farmers of the cluster.

As per the figure 3 (Refer Annexure 2.4), the status of fruit crop is not encouraging, all the fruit crops are show declining trend in growth percentage of area as per the district scenario whereas in terms of state, except chilly all other horticulture crop has shown positive trend.

Figure 3: Percentage growth for area under horticulture crops (2011-12 and 2015-16)

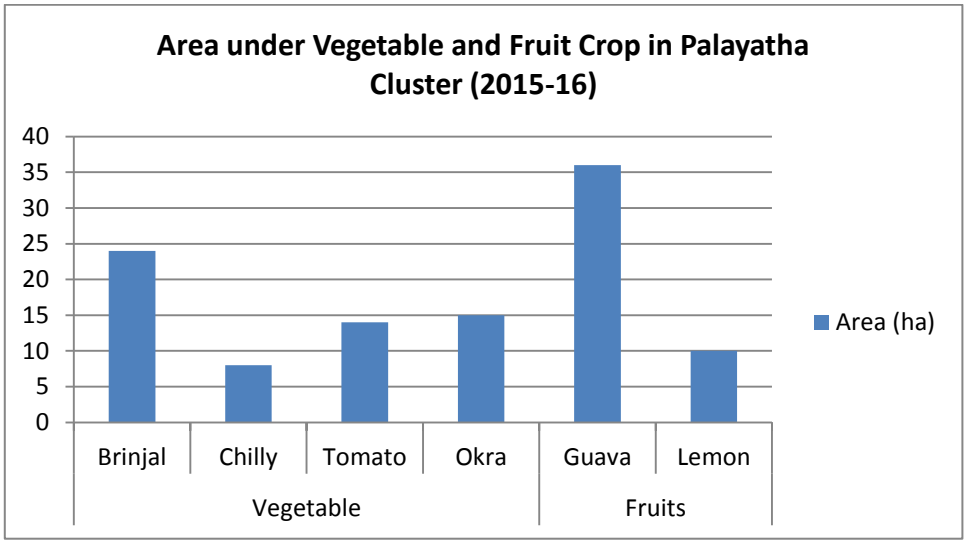


2.4.2.2. Crop wise area of Horticultural crops in Palayatha Cluster

To finalize the proposed area of the horticultural crops in the selected cluster of Palayatha, the area of horticultural crops in the cluster has to be discussed. A field survey has been conducted in the project cluster to assess the area under horticultural crops and it was found that there was no significant area under the vegetable and fruit crops during the year 2015-16.

As per the figure 3 (Refer Annexure 2.4), it shows that guava is having major area under fruit crop with 36 ha whereas brinjal is major vegetable crop with 24 ha. The total area covered by both vegetable and fruit crop is just 107 ha therefore the scope of intervention is very limited.

Figure 4: Area under horticultural crops in Palayatha Cluster (2015-16)



2.4.3. Crop Water Requirement in Palayatha Cluster

The Crop Water Requirement of crops being grown in the Palayatha cluster can be referred from Annexure 2.13. The table shows that the total cropped area is proposed to be increased to 98 ha. Out of this an area of 72 ha is proposed to be increased in Kharif and 26 ha area is proposed to be increased in horticultural crops.

As discussed elsewhere that based on the above data, the ground water is in safe category in this cluster and additional 4.18 MCM ground water is available for irrigation. Looking to the ground water availability and canal water, there is need of conjunctive use of ground and canal water to avoid the perch water development and water logging conditions in the future.

Here one thing is very significant to see here that estimated proposed crop water requirement is 55.40 MCM as per above table and 1 MCM is need to be required for domestic and drinking purposes so total 56.40 MCM is to be required in the cluster in normal conditions. Overall a slight crop water requirement has been reduced due to proposed cropping pattern, where as an area of 98 ha has been increased in the cluster.

2.4.3.1. Drinking Water Requirement

The water requirement of human being, animals, birds etc. will also be met out from the cluster. The total of such water requirement is being summarized as under:

Table 7 Requirement of drinking water in project area

S. No.	Particular	Nos.	Per day requirement (in liter)	Total Requirement (in liter)
1	Human	47718	40	1,908,720.00
2	Big animal	21758	30	652,740.00
3	Small animal	12773	15	191,595.00
4	Birds	3158	0.15	473.70
Total (in liters) Day				2,753,528.70
Per year Requirement of drinking water (in liters)				1,005,037,976.00
Per year Requirement of drinking water (in cum)				1,005,037.98
Per year Requirement of drinking water (in MCM)				1.01

(Source: Animal Husbandry Department, Palayatha)

Above table reveals that the estimated total water requirement for human beings, animals & birds etc. is 1 MCM.

2.4.3.2. Water Budgeting and Water Balance

Based on the ground water data, the ground water of this cluster is in safe zone Cluster area is treated as Safe Category which indicates that the scope of ground water development for Irrigation purposes is available. Additional 4.18 MCM of Ground Water is available for Ground Water Development in addition to present draft of 5.89 MCM. However, in canal command areas, conjunctive use of groundwater & canal water is the need of the hour so as to avoid land degradation by water logging hazards and soil salinity/alkalinity.

The average rainfall of this cluster is 835 mm and command area of the cluster is 8003 ha, so total yield of the rainfall will be about 66.825 MCM (simple formula used area x average rainfall). As per ground water study about 6-18% of rains contribute ground water, which depend type of catchment, formation, intensity & quantity of rainfall etc. Palayatha cluster is under Average to good catchment and its formation is older alluvium and rainfall is also good in the area so about 6 to 10% of rainfall, which contribute to the ground water. It means 4.01 to 6.68 MCM rainwater may contribute ground water. In addition soil moisture would also be available repeatedly and fulfil the crop water requirement of Kharif crops. As discussed elsewhere, the adoption of Micro Irrigation System (MIS) can save about 50% of crop water demand. The field and horticulture crops being grown in Rabi season are depend on canal water and somewhat on conserved moisture. It means 50% ground water may be saved through cultivation on conserved moisture and about 50 of canal water can be saved through adoption of MIS. The crop water requirement and need of the ground water may be summarized as hereunder to maintain the water balance in the cluster:

Table 8: The crop water requirement and need of the ground water

S. No.	Items	Crop Water Requirement (MCM)	Total Ground Water/Canal Water Saved due to Various Measures (in MCM	Net crop water requirement to fulfilled from ground water (MCM)
1.	Crop water requirement of Kharif crops	17.91	13.4325	4.4775
2.	Crop water requirement of Rabi crops	22.444	11.222	11.222
3.	Crop water requirement of Horticultural crops	13.95	6.975	6.975
5.	Domestic & drinking water requirement	1.00503798	0	1.005038
	Total	**55.309038**	**31.6295**	**23.67954**

Since 835 mm is average rainfall in the area and total area of the cluster are 8003 ha so total 66.825 MCM rains received during the monsoon in this cluster, whereas total 53.90 MCM is available from the canal system. In addition to in-situ moisture conservation during the monsoon, some crops like Mustard is sown on conserve moisture. It clearly shows that Kharif can be grown with in-situ moisture conservation and as mentioned above, only a maximum to 25% canal water may be used for lifesaving irrigation. Keeping in view, 100% area is covered under micro irrigation system about 50% canal water can be saved. Keeping these facts in mind, the final crop water requirement would be about 23.68 MCM which would be supplied from canal system. The conjunctive use of canal and ground water is recommended in this cluster for avoiding development of perch water table and water logging condition.

2.4.4. Seed Replacement Rate (SRR)

2.4.4.1. Seed Replacement Rate (SRR) in the State & in District

The status of Seed Distribution and Seed Replacement Rate in the State & District (Refer Annexure 2.5) has to be discussed with reference to the project area i.e. Palayatha cluster.

The Soybean in Kharif and Wheat and Garlic crops in Rabi season are suitable crops for the cluster, as these crops have good scope of the value chain. But the data on seed replacement rate (SRR) of Coriander and Garlic is not available with the Agriculture department. As per the above table, it reveals that the seed replacement rate (SRR) in almost all the crops is not encouraging in both the years 2013-14 & 2014-15.

It indicates that in almost all the crops the SRR is less than what it should be. To increase the productivity of these crops, increased use of certified seed of high yielding varieties have to be sown in all the crops. Therefore, the SRR may have to be increased for getting optimum / desired productivity in the years to come in the district.

2.4.4.2. Seed Replacement Rate (SRR) in Palayatha cluster

During the field survey, it was observed that the Seed Replacement Rate (SRR), in Soybean, Wheat & Mustard is less than the district and in Paddy it is higher than the district. But the focus is to be given on adoption of the certified seed and high yielding varieties which are having disease & insect-pest resistance, have higher economic & commercial value in view of the storage capacity & marketing linkages and/or values. (Refer Annexure 2.12)

2.4.4.3. The status of Fertilizer Consumption in Terms of Nutrients in State & District

The consumption of fertilizers for the supply of nutrients is very significant to increase the productivity. But at the same time it is very necessary that they should be used judiciously in the crops. Integrated Nutrient Management (INM) is also important in the production sector. The department has also finalized the package of practices for adoption of INM in crop production. The current status of fertilizer consumption in terms of nutrients is being discussed here as used in the state as well as in the district. The current status of Fertilizer Consumption in Terms of Nutrients during 2014-15 (In Lac Tons) is being presented under:

Table 9: The current status of Fertilizer Consumption in Terms of Nutrients during 2014-15 (In Lac Tons)

State/District-Baran	Nitrogenous (N)			Phosphate (P)			Potashic (K)			Total Fertilizer in terms of NPK			Per ha Fertilizer Consumed (Kg/ha)		
	K	R	T	K	R	T	K	R	T	K	R	T	K	R	T
Rajasthan	3.47	6.06	9.53	1.75	1.56	3.31	0.063	0.088	0.15	5.28	7.7	12.98	34.4	82.76	52.64
District	0.17	0.31	0.48	0.12	0.10	0.22	0.002	0.001	0.003	0.29	0.41	0.70	179.43	112.49	132.90

(Source: Agriculture Department, Palayatha)

Above presented table reveals that average consumption of fertilizers in the district in Kharif is very high i.e.179.43 Kg/ha against the state average & in Rabi seasons, it is only 112.49 Kg/ha, which is again higher than the state average. In totality the consumption of fertilizers in the district is 132.90 Kg/ha, again higher than the state average. The judicious use of fertilizers is needed & the farmers have to be promoted to adopt package of practices and apply fertilizers in the crops judiciously.

2.4.4.4. The Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures in State & District:

The aspect of adoption of plant protection measures in the crop production is of paramount importance. Although the use of plant protection measures is not healthy in term of human health but optimum level of production is also need of the time. While adoption of plant protection measures, the Integrated Pest Management has to be kept in mind and accordingly package of practices for IPM has to be adopted at the time crop production in Agricultural as well as Horticultural crops.

Here the current status of seed treatment, soil treatment, poly treatment, intensive treatment, rat & weed control etc. is being summarized hereunder:

Table 10: The Area (in 000ha) Covered and Technical Grade Material (TGM) used under Plant Protection Measures during 2014-15 (Method of Plant Protection)

State/District	Season	Seed Treat	Soil Treat	Poly Treat	Intensive Treat	Rat Control	Weed Control	Total Area	TGM in tones
Rajasthan	K	6940	349	700	1178	138	355	9660	719
	R	4503	329	518	848	278	525	7001	1975
	K&R	11443	678	1218	2026	416	880	16661	2694
District	K	200	2	19	26	1	55	303	27
	R	188	23	33	45	12	35	336	561
	K&R	388	25	52	71	13	90	639	588
Rajasthan (%)	K	45.15%	2.27%	4.55%	7.66%	0.90%	2.31%	62.85%	4.68%
	R	48.38%	3.53%	5.57%	9.11%	2.99%	5.64%	75.21%	21.22%
	K&R	46.37%	2.75%	4.94%	8.21%	1.69%	3.57%	67.51%	10.92%
District (%)	K	123.94%	1.24%	11.77%	16.11%	0.62%	34.08%	187.78%	16.73%
	R	51.10%	6.25%	8.97%	12.23%	3.26%	9.51%	91.34%	152.50%
	K&R	73.31%	4.72%	9.83%	13.42%	2.46%	17.01%	120.74%	111.10%

(K – Kharif, R – Rabi & T – Total)

(Source: Agriculture Department, Palayatha**)**

The above table indicates that the seed treatment is done in 123.94% area; it means more seed rate is adopted in Kharif cropped area. Likewise in other methods of application of plant protection measures, adoption level is higher than the state average. So in this case judicious adoption is required. Adoption of the package of practices needs further improvement in a big way keeping in view the Integrated Pest Management (IPM) so that crop production can be increased without effecting environmental.

2.4.4.5. Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures in Palayatha Cluster:

During the field survey, it was observed that the area covered and technical grade material (TGM) used under Plant Protection Measures in Palayatha cluster is almost the same as per the district. It means the focus is to be given on adoption of package of practices for enhancing the area to be covered and technical grade material (TGM) used under Plant Protection Measures keeping in view IPM and high yielding varieties which are having disease & insect-pest resistance and, have higher economic & commercial value in view of the storage capacity & marketing linkages and/or value chain. **(Refer Annexure 2.6)**

2.4.4.6. Crop-wise Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures in the State & District:

The crop wise area covered and technical grad material (TGM) used under plant protection measures in the crop production is very important factor to keep the productivity optimum. But excess use of chemicals is threat to the health so IPM has to be kept in mind in the process of crop production and very careful use of plant protection measures are to be adopted in crop production. **(Refer Annexure 2.6)**

The crop wise area covered and technical grad material (TGM) used under plant protection measures in the state and district is being summarized in the following table:

Table 11: The Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures during 2014-15 (Method of Plant Protection)

State/District	Season	Cereals	Pulses	Food Grains	Oilseed	Sugarcane	Cotton	Guar	Others
Rajasthan	K	4049	1277	5326	1856	16	775	1242	445
	R	2862	1160	4022	2289	0	0	0	690
	K&R	6911	2437	9348	4145	16	775	1242	1135
Baran	K	55	10	65	226	0	0	2	10
	R	145	9	154	95	0	0	0	87
	K&R	200	19	219	321	0	0	2	97
Rajasthan (%)	K	26.34%	8.31%	34.65%	12.08%	-	-	-	2.90%
	R	30.75%	12.46%	43.21%	24.59%	-	-	-	7.41%
	K&R	28.00%	9.88%	37.88%	16.80%	-	-	-	4.60%
Baran (%)	K	34.08%	6.20%	40.28%	140.06%	-	-	-	6.20%
	R	39.42%	2.45%	41.86%	25.82%	-	-	-	23.65%
	K&R	37.79%	3.59%	41.38%	60.65%	-	-	-	18.33%

(K – Kharif, R – Rabi & T – Total)

(Source: Agriculture Department, Palayatha**)**

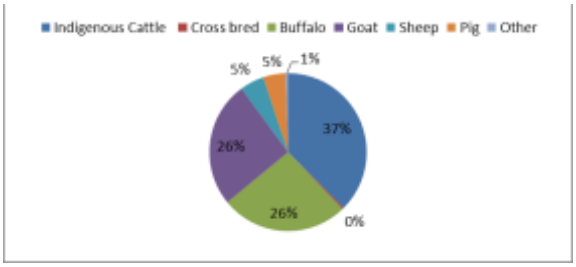
The above table indicates that the adoption of plant protection measures in oilseed crops is much higher than the package of practices. But in other crops it is at par to state average. It means that the adoption of package of practices is not being done at the optimum level. So, further improvement is needed in a big way keeping in view the Integrated Pest Management (IPM) so that crop production can be increased without effecting environmental.

2.4.4.6.1. Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures in Palayatha Cluster:

Likewise the data for Palayatha cluster is available at the movement. During the field survey, it was observed that the crop wise area covered and technical grade material (TGM) used under Plant Protection Measures in Palayatha cluster is almost the same as per the district. It means the focus is to be given on adoption of package of practices for enhancing the crop wise area to be covered and technical grade material (TGM) used under Plant Protection Measures keeping in view IPM and high yielding varieties which are having disease & insect-pest resistance and have higher economic & commercial value in view of the storage capacity & marketing linkages and / or value chains. (Refer Annexure 2.6)

2.5. Livestock profile of Palayatha Cluster

Table 12: Share of goats in livestock profile of



An overview of Goat sector in Rajasthan is described in the Annexure 2.11. In the Palayatha cluster large no of households' keeping cattle, buffalo and Goats (Refer Annexure-2.7). Dairy co-operative network is not developed. The district milk union Baran has total milk collection of around 15000-20000 litres per day. Goats are reared by substantial no of house-holds and these house hold are primarily small holders with limited resources. Baran and Palayatha is on the breeding tract of Sirohi goat breed and important sourcing place for quality goats. The Livestock Profile of Palayatha cluster shows high poulation of the goats, Indigenous cattle with low milk yield. The small holders of the cluster prefers to keep animals with low resource requirements. So there is scope of popularising goat farming with sutable interventions for improving milk and meat productivity. Project intervention will also support small hoder's to collectively market breeding animals to institutional buyers.

The cluster has 40 goat specific MTGs and around 3467 families own 9227 goats, averaging around 3 goats per goat rearing family. The village wise data for Goat population segregated further into male, female, calved etc. is in Annexure 2.8.

The livestock resources and mechanization profile of the district is provided in Annexure-2.9. The cluster has only four milking machines and ten mechanised chaff cutters. This indicates poor Livestock resources (low milk and meat yield) and poor mechanization of resources leading to poor return to the farmers of the project area.

2.6. Structural characteristics

The Palayatha cluster is located in Baran district. The district has a number of industrial areas like Baran, IID Baran and Chhabra (source: MSME Development Institute, "Brief industrial profile of Baran district"). Apparently there are over 500 food processing and related MSE unit in the district. One of the leading processor in the region is Ruchi Soya, Haripur. They are into soya meal respectively. Some of the supporting institutions and service providers supporting processing units with region are given in the Annexure 2.15

The structural infrastructure in the Palayatha cluster that may influence Agri business activities in the clusters presented below:

2.6.1. Government departments

There is presence of Agriculture, horticulture, animal husbandry and water Resource departments. These departments have head office in Jaipur and have offices at district level too.

2.6.2. Farmer Producer Companies

Palayatha cluster comes under surface water command area. Jaipur Seva foundation has been working in the cluster for formation and mobilization of 627 MTGs of Agriculture and horticulture farmers, 40 MTGs of goat rearers in 27 villages of 6 gram panchayats over 8000 ha area of command in Palayatha cluster. One or more FPCs are proposed to be formed covering 12 Water Users Association and 9075 household in command. Jaipur Seva Foundation is in process to federate all this groups in Farmer producer organization under RACP.

However, some FPCs which were registered under Rashtriya Krishi Vikas Yojna (RKVY) in and around cluster area are active but not operative to the extent of viable profitability. 2 FPCs have been formed by local NGOs in the cluster under SFAC which are working on input side

only. Overall there is limited understanding among the stakeholders that FPO are meant only for input supply and sales.

a. **Antah Kisan Agro Farmer Producer Company-** It was registered in September 2016, under the scheme of RKVY in the Antah block of Baran district. It comprises of 10 board members including 5 directors and 5 promoters. Till date, 1000 farmers have associated with the company, while 300 shareholders are formed from 20 villages and 7 panchayats. As per the Team leader, the company has acquired the mandi license and input license along with leasing out a input shop in Antah itself. This season the company could only give demonstrations to the farmers regarding seeds and pesticides. The company has also registered on the e-trading platform of NCDEX for the trading of commodities like Soybean, mustard, etc. They are facing the credit constraints in order to procure and aggregate the produce of farmers for further trading and sales. In order to meet the credit requirements, the company has taken short term loan from NBFC named Sammunati Value Chain Finance.

b. Nageshwar Mahadev Farmer Producer Company, Antah- The Nageshwar MAhadev Farmer Producer Company was registered in the year 2014. The company consists of very progressive shareholders with shares worth Rs 1000 per share. The company owns 4 tractors which are used for custom hiring among the farmers for sowing, tilling and harvesting. They are also getting technical and financial support from a Morocco based company regarding the setting up of dal mill and garlic processing unit in its area.

Hence proper training for NGO, Staff, BOD, and line department staff (stakeholders of RACP) is required to build the concept and vision of formation of FPC and working of farmer common service center of FPC along with the steps and guidelines for formation of the same. There is need for training and exposure of board of directors of newly registered FPCs in the cluster.

2.6.3. APMCs

The Palayatha has only 3 APMCs, which directly can have impact on the cluster.

a Atru, 60 kms from the cluster

b Baran, 30 kms from the cluster

c Kawai Salpura, 80 kms from the cluster

Farmers sell their produce mostly in Baran main APMC irrespective of the season or type of crop. In some cases, village level traders also approach and buy the produce at farm gate itself.

2.6.4. Warehouses

During the discussion with the farmers of the Palayatha cluster, it was found that there is lack of sufficient public or private warehousing structure in the cluster. Due to inefficient grain storage structures and space, the farmers are compelled to sell their produce immediately after harvest at any unwarranted prices to the middlemen cum traders. Farmers are, thus, unable to garner high returns from their produce.

There is warehousing facility of Indian warehousing Corporation and Star agri warehousing at about 30 km from the cluster. All types of food grains can be kept in this warehouse. Warehouse receipts are provided on which producer can avail credit from the bankers.

Sr.No.	Name of Warehouse	Capacity
1	State warehouse corporation	60,420 MT
2	Central warehouse corporation	5,000 MT

2.6.5. e- Markets

We are currently witnessing the transition to online marketing for various marketing activities involved in agriculture business. Government has taken various initiatives to introduce trading platforms for the support of agriculture business. Baran and Atru mandi of the district have already registered under eNAM.

2.6.6. Predominant practices for cultivation

Following are the predominant practices being carried out in the Palayatha cluster with regard to the purchase of inputs, crop cultivation and transport of harvested produce-

Sr.no	Particulars	Present Practice
1.	Seeds/Fertilizers	Local Input Shops
2.	Fungicide & Pesticide	Local Input Shops
3.	Land Preparation and other cultivation practices	Local labors and own/hired tractors/implements
4.	Harvesting and farm level grading	Combine Harvesters
5.	Transport	Pick up vans/Tractor Trolleys/Bullock carts
6.	Credit	Traders provide facilities, credit facilities with interest.
7.	Marketing	Local Traders
8.	Packaging	Processors- Clean, grade and package

Chapter – 3: Strategic context and rationale for selecting value chains in Palayatha cluster

3.1. Parameters for selection of Value Chain crops

A scoring matrix consisting of the parameters along with their weightage has been designed for prioritisation and selection of commodities for value chain intervention in the cluster (Annexure 3.1). Broadly, there are four different types of parameter categories with different weights based upon which the crops have been scored. Soybean, Mustard, Wheat, Garlic and Coriander are the major crops from Palayatha cluster that have been considered and compared using this scoring parameter. (Annexure 3.2)

3.1.1. Existing size of the crops

The first category of parameters may be broadly categorised under with respect to existing size of crops in the cluster with regard to their area under cultivation, production and average cluster level productivity relative to national average productivity. Soybean has the largest cropped area while Wheat has the highest production followed by Garlic. When it comes to relative productivity of the crops in the cluster, all the crops have higher productivity when compared to their respective national average productivity Overall Wheat gets the highest score under this category followed by Soybean and then Garlic. (Annexure 3.2)

3.1.2. Potential for Value addition

The second category of parameters may be broadly categorised under the potential for value addition to the crops of the cluster, implying scope for increased value addition for local producers and processors and higher margin realization for producers. The typically processed value added products of each crop have been considered for estimating the retail level price spread. In order to maintain parity among these crops for their different value added products, the yield loss at processing level has been considered in cases where significant to get the actual required raw material to prepare the end product. For instance, the yield loss in case of Soybean oil, it has been considered as 40% while that for Mustard oil, it is 60%. Yield loss has been taken as 10% each for products like Wheat biscuits, garlic paste and Coriander powder. Thus, Garlic paste gets the highest score in the price spread at retail level as Garlic paste has retail price spread of Rs. 30,000/- which is based upon its market value of Rs. 300 per kg and gross realization of farm at Rs. 50 per kg. Coriander gets the second highest score as the market value is Rs. 300 per kg while gross farm gate price is Rs. 55 per kg.

In the parameter related to price spread between farmer's gross realization at the farm and price paid by the primary processor at mandi, a margin of 4% has been considered as measure of price spread, over and above the prevalent mandi prices of the crops after consultation with traders and processors. Coriander scores the highest with around Rs. 220 per quintal followed by Garlic with Rs. 200 per Quintal. This parameter signifies the small scope of getting this

margin transferred to farmers through relevant value chain interventions in the crops such as through establishment of primary processing FCSCs and reduction in mandi fees.

Net profit in production per acre is the measure of direct returns to farmers by selling the crop in the mandi and fodder locally without any value addition. The fodder yield for Wheat and Soybean is almost equal to their commodity yield that is 16 Qtl/acre and 5 Qtl/acre. Garlic and Coriander do not have any significant fodder. Overall, Garlic gets highest score in the net profit realization.

The next parameter is on scope for processing in the state of Rajasthan, there are comparatively more number of secondary and tertiary processing units of Mustard like Adani Wilmar, Dhara and other private players in the state followed by Soybean oil, there are a lot of small and private units of Wheat in the vicinity of the cluster. Although wheat has multiple private flour mills and cleaning and grading units, it lacks nevertheless in high end technologically advance processing units which could yield refined and high quality end products. Coriander and Garlic have not as many processors in the state hence they get lowest scores.

The parameter regarding the number of value added products of the crop considers the scope for locally feasible value addition at the primary level, secondary level, tertiary level and above such that higher the degree of value addition, higher are the returns. Among these crops, Soybean and Garlic have the highest number of value added products viz. Dal, oil, milk, tofu and Soy Sauce for Soybean and similarly, powder, paste, braided garlic, vinegar and pickle for Garlic.

In order to quantify the parameters of growth in market demand, the national growth rate of consumption has been calculated (as CAGR) for each commodity and equated against its market demand. It is highest for Soybean (12.18%) followed by Mustard (5.00%), then Coriander and Garlic both having 4.00% and Wheat (3.60%). (Annexure 3.5)

3.1.3. Risk assessment of Potential Value Chain crops

The third category of parameter is regarding identifying the risk in the respective value chain of the crops of the cluster. Price volatility in the historical mandi prices of the respective commodity over the period of 3 years has been taken as the benchmark for capturing and measuring the risk in the commodities due to any adverse agronomic circumstances like drought, pest epidemic, bumper production and/or international market prices crash/upsurge. The price volatility is highest in case of Garlic (70.11%) followed by Coriander (51.80%) and Mustard (29.45%) while Soybean and Wheat have the lowest price volatility at 26.13% and 28.28% respectively. Garlic has scored highest in this category as it has highest scope for value chain intervention in order to curb the price volatility and thus, ensure sustained regular income to the farmers. (Annexure 3.2)

3.1.4. Environmental Parameter

In the next category for environmental parameter with respect to water intensiveness of the crop, the water requirement of every crop has been compared with each other. The crop with lowest water requirement has scored highest as it proposes highest scope for crop diversification in order to conserve water in the cluster. Importantly, Soybean with lowest water requirement of 1000 cum/ha have the highest scope for crop diversification followed by Mustard and Coriander with that of 2500 cum/ha and 3000 cum/ha. Wheat and Garlic have the most water requirement of 4000 cum/ha, and 6000 cum/ha respectively making it least preferred for crop diversification. (Annexure 3.2)

3.2. Inference from the Scoring Matrix

It could be concluded from the total scores of the matrix that Soybean is the most important value chain crop in the matrix. Soybean has the highest cropped area and is among the crops with highest production in the cluster. Soybean has the most potential in value addition with the highest growth along with the highest number of possible value added products used

commonly. Although it is comparatively the most stable commodity in terms of price but it serves the main objective of project of saving water.

Second highest scoring crop is Garlic as per the matrix, for which the major reason is that it has one of the highest production among other crops. In terms of potential for value addition, it scores just below Soybean as it has the highest price spread at retail level, highest net value realization per acre and also it has the highest number of value added products.

Third highest scoring crop as per the matrix is Wheat, with the highest production in the cluster as it is the major crop of Rabi. Although it has not as high potential for value addition as other two crop but since it has the largest reach in terms of producers as well as consumers hence value chain intervention can impact many households.

Based on this Soybean, Garlic and Wheat are the top 3 crops selected for the value chain intervention. Apart from spice crops like Garlic and Coriander, there is not much horticulture practice prevalent in the cluster.

3.3. Current marketing chain of selected value chain crops

Present condition of overall value chain of selected commodities has been ascertained and formulated with the help of site visits and interaction with producers and related stakeholders. With support of the production analysis made in the earlier chapter, an attempt is made to arrive at the value added activities and value added products that could substantially add values. (Annexure 3.3)**Garlic**

The present pre-intervention or value chain for Garlic may be viewed as one with two critical production-distribution or activity-marketing channels. The product is largely marketed by farmers through the APMC, local vendors and private processors. Channel 1 may be viewed in terms of one for table variety and other for processed products of garlic like dehydrated garlic, garlic paste, garlic pickle, garlic powder and vinegar. The producers market their produce in both value chains through local traders and APMC commission agents largely. (Annexure 3.3)

Typically, the gross yield enjoyed by producers is 24 quintals per acre. Gross value realisation on sale at Rs. 5,000 per quintal is Rs. 120,000 per acre. The cost of cultivation is about Rs. 48,000 per acre and the net value realisation is about Rs. 72,000 per acre. (Annexure 3.6)

Soybean

The present pre-intervention or value chain for Soybean may be viewed as one with three critical production-distribution or activity-marketing channels. The product is largely marketed by farmers through the APMC. Channel 1 may be viewed in terms of one for raw soybean while channel 2 is for feed market. The producers market their produce in both value chains through local traders/ processors and APMC Commission agents largely. (Annexure 3.3)

Typically, the gross yield enjoyed by producers is barely 5.6 quintals per acre. Gross value realisation on sale at Rs. 3,100 per quintal is Rs.17, 360 per acre. The cost of cultivation is about Rs.8,000 per acre and the net value realisation is about Rs. 10,860 per acre including returns from fodder. (Annexure 3.6)

Wheat

Wheat is notified commodity and most of the sales by farmers are conducted in various regulated markets. However, under Market Intervention Scheme (MIS), Food Corporation of India and other organizations procure wheat directly from producers at their collection centers. [1]Since wheat is an important food item, its transactions take place in most of the markets of the country. Important wheat markets of Rajasthan are presented in the table below.

[1] http://agmarknet.nic.in/profile_wheat.pdf

Rajasthan	**11**	Kota, Alwar, Jaipur, Sriganganagar, Dausa, Hanumangarh, Sikar, Baran, Bundi, Bharatpur and Pali

Producers bring the produce to assembling markets. Further distribution of wheat is handled by aartiyas in the mandi then stockiest, cleaning/grading units and then processing units before reaching the consumers through distribution channels of wholesalers and retailers. The marketed surplus of wheat, which has been estimated to about 40 to 50 per cent of production, was sold by the producers through different channels as indicated under. (Annexure 3.3)

Stake Holders in Various Marketing Channels

1.	Village Traders	4.	Commission Agents	7.	Procurement Agencies
2.	Itinerant Traders	5.	Flour Millers	8.	Retailer
3.	Wholesalers	6.	Cooperative Agencies	9.	Exporter

Presently, producers enjoy output about 18 quintals per acre. The market rate of sale is about Rs 1600/quintal or Rs 28,800/acre. The cost of cultivation is about Rs 16,000 per acre and therefore net realization is about Rs 17,600/acre including returns from fodder. Notably, margins in processing are low at 5-7% in the secondary processing units..

3.4. Strategic context of Goat Value chain in Palayatha cluster

3.4.1. Goat for milk production

The goat farmers mostly consume the milk from these goats domestically, apart from selling live animals. Many families also sell excess milk in the village at the rate of Rs 18 - 20/L in the dairy Cooperative mixing with Cow/Buffalo milk as there is currently no separate channel available for goat milk collection. This provides handy daily income during the milking cycle of these goats. Goats however produce far lesser quantity of milk compared to large ruminants. Among the breeds of goats in the cluster, some of important milk production traits noted in field areas have been as follows.

Table 13: Productivity trend of goat milk in the cluster

Average daily milk production (Wet average)	500 ml to 1 liter (Range 250 ml to 3 Liter)
Lactation length	150 to 170 days (5 to 6 months)
Estimated lactation yield - Dry period 3 to 4 months	100 to 180 liters

Source: Department of AH

The cluster has a total of around 9227 goats out of which 29% are milking animals. The estimated milk yield would be around 6722 L/day at an average estimated yield of around 2.5 L per day in two milking. Out of this, if 1 L of milk per day per farmer is taken as marketable surplus, it can be estimated that around 2689 L per day is the potential for collection as on date and this can grow up to 6722 L/day if maximum potential is achieved by developing a separate remunerative value chain for Goat milk. This suggests Goat milk has a future in the area. However, it is suggested to club this area with Bundi for future milk processing activities as Bundi district has a large number of goat population and the cluster is hardly 45 km from the cluster in Bundi.

3.4.2. Goat for meat production

The market linkage for live goats poses difficulties, as it is highly informal and the cluster is located at a long distance from the major markets like Jaipur, Delhi and Mumbai. Breeders sell to traders who take animals to larger terminal markets out of the state (the main ones being Bhopal, Indore and Mumbai bakra mandi) for goats originating from Hadoti region. Few also find their way to markets in UP like Agra and Ghaziabad or to smaller markets near cities. Transportation cost for these movements is high, but traders who buy locally can organize themselves in groups to transport animals. Traders are an organized group called Khatiks and look out for each other. They are an extremely tight community and make good profits from buying and selling livestock. This means it is not possible to eliminate them as middlemen, and the best option is to ensure fair prices are paid to the breeders.

Major constraints in goat value chain in the cluster:

The process of goat selling and buying though deeply associated with the weight of the animal, do not involve any weighing of animals. • Goat rearers sell male goat and old female goats to traders visiting from nearby cities and town. The price of the animal is quoted by the trader first (on visual estimate) and not by the goat rearer.. • Rearers are unaware of the live weights of the animals and fail to correlate the price of the sale with the live weight of the animal. Meat equivalent to 50-60% weight of the animal (depends on age and feed intake) can be obtained from the animal. Social taboo of meat handling also keeps the rearer uninterested. • Rearers have a tendency to sell off their male stocks at an early age. Fear of mortality and losses instigate rearers to sell off the male stocks early. Lack of proper knowledge on efficient and good animal management is generally absent, which increases mortality. • Old female goats are also sold off at very low prices for meat purposes. These goats are used for Defence Cantonment supplies as well as consumption in block/district level meat shops. The Defence Supplies generally go at very low tender rates (Rs 40-50 per kg) where supplying male goats is not viable for the supplier. • All goat parts have commercial value. Goat wool is sold at Rs 10-12 per kg to local traders who supply it to carpet industry in UP, Haryana and within Rajasthan. The skin of the animal is valued at Rs 70-80 per piece and the head for Rs 100.

Factors affecting sale price of goat by farmers:

i) Rearers also end up selling animals at a wrong time due to cash crunch. Generally business planning of selling animals in the festive seasons of Eid is absent. ii) Deciding the quantity of saleable meat in the goat. On an average the quantity of meat is found to be 50 to 60 % of the live weight of the animal, iii) The look and health of the animals. A sick animal will fetch a very low price. iv) The season and time of the year. Especially during Eid, animals fetch better prices. At this time goats are not judged by the above-mentioned points but by the sacrificial value of the animal. Although sick and imperfect animals are not sacrificed, some animals can fetch a fortune if it has certain religious marks like a star or a half moon etc. on its body.

3.4.3. Livestock population and Fodder Requirement of Palayatha cluster

The data given in Annexure 3.7 indicates the fodder requirement of livestock population of Palayatha cluster at 65346 MT/annum. It has to be fulfilled from the fodder to be produced in the cluster and if there is some gap, then two current measures have to be followed, one is to increase production within the cluster through promoting cultivation practices and second is to import from the outside the cluster.

3.4.4. Fodder availability in Palayatha Cluster

Annexure 3.7 reveals that the estimated total requirement of dry matter (Fodder) is 65346 MT against the fodder availability of 51037 MT which is lower than the requirement so there is a gap of 14308 MT against the total requirement of the fodder.

Chapter – 4: Key opportunities and challenges in selected value chain crops

4.1. Opportunities and challenges

(A) Looking at the cropping pattern, production, etc., the following crops have been selected for value chains study/diagnostics.

#	Season/Type	Crop
1	Kharif	Soybean
2	Rabi	Garlic, Wheat

(B) The SWOT of key commodities reflects gaps in terms of storage and primary processing facilities, large number of intermediaries in the chain, limited market information on processing activities, limited support from financial institutions for producers and/or their networks etc.

The SWOT of the key commodities/crops as per value chain study is as follows:

4.1.1. Garlic

Garlic is a major Rabi crop grown in Palayatha cluster. Garlic is mainly grown for Dal and Flour purpose.

Strength	Weakness
• Although in 2014, world production of garlic was 25 million tonnes, with China alone accounting for 80% of the total. • India is the second largest producer, with other countries growing less than 0.5 million tonnes annually. • The major states of India cultivating garlic are Madhya Pradesh, Gujarat, Uttar Pradesh and Rajasthan. • Garlic is widely used around the world for its pungent flavour as a seasoning or condiment. • Garlic plants are usually hardy and not affected by many pests or diseases. • Garlic plants are said to repel rabbits and moles	• Lack of knowledge of garlic production technologies • Non-availability of improved & good quality seed • Pathogens that affect garlic are nematodes and wood-decay fungus, which remain in the soil indefinitely after the ground has become infected. • Lack of grading and storage facilities • Low market price during produce harvest • Non-availability of reliable insecticide/fungicide • Due to inadequate infrastructural facilities with producers, traders, processors and at market level results in marketing inefficiencies • Limited processing units for garlic and its by-products such as garlic peeling/ paste unit

	• Inadequate grading & sorting facilities • The production of the crop is seasonal, but its demand remains for a longer period. Thus, adequate storage facilities required. • Large number of intermediaries in the chain leads to low producer's income. • Lack of market information regarding prevailing prices, arrivals etc. force farmers to sell in village itself.
Opportunity	**Threat**
• Scope for tie up of PCs through FCSC with firms like Patanjali, MDH, Catch • Scope for tie up of PCs through FCSC with garlic processing units/ MSME firms • Scope for tie up of PCs through FCSC with housing societies in urban areas and retail outlets • Scope for facilitation of start-ups from amongst PCs or individual entrepreneurs, in secondary processing of value added products of Garlic like peeled garlic, garlic paste, dehydrated garlic powder, etc. • Scope for establishment of quality sorting and grading facilities by PCs as part of Farmers Common Service Centre (FCSC), along with facilities for packaging and vehicle to facilitate transportation. • Establish storage facilities by PC as a part of FCSC. • Promote good agricultural practices with regard to planting, harvesting, use of inputs, disease management, etc. through FCSC • PCs to undertake joint input sourcing activities for seeds, fertilizers, pesticides, etc. under the umbrella of FCSC • PCs to also undertake custom hiring services and hence lead farm mechanization through FCSC	• Fluctuate in time of sowing due to climate change • Cloudy weather, rainfall at the time of flowering and seed formation (Adverse weather conditions) • Infestation of insect-pest & other epidemic disease

4.1.2. Soybean

Soybean is a major Kharif crop grown in Palayatha cluster. Soybean is consumed in the form of whole pulse as well as other processed forms like soy milk, tofu, etc.

Strength	Weakness
• Low risk crop • Higher profit than other crops • Lower water requirement • Cost of cultivation is low • Lower incidence of pest and disease attack	• Lack of proper and adequate market intelligence system • Low income-generating black soybeans are favored by the farming community.

• High demand for the value added soya products in the market • The growing consciousness of the public on processed products of soybean • High net returns for value added products • High value for the soya products at Nation and International level • Entry of branded companies into the soya markets like Reliance, Orion commodities and services Pvt. Ltd., Ruchi Soya Industries Ltd-Indore, Gujarat Ambuja Exports Ltd-Pithambur, Prestige food Ltd-Indore and Agro Solvent Products Pvt. Ltd-Gwaliar, Adani Wilmar, Mahyco, Eagle Seeds & Biotech, Gokul Refoils & Solvent, etc.	• Limited farmers have access to information about the price and arrivals of the soybean in different markets • Dearth of adequate good storage facilities for the producers • Most farmers sell their produce without any grading which fetches poor price in the market • Lack of facilities for oil testing to determine the oil content in produce leads to poor value accrual • Inadequate processing units for soybean such as soymilk processing units, certified seed production and trading units, etc. • Low labour availability for farming activity • Picking (harvesting) of soybean pods is difficult • Non availability of quality seed • Dwarf and low yielding varieties • Improper postharvest handling
Opportunities	**Threat**
• Ties with firms like Reliance, Orion commodities and services Pvt. Ltd., Ruchi Soya Industries Ltd-Indore, Gujarat Ambuja Exports Ltd-Pithambur, Prestige food Ltd-Indore and Agro Solvent Products Pvt. Ltd-Gwaliar, Adani Wilmar, Mahyco, Eagle Seeds & Biotech, Gokul Refoils & Solvent, etc. • Ties with soybean processing associations • Oil content testing facilities are also required. • Facilitate start-ups in secondary processing (production of value added products of soybean like soya flour, oil, milk, chunks, etc.) from amongst FPOs or individual entrepreneurs • Establishment of quality sorting and grading facilities by FPOs as part of Farmer Common Services Centers (FSCS), along with facilities for packaging and vehicle to facilitate transportation • Establish storage facilities by FPO as a part of FCSC • High value yielding yellow variety of soybean may be popularised for cultivation to make soybean cultivation more profitable. • Market information about different markets needs to be made available to producers. • FPOs to undertake joint input sourcing activities for seeds, fertilizers, pesticides, etc. • FPOs to also undertake custom hiring services and hence lead farm mechanisation	• High temperature during summer reduces the seed viability • Heavy rainfall during the last stage of the crop • Non availability of seed in time • Stiff competition in increasing the cultivable area from hybrids and Genetically Modified varieties of maize and cotton • Weak Information management systems on soybean production • Predominance of a single variety in cultivation • Lack of facilities available to prepare soybean products like soya chunks, soya biscuits, etc. • Fluctuation in market prices • Intense competition from other states to market the soya produce

• Resists soil fertility from erosion due to its dense foliage • Chances of reducing Nitrogen containing fertilizers as it fixes N into the soil • Soya products are considered as the best way to combat malnutrition • Assured marketing of soya and soya products • Chance to explore the market to meet the existing demand and supply requirement	

4.1.3. Wheat

Wheat is a major Rabi crop grown in Palayatha cluster.

Strength	Weakness
• India ranks 2nd in production of Wheat with global contribution of 17.40%. • Rajasthan stands 4th in India contributing to 9.3% share in total production • It is an important oilseed crop suitable for cultivation in tropical climate and is the third largest oilseed produced in the world. • It is also a rich source of thiamine, riboflavin, nicotinic acid, vitamin E and all B vitamins except B12. • Wheat is consumed in mainly two forms. The kernels are widely used for table purpose as a snack and in the manufacturing of ground nut oil. • The oil cake obtained after the extraction of oil is used as animal and poultry feed as well as an organic fertilizer and also for fuel purposes. • The shell of Ground nut is used to prepare card board. It is also used in husk power plants in Rajasthan.	• Wheat is vulnerable to attack by Aspergillus flavus fungus, which produces Aflatoxin • Inadequate infrastructural facilities with producers, traders, millers and at market level results in marketing inefficiencies • Limited processing facilities for Wheat near the cluster and its by-products such as Wheat oil units, roasted Wheat units, etc. • Inadequate grading, sorting and processing facilities around the clusters. • The production of the crop is seasonal. Thus, adequate storage facilities are required. • Large number of intermediaries in the chain leads to low producer's income. • Highly labor intensive processing • Obsolete techniques are used in processing, which reduces output. • Lack of market information regarding prevailing prices, arrivals etc. force farmers to sell in the village itself.
Opportunity	**Threat**
• Reducing cost of cultivation through FPCs by undertaking joint input sourcing activities for seeds, fertilizers, pesticides, etc. under the umbrella of PC • Scope for establishment of quality sorting, grading and storage facilities by PCs as part of Farmers Common Service Centre (FCSC), along with facilities for packaging and vehicle to facilitate transportation.	• Adverse climatic conditions impact crop production and productivity • Abrupt or less rainfall during various developmental stages of Wheat may reduce production or cause pest/disease attack

• Scope for tie up of FPOs through PC with firms like Fortune, Dhara, Nature Fresh, Sundrop, etc. • Scope for tie up of PCs ground nut processing associations/MSME firms • Scope for facilitation of start-ups from amongst FPOs or individual entrepreneurs, in secondary processing of value added products of Wheat like oil, paste, powder, butter, DOC, etc. • Promotion of good agricultural practices with regard to planting, harvesting, use of inputs, disease management, pest control, etc. through FCSC • PCs to also undertake custom hiring services and hence lead farm mechanization through PC	

4.1.4. Goat

Strength	Weakness
Strength of Goat milk as a product • Potential of collecting around 2600 L of goat milk/day • Potential of goat milk as a health drink **Strength of meat from supply side** • 40 goat specific MTGs, around 3467 families own 9227 goats, averaging around 3 goats per goat rearing family. • The weather supports goat rearing • It is a secondary source of livelihood for the farmers • There is sufficient availability of fodder and water in the cluster for goat rearing	• Low milk yield and weight gain of non-descript goat population • Low penetration of animal health services and poor infrastructure of exiting animal husbandry institutions • Lack of knowledge of scientific goat husbandry practices specially feeding, breeding and management among farmers • Low resources specially among small holders for housing and feeding • Lack of aggregation practices for bulk procurement and marketing • No update knowledge of improved goat husbandry practices among veterinary professionals • Poor marketing practices • Poor Livestock resources (low milk and meat yield) and very poor mechanization resources leads to poor return to the farmers of the project area.
Opportunities	**Challenges**
• Goat specific FPC, with support system from the RACP project provide enough opportunity for the goat rearers in the area for enhancing livelihood opportunity through creating efficient value chain linkages for live goat marketing	• Mortality remains a challenge for the farmers and hence they sometimes tend to sell small animals at half body weight (meat estimation basis). • Distance of cluster from major cities.

So is the scope of popularising goat farming with sutable interventions for improving milk and meat productivity. Project intervention will also support small hoder's to collectively market breeding animals to institutional buyers.

4.2. Constraints in value chain crops of Palayatha Cluster

The constraints observed under various value chain crops in the cluster are divided under from different categories, viz Production related constraints, Post-Harvest related constraints and Processing and market infrastructure related constraints.

4.2.1. Production related constraints

Wheat

In Rabbi Season Wheat has largest area under cultivation in the Palayatha cluster. Productivity & production level in the cluster is low for following reasons

a. Use of new high yielding certified, truthful varieties of wheat, SRR (seed replacement ratio) is low in the cluster.
b. Improper field preparation, Timely sowing, Proper depth and row spacing, seed rate is not maintained
c. Improper INM (Integrated Nutrient Management) on the basis of soil test report.
d. Improper irrigation at critical stage and inadequate use of water.
e. Improper weed management

Soybean

In Kharif season Soybean has largest area under cultivation in the Palayatha cluster. Productivity & production level in the cluster is low for following reasons

a. Use of new high yielding certified, truthful varieties of Soybean, SRR (seed replacement ratio) is low in the cluster.
b. No seed treatment practice followed.
c. Improper field preparation, Timely sowing, Proper row and plant spacing, seed rate is not maintained
d. Improper IPM (Integrated Pest Management) .
e. Improper irrigation at critical stage and inadequate use of water.
f. Improper weed management

Garlic

Garlic is important spices cash crop in Palayatha cluster in rabbi season. Productivity & production level in the cluster is low for following reasons

a. Unavailability of good quality planting material
b. Improper field preparation for Garlic
c. Improper integrated nutrient management
d. Poor water management practices
e. Improper protection from pest and diseases followed
f. Improper weed management

Increasing adoption level of producer: Farmers are trained with production lead extension approach till date but hence forth market led extension approach is necessary to increase farmers' income in terms of money. For increasing level of adoption of good agriculture practices to reduce constrains in value chain of crops following strategies are proposed in agriculture extension:

- Multi- agency Extension Strategies
- Farming System Approach
- Convergence of ongoing schemes
- Sustainability of Extension Services
- Improving productivity and income of existing crops.
- Promoting diversification and or intensification of crops and enterprises
- Improving sustainability in production and income
- Mobilization of farmers Groups
- Increasing Research- Extension – Farmers linkages by organizing farmers –scientists' interaction, Field Days and Kisan Goshties farmer field schools.

- Farmers oriented activities for their capacity building regarding production, post-harvest management, value addition, processing and marketing
- Farm Information Dissemination through District level exhibition, Kisan melas, fruit, vegetable shows, information dissemination through Printed materials, technology package, electronic media
- Mainstreaming Gender Concern

4.2.2. Post-Harvest related constraints

Wheat

There is lack of post-harvest facility except sun drying in wheat produced. Harvested manually using Threshing Machine also combine harvester are available on hire basis. If not harvested at proper time will lead in low productivity due to losses. There is practice among the farmers directly taking harvested wheat from farm to mandi without drying or cleaning.

Soybean

Soybean cannot be harvested directly through Combine harvester hence manually harvesting and threshing takes place which is laborious and tedious task. Sun drying is difficult due to cloudy conditions and high humidity at the time of harvesting. Unavailability of labour, threshers and commercial dryers in peak harvesting period hampers the quality of produce

Garlic

Proper curing is necessary in garlic .15 to 20 % handling losses incurred during Curing, drying and grading Storage of garlic at 30 to 35 c temp at 65 to 75 % humidity is major requirement is not maintained in the home/ farm based temporary/ permanent storage built by farmers. Lack of infrastructure facility at farmer's level for stacking and storage of garlic is prevalent in the cluster.

Inadequate storage facilities in rural areas: Storage facilities in villages are found to be inadequate which contributes leads to distress sale. Due to lack of storage facilities, substantial quantity of commodity is also lost. Distress sale is obligatory on some farmers as they have to repay the loan availed from traders during the time of sowing for seed, fertilisers etc. whereas storage facility of Indian Warehousing Corporation and Star Agri Pvt ltd is available 20 to 30 Km from the cluster area.

Transportation facilities at producers' level: Due to inadequate facilities of transportation at the village level, producers are forced to sell in the village itself to itinerant merchants or traders directly at low prices. Aggregation and negotiation with buyers is only possible if farmers have volume to trade and transport up to procurement centre.

4.2.3. Processing and market infrastructure related constraints

Wheat

The processing facility of Wheat is available at market yard. Traders, after procuring and packaging wheat send it to whole sellers and retailers while remaining material goes to animal feed unit. PDW 215 variety is processed for suji, 1544, lokvan and other sarbati varieties are cleaned graded and sortex and packed for direct consumption by traders.

Soybean

Processing facility is set up at about 25 to 35 km from the cluster area by the private ltd companies like Ruchi industries who are procuring material from traders from APMC with

advance payments, they are interested to procure from farmers through farmer producer organisations only and not from individual farmers at Factory level .

Garlic

Garlic is processed very little near the cluster area as no such infrastructure is available near the cluster area.

Traditional system of marketing: In the cluster, there is an absence of alternate channels of marketing. So farmers typically sell only through APMCs or village level traders. The only rare exceptions are some contract farming and direct marketing initiative of a few (about 3,500) producers/farmers) and processors like Soufflet. Apparently, even such large players in barley like KS oil mill and Ruchi oil mill procure significantly through APMCs in the cluster.

Lack of market intelligence services: Farmers do not receive information on market prices. Some farmers sell crops through village level traders, because due to which they are not realising fair price.

Lack of primary processing infrastructure:

i. There is a non-availability of facilities for primary processing: cleaning, grading & sorting at the farm level.

ii. There is no practice and provision of producer level storage.

iii. There is acute lack of awareness among farmers regarding FAQ (Fair Average Quality) standards.

iv. Farmers do not practice the usage of basic equipment like moisture meter and weighing machine.

Distant markets: The nearest market from the cluster is the Baran APMC that is 35 kms away. This leads to farm gate selling where farmers receive non-competitive prices for their produce.

Fluctuations in prices: Generally, the prices of commodities go down in the post-harvest period due to heavy arrivals in the market and later shoot up. Farmers in the catchment area do not have storage facility to store and they also don't use a warehouse receipt system.

Lack of marketing information: Due to a lack of market information regarding prevailing prices, arrivals etc., most of the producers' market garlic in the Baran Mandi without studying the price trends.

Adoption of grading: Grading of wheat and garlic at the producers' level ensures better prices to producers and better quality to consumers. At present there is no infrastructure available at the farmers' level for primary processing.

Malpractices in markets: Many malpractices prevail in the markets i.e. excess weighment, delay in payment, high commission charges, delay in weighing and auction, different kinds of arbitrary deductions for religious and charitable purposes etc.

Hundekari System: Farmers are compelled to sell the produce to the trader from whom he has received credit for sowing of crops. It was observed that even MSP procurement is facilitated by the respective trader of that farmer for weighing and bagging of his produce to FCI through Indian ware Housing Corporation.

Infrastructure facilities: Due to inadequate infrastructural facilities available with the producers, traders, millers and at market level, the marketing efficiency is affected adversely

Long Supply Chain: The existence of a long chain of middlemen also reduces the producer's share in consumer's rupee.

4.2.4. Agri business policy related constraints

Contract farming: Rajasthan has adopted a model APMC Act, 2007. In Rajasthan Contract farming of desired variety and quantity as per buyer's/processor's need, has been allowed. Buyer/processors may supply inputs and technical know-how and farmers may produce the crop for sale to buyers at an agreed price. However, this price shall not be lower than minimum support price and title of land shall remain with farmer. Produce will be purchased at buyer/processor's business/factory place. But processors found less interested in registering under contract farming. As per the discussion carried out by Team ABPF with some of the processors regarding contract farming, the common issues and challenges are given below:

i. **Rule 5** – Each agreement shall be written on stamp paper of the value of Rs.100. This increases cost of procurement and procurement time.

ii. **Rule 9** – Separate registration form shall be filled for each agreement. Large amount of paper work can be reduced by group registrations or procurement directly from FPCs.

iii. **Rule 17-**In case the contract farming buyer fails or refuses to purchase the agreed quantity of the agriculture produce from the contract farming producer, he is to pay the amount of the difference between the agreed price and the actual sale price of the contracted produce in the market committee concerned to the producer. Mutual termination of contract should be allowed.

iv. **Rule 19** – The contract farming buyer need furnish an undertaking equal to 20% of the value of the contracted amount. This amount can be reduced and this will motivate big players to participate in contract farming.

4.3. Intervention plan of selected Value chain crop of Palayatha Cluster

The intervention plan in the selected commodities in the light of critical constraints may be viewed as follows:

4.3.1. Garlic:

Table 14: Indicative intervention plan of Garlic value chain

Sr.No.	Constraints	Action
1.	**Production**	
1.1	Limited knowledge of garlic production technologies and inadequate availability about improved & good quality varieties of garlic among producers	To promote both table purpose varieties and processing purpose varieties
2.	**Post-Harvest**	
2.1	Contractual harvesting of garlic	Setting up alternate channel to sell directly through PC to processor or large retail shops like Walmart, Big basket
2.2	Due to same harvesting time prices collapses and hence storage/pack house option could help reduce distress sale.	Storage facility/ mini cold storage for farmers as part of FCSC
3.	**Processing**	

3.1	Lack of precooling and cold storage facility in the cluster	Setting up pre cooling and/or cold storage facility as part of FCSC or individual enterprise or start ups
3.2	Limited processed product available in the market which limits the marketing potential of the commodity	Facilitate the entrepreneur development to set up small scale processed product like garlic powder, paste, peeled garlic
3.3	Lack of proper washing and cleaning facility	To make farmer aware about quality parameter of garlic for processing like value added products; washing facility as part of FCSC

4.3.2. Soybean

Table 15: Indicative intervention plan of Soybean value chain

Sr.no	Constraints	Action
1.	**Production**	
1.1	Low income generating black soybean are favoured by the farmer community and not HYV yellow soybean	PCs to undertake input sourcing activities under the joint umbrella of FCSC to facilitate
2.	**Post-Harvest**	
2.1	Dearth of adequate storage facilities for the producers	Establish storage facilities by PC as a part of FCSC
2.2	Limited access to market intelligence about price arrivals of the soybean in different markets	Market intelligence system to be developed in FCSC
3.	**Processing**	
3.1	Lack of facilities for oil testing to determine the content in produce resulting in increased price yield to farmers	Oil content testing facilities as part of FCSC
3.2	Inadequate processing unit of soybean such as soymilk processing unit, soya chunks, soy paneer.	Facilitate start up in secondary producing from amongst PCs or individual entrepreneurs
3.3	Lack of any cleaning grading unit of soybean	Establishment of quality sorting and grading by along with facilities for packaging & vehicle to facilitate transportation through FCSC

4.3.3. Wheat:

Table 16: Indicative intervention plan of Wheat value chain

Sn.	Constraints	Action
1.	**Production**	
1.1	Role of weather (Temperature and rainfall) in crop production in immense key months being January and February	To provide weather forecasting facility to help minimize the climatic risk
1.2	Farmers end up paying higher for Seeds, fertilizers and pesticides if procuring from retailors	Setup of FPC and FCSC to take all marketing licenses to provide inputs to farmers at right time at right price and quality
2.	**Post-Harvest**	
2.1	Farmers unware about quality parameters like moisture, foreign material, immature grains, weevils etc. Inadequate infrastructure for grading/sorting/drying and storage at village/cluster level.	To make aware about quality parameter of wheat, a common facility centre should be established at cluster level with sorting, grading facility to ensure higher returns to the farmers.
3.	**Processing**	

3.1	Not aware of special license option to source directly from farmers /FPOs.	Well planned strategy is to be decided to make food processors aware about the license.
3.2	Less value addition product and its volume available in market	To promote entrepreneur start up for wheat value added product where there is surplus production
3.3	Wheat processors are not aware of schemes of the GoI Including CLCSS, cluster Development scheme or “Sampada” for technology upgrading.	Print and visual medium could be an effective way to cascade the information to the target audience.

4.3.4. Goat

S.no	Constraints	Action	Action By	Timeline	Outcome/Impact
1	**Production**				
1.1	Most of the available animals are non-descriptive resulting in low yield of milk/meat	Distribution of bucks of good variety	DH		Improved quality and yield of output to producers
1.2	Farmers do not take proper care of the goats	Training on improved goatry practices including housing, feeding, grazing etc.	DH	Y1Q1-Y1Q2	Improve quality of milk, meat and skin
1.3	Mortality of goats	Rural Technology Center for providing health care services and promoting rural employment	DH	Y1, Q2	Maintaining a healthy herd
2	Marketing				
2.1	Non availability of milk supply chain	Piloting goat milk collection, value addition and market linkage through FPC	DH, FPC, ABPF	Y1, Q3	Merging with supply chain of Bundi cluster
2.2	Non availability of live goat marketing infrastructure	Promotion of goat marketing through FPC	DH, FPC, ABPF	Y1, Q4	A marketplace for trading of goats
2.3	Non availability of community institution for goat rearers	Promoting a goat specific FPC	DH, FPC, ABPF	Y1 Q4	The FPC will take up further market linkage activities.

4.4. Interventions through FPC in the value chain crops of Palayatha cluster

4.4.1. FPC Development Approach

The FPC development approach may be viewed as depicted below:

Figure 5 FPC Development Approach

Following are the steps to be followed for formation of the FPC:

i. **PRI of the MTG:** The MTGs will be made aware on the FPC model through PRI and individual farmers will be motivated to join the FPC as shareholder through respective MTGs.

ii. **Initial discussions with MTG leaders**: After PRI is done, initial discussion will be done with the MTG leaders for further orientation on FPC concept.

iii. **Identification of MTG leaders**: MTG leaders who show inclination to the concept will be selected in the executive committee for FPC formation.

iv. Resource mobilization and FPC planning: The executive committee will meet 2-3 times to plan further activities of FPC viz. crops, strategy for business etc.

v. Election of BoD and Share collection: 10-12 BoD will be identified along with 2-3 expert directors one each from Agri, Horti, AH and WS dept. The BoD will decide on share value and initiate collection of share through MTG leaders.

vi. **FPC registration:** Following identification of FPC BoD, registration will be done. This may take 1-2 months as DIN no of BoD has to be generated first. Care should be take that all elected BoD should have PAN no so that there is no delay in paper formalities for registrations.

vii. **FPC business:** Following registration of FPC, ABPF will prepare business plan for the FPC and facilitate market linkage for input and output.

viii. Setup of processing/ financing – ABPF will further facilitate establishment of processing unit setup along with feasibility studies and planning business linkage with market players.

4.4.2. Policy and Management

A PC will function within the overall policy and regulatory framework as per the Producer Company Act. The management of a PC or FPO will vest with the elected Board from amongst the members. The provision about constitution of managing committee will be made in the byelaws. The management of PCs will be by an elected Board of Directors. Therefore, the representatives of farmers will actually oversee and manage the affairs of a Producer Company or FPO.

The selection criteria for membership of FPC may be viewed as follows:

1. A member will express his willingness to become a member of PG / CIG / FIG.
2. A member will actively participate in all functions and activities of PG / CIG/ FIG and PC.
3. A member will contribute his equity to the Producer Company (PC)
4. A member will bring all or part of his produce to the PC for sale.
5. A member will purchase all or part of his farm inputs through the PC.
6. A member will produce and prepare his produce for marketing as per directions of PC.
7. A member will contribute his share to the Producer Association as upfront payment for the business development plan of a PC as needed.
8. A member will contribute his share to the Producer Company towards the reserves of PC as needed.

Illustrative list of components of a common facility of a Producer Company (Food Grain)

i. Godown for storage, drying platforms
ii. 2-3 MT per hour grain cleaning, grading, and packing machinery with shed
iii. Additional need based Agricultural Equipment
iv. Computer with internet connectivity for market information
v. Display Board with Accessories
vi. Auction Hall
vii. Input Suppliers Shops
viii. Toilets
ix. Drinking water & Electricity

Note: Though the illustrative infrastructure proposed is shown in the above tables, the actual infrastructure to be developed will be need based and on participative consultation process.

Typically, start-up may be involved in secondary and tertiary processing activities while FPO's may be involved in post-harvest and primary processing activity. In many cases, start-up may emerge firm within FPO members.

4.4.3. Introduction to FPC Model

Aggregation is the proposed solution of the constraints farmers are facing at present. It is proposed to form Farmers Producers' Company by bringing farmers together in the form of voluntary groups of about 15 to 20 active farmers and federating 20 to 25 such groups into a Producer Company. These Producer Companies will be functioning on behalf of member farmers and will strive to undertake a range of activities which will result in added value accruals

to farmers and value to farmers produce. To form a producer company, producer groups will be mobilized (in some cases, this initiative may have already been completed by NGO's).

It is envisaged that an elected committee of members of Producers Groups will form a management committee and oversee the performance of an incentivized manager/CEO. The manager will be trained in technical issues of post-harvest management, marketing and in operating a transparent accounting system. The ABPF will support the operation of the Producer Company, and accelerate the cross learning of best practices.

The evaluation of success should be evaluated on the parameters as under:

i. PCs operating without financial support by the end of 36 months.
ii. The PC operates with a reserve fund to cover short term cash flow deficit and with potential for reinvestment in various activities
iii. The PC has an effective governing structure.
iv. The PC has a transparent accounting system.
v. The PC can function as a working example for other farmer organizations to observe and learn from.
vi. Contribution towards increasing farmers'/members incomes.

Chapter – 5: Value Chain Investments

5.1. Rationale for investments

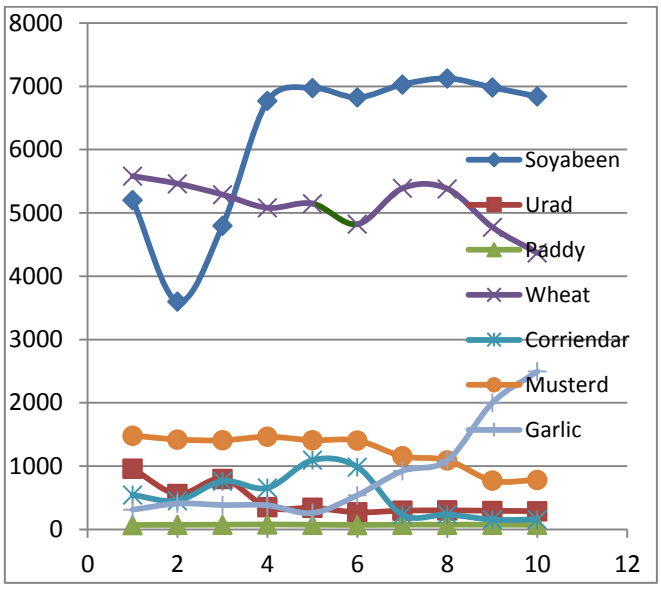
Post-Harvest infrastructure is of great relevance to smallholders, who tend to be geographically dispersed. The lack of primary processing infrastructure and efficient transport can therefore be a particular obstacle, making it difficult for them to obtain essential inputs and get their produce to markets. When smallholders do have access to transport services, the cost is often very high, limiting their competitiveness and ability to participate in agricultural value chains. Small-scale producers are at the greatest risk of significant post-harvest losses owing to the use of rudimentary storage facilities and limited access to reliable and efficient transportation systems. In the absence of primary processing infrastructure, transportation, farmers carry most of the produce (without any processing) themselves, often resulting in limited loads and produce spoilage. Small-scale farmers may also lack the resources to comply with increasingly strict food safety standards, particularly traceability requirements. It is therefore important to integrate and empower small-scale agricultural producers in the food supply chain by giving them access to information and communication technologies. Access to the right information at the right time gives smallholders the capacity to make informed decisions that enable them to optimize their price negotiations and the way in which they place their produce on the market.

As goat or small ruminants are basic livelihood of the villagers / farmers, so the emphasis on these aspects is to be needed in the cluster. Therefore appropriate investment provision has to be made in the cluster. 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.

5.2. Non water use interventions in value chain

The focus of this sub-component is on improving on-farm water use efficiency and productivity in the clusters by promoting micro irrigation techniques, demonstrations and crop husbandry practices which improve agricultural productivity, profitability and sustainability while reducing the water footprint of agriculture.

5.2.1. Agriculture



The Palayatha cluster has semi humid climatic conditions with an average rainfall of 835 mm and it belongs to Chambal canal command area. Soybean and wheat are the major crops of the area. During Kharif, Soybean, Urad and Paddy crop is grown on the monsoon rains and sometimes lifesaving irrigation is provide through canal water. Likewise in Rabi season, crops viz. Wheat, Mustard, Garlic and Coriander are grown on assured canal irrigated conditions. The Paddy is extreme high water loving crop but the area is negligible. The water requirement of wheat is also higher in comparison to coriander and mustard but this crop is grown to provide sustainable income in command areas. Emphasis would be given to comparatively low water loving crops like Soybean in Kharif and Mustard in Rabi.

As a general practice Irrigation to most of the crops in the cluster is being done through surface irrigation methods with poor water use efficiencies. Dependence on ground water for irrigation at present is low due to sufficient supply of water through the surface source of irrigation water i.e. canal. Some wells and tube well are also being used as source of irrigation especially during the canal closure. Irrigation through Micro Irrigation (Drip, Mini sprinkler and sprinklers) would be the major intervention for the efficient use of the irrigation water. Fertigation and automation techniques need to be promoted to synergise the micro irrigation technology.

The seed replacement rate (SRR) of mustard and paddy is about 86% and 73% which need to be further enhanced with more effective varieties while the SRR for wheat, soybean, urad and coriander crops is quite lower which needs to be further enhanced by more promising varieties. In the case of this cluster the SRR, INM, IPM and other issues have to be addressed to achieve the Project Development Objective (PDO) and adoption of package of practices has to be ensured to increase the agricultural as well as water productivity and get maximum benefit out of it. In this case Soybean in Kharif and wheat and barley in Rabi season are most appropriate crops for further promotion through crop demonstrations. The Integrated Nutrient Management (INM), Integrated Pest Management (IPM) and other innovative techniques are still needs to be intervened for the environmental and techno friendly agriculture.

The soil preparation, sowing and threshing of the crops is performed through tractor drawn implements but still there is a great need to introduce the more efficient mechanization tools

for farm operations. Post-harvest techniques are also imperative to introduce in the cluster for the prevailing and ensuing crops.

The farmers' community is supported by the extension machinery of Agriculture department up to the grass root level but the extension system still needs to be compatible with the ICT (Information and Communication Technology) for more effective delivery of the services. Market information and market access is an important intervention to be looked into. The capacity building and regular technical back up to the farmers for the latest updates of the agriculture technologies would be a useful tool for the competitiveness, sustainability and profitability.

Thus looking to the present scenario, the main proposed activities of the Agriculture subcomponent with certain desired objectives are:

a. Promotion of efficient techniques of irrigation to increase the irrigation efficiency, improve productivity and reduce cost of production.

b. Diversify the present Paddy crop to Soybean and wheat crop to mustard with the aim to improve the irrigation water use efficiency and to develop a new value chain crop through demonstrations and capacity building.

c. Promotion of farm mechanization to reduce the cost of production.

d. Promotion of seed production and adaption support to improve the SRR and the farmer income.

e. Promotion of fodder production to reduce the gap of demand and availability of fodder for the animals.

f. Introduction of ICT based extension system for the quick reach of the solutions to the beneficiaries.

g. Capacity building of the beneficiaries to achieve the PDO.

Detailed description on the activities is given in the Annexure 5.1.

Proposed Cropping Pattern and Productivity of field Crops in Palayatha Cluster for the Project Period

The proposed cropping area and cropping pattern (has been calculated on total cultivated area i.e. 8003 ha) and productivity of value chain crops in Palayatha cluster for the project period is proposed to be as under:

Table 17 Proposed Cropping Pattern and Productivity of Crops

Name of crop	Proposed Area (ha)	Proposed Cropping Pattern (%)	Current Productivity (Kg. / ha)	Proposed Productivity (Kg/ha)
Kharif				
Soybean	6840	85.47%	1400	1540
Black gram	378	4.72%	799	878
Paddy	54	0.67%	6000	6600
Total	**7272**	**90.87%**		
Rabi				
Wheat	3500	43.73%	4500	4950
Mustard	1648	20.59%	2000	2200
Total	**5148**	**64.33%**		
Grand Total	**12420**	**155.19%**		

The investments and Cost Estimates under Agriculture Subcomponent under RACP Palayatha

To achieve the above proposed cropping pattern and productivity level, the Seed Replacement Rate has to be increased so that productivity can be increased. To promote farmers to achieve above targets following investments of amounting **Rs.713.04 lakh** have to be done under Agriculture sub component:

Table 18 Investments and Cost Estimates under Agriculture Subcomponent under RACP Palayatha

#	Name of sub-component	Unit	Unit cost	Assistance (%)	Palayatha (Baran)			
					Phy	Assistance	Beneficiary Contribution	Total Project Cost
						Fin	Fin	Fin
1	**Component 1: Climate Resilient Agriculture**							
1A	Sub Component 1A: Improved water use efficiency (Micro Irrigation (MI) based technology)							
1	Integrated demonstration for Drip Irrigation System with Automation and fertigation based techniques for field crops	ha	2.20	75	5	8.25	2.75	11.00
2	Integrated demonstration for Mini Sprinkler based techniques for field crops	ha	1.45	75	17	15.59	5.19	20.78
3	Drip Irrigation System	ha	1.30	75	25	24.38	8.12	32.50
4	Mini/ Micro Sprinkler Irrigation System	ha	0.90	75	60	40.50	13.50	54.00
5	Sprinkler Irrigation System	ha	0.20	75	200	30.00	10.00	40.00
6	Pipeline for piped conveyance of irrigation water	100 mtr	0.10	75	200	15.00	5.00	20.00
	Sub total 1A					133.71	44.57	178.28
1B	Sub Component 1B: Technology transfer and market led advisory services (Promoting Adoption and Documentation of Improved Technologies)							
1	Soil Testing	Nos	0.00	100	1400	0.90		0.90
2	Demonstrations on production technologies for value chain crops to bridge gap	ha	0.10	75	1500	102.90	34.30	137.20
3	Demonstrations on farm mechanisation and PHM technologies	Nos	1.00	75	110	82.50	27.50	110.00
4	Demonstrations on forage/ fodder	ha	0.10	75	250	18.75	6.25	25.00
5a	1. Promotion to seed production	ha	0.05	100	400	20.00		20.00
5b	2. Promotion to Adaption support	ha	0.05	50	900	22.50	22.50	45.00
6	Innovative activities/ INM/ IPM	No.	1.00	75	20	15.00	5.00	20.00
	Sub total 1 Ba					262.55	95.55	358.10
1B-b	Information and Communication Technologies (ICT) based demand driven participatory extension system (Modernization of extension/ research linkages)							
1	KSK strengthening as model in project area-to serve as level I platform for ICT	Nos	3.50	100	2	7.00		7.00
2	Agriculture Research Institute strengthening to serve as level II/ III platform for ICT	Nos	3.00	100	1	3.00		3.00

#	Name of sub-component	Unit	Unit cost	Assistance (%)	Palayatha (Baran)			
					Phy	Assistance	Beneficiary Contribution	Total Project Cost
						Fin	Fin	Fin
3	Honorarium to the experts for solution of the problems and facilitate field visits	LS	1.00	100	2	2.00		2.00
4	Digital instruments to field coordinator/ staff	Nos	0.50	100	20	10.00		10.00
5	Potential threats led/ Pro-P based literature on cluster specific crops	Nos	0.50	100	3	1.50		1.50
	Subtotal 1 Bb					23.50	0.00	23.50
	Subtotal 1 Ba +1 Bb					286.05	95.55	381.60
	Subtotal 1 (1A + 1 B)					419.76	140.12	559.88
2	**Component 2: Markets and Value Chains**							
	Subtotal 2							
3	**Component 3: Farmer Organization and Capacity Building**							
1	Field days, exposure visits, orientation, capacity building	LS		100	12	24.45		24.45
2	Hiring the Services of NGO for Community Participation, Social Screening and Social Mobilization required for implementation of Cluster Agricultural Competitiveness Plan (CACP)	As per deliverables		100	0	118.09		118.09
	Sub Total 3					142.54	0.00	142.54
4	**Component 4: Project Management, Monitoring and Learning**							
1	PIA Operating costs including photo state, computer typing & printing, fax, Machine with man, mobility (hired taxi/POL), TA/DA etc.	LS	LS	100	2	10.62		10.62
	Sub total 4					10.62	0.00	10.62
Total Cost (Agriculture Department)						**572.92**	**140.12**	**713.04**

5.2.2. Horticulture

In agriculture water productivity is major concern in the state, means promotion of high payoff and low water requiring crops is main focus under the project. The horticultural crops are recognized high payoff, nutritious value crops. Water management issue is also very important issue in the agriculture. Areas depend on rains and ground water is become very important in the field of water management. Whatever ground water is available in the cluster should be used judiciously. The horticulture is one of the sectors has emerged as major drivers of growth in the agricultural and allied sector.

The problems in development of Horticulture are pressures emanating from climate change; post-harvest losses; bio-security concerns; absence of market linkages and resultant price fluctuations; changing quality consciousness; and global competition. These concerns need to be addressed in order to sustain the growth momentum in horticulture. The focus of growth strategy, therefore, needs to be on raising productivity by supporting high density plantations, protected cultivation, efficient irrigation methods i.e. micro irrigation, quality planting material, rejuvenation of senile orchards and a thrust on post-harvest management to ensure that the farmers do not lose their produce in the transit from the farm gate to the consumer's plate.

Although there is not much horticultural fruit plantations at present, but the availability of fertile land and good quality water along with the proximity to the National Capital Region (NCR) provides immense opportunity for the cultivation of flowers and fruits as well as vegetables, herbs. The area is suitable for fruits like Guava, Mandarin, Pomegranate, Papaya etc., hence, the area under pearl millet in Kharif crops, would be diversified in to the cultivation of vegetables and fruits crops. Looking to the potentiality and acceptance of the area Chilly, Tomato, Okra & Garlic in vegetable crops and Guava, Mandarin, Pomegranate, Papaya in fruit crops are to be promoted through demonstration with drip irrigation. Solar technology would also be promoted to assure irrigation. Farm mechanization would also be promoted to reduce the cost of cultivation. Post-harvest management would also be promoted.

Based on the above facts and to promote horticulture in the area following activities would be attempted in the cluster:

Promoting Adoption and Documentation of Improved Technologies

Demonstrations on production technologies for Fruit Cultivation:

Under this component assistance to farmers shall be provided for establishment of fruit orchards at normal / wide spacing as well as high density plantations. The attempt has been made to integrate various components of scientific fruit production viz. efficient water use devices like Drip irrigation system with Package of practices, IPM, INM, Fertigation, mulching, automation etc.

Wide spacing crops with inter cropping:

Under this activity assistance to farmers for scientific establishment of fruit orchards will be provided. It has been contemplated that various aspects of modern fruit production at wide spacing/normal spacing with intercrop are integrated. The farmers shall be provided planting material, drip system, mulch, fertilizers and plant protection chemicals.

An investment of Rs.118.02 lacs is to be made on demonstration and establishment of 42 ha orchard with Pomegranate, lemon and papaya orchard establishment. The assistance will be provide to farmers 75% of total unit cost Rs.2.81lacs in different inputs. After plantation of fruit crops in first year additional support during second year and third year would be given.

Demonstrations on production technologies for vegetable Cultivation:

The cultivation of vegetables has been very remunerative but due to lack of investment capacity of the farmers and involvement of high level of technical skills, the rate of adoption of vegetable as well as floriculture is not picking up the desired scales. It has been contemplated that various aspects of modern vegetable production technologies with drip and automation ,hybrid and

improved quality seeds, soil sterilization full POP, water soluble fertilizer, mulching, PP chemical and growth regulators and others cultural practices are integrated.

Under this component technological and input assistance shall be provided to the farmers for vegetable technology demonstration. An investment of Rs. 116.80 lacs is to be incurred on demonstration and cultivation of 40 ha with Chilly, Tomato, Okra & Garlic which are the leading crops & selected for demonstration. The assistance will be provide to farmers 75% of total unit cost Rs. 2.92 lacs in different inputs.

On farm Demonstration on Protected Horticulture

The protected cultivation has opened avenues for intensifying the land use. This can provide excellent avenue for small size of holdings owned by families having ample of underemployed manpower. The weather proof (protected) cultivation results in high quality product and better income to farmers with optimum use of water. There are the two types of protected structure proposed in cluster.

A. Green house (GH) -The benefits of Green House to improve the productivity and quality are as

1. Equal distribution of light inside the green house.
2. To optimize the heat inside the green house.
3. To control the micro climate & establish optimal environment for cultivation & adjust temperature, humidity, lighting etc.
4. Protection against disease, pest etc.
5. Excellent ventilation.
6. Optimum sealing against rains & air.
7. To increase production
8. To ensure off season production, resulting good market rates.

Under this component technological and input assistance shall be provided to the farmers for establishment of G.H. is 75% of total cost of Rs.0.0108 per sqm. The total investment of Rs. 88.00 lacs is to be needed for establishment of green house in 8,000 sqm.

Solar Pump Program

Energy as input in horticulture has great importance as with increase in intensity of production we need may more and more energy. The solar pumps have paved new pathways for independent energy system for the farmers. It is proposed that solar pump of an estimated cost of Rs. 5.5 lac shall be provided to the farmers on 70% assistance. The SPV system should be operated with a PV array capacity in the range of 3,000 watts peak to 5,000 watts peak. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs and has less environmental impact than pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable.

Under this component technological and equipment assistance shall be provided to the farmers for establishment of SPV is 70% of total cost. The total investment for SPV establishment is Rs. 165.00 lacs for 30 SPV.

Post-Harvest Management

The post-harvest management of horticultural crops is of paramount importance as these products are of perishable nature and any attempt to service the gluts results in ensuring fair price realization to the farmers. It is contemplated that assistance to the entrepreneurs is to be needed for establishing new post-harvest units. The contemplated assistance will be 50% of eligible project cost in the form of credit linked back ended subsidy or 50% of total cost of PHM equipment and Machinery.

Under this component assistance shall be provided to the farmers for establishment of pack house, grading, sorting, washing, packing, primary and secondary PHM Machinery and equipment .The total investment for this activity is Rs. 28 lacs. The maximum assistance will be provided 50% of the unit cost of Rs. 28 lacs.

Horticulture Mechanization

Mechanization is the effective tool to reduce the production cost, increase the efficiency of farm and reduction in chemical weedicides. Power operated machines and mini tractors for field operations, planting, sowing, spraying, Mulch laying machine, training and pruning, grading, harvesting etc. operations are proposed to be provided with the assistance level of 50 per cent to the selected beneficiary of the cluster. An estimated maximum cost of Rs. 7.5 Lac has been kept for the implements/ mechanization technology per unit.

The total investment for this activity is Rs. 37.50 lacs. The maximum assistance will be provided 50% of the unit cost of Rs.7.5 lacs or 50% of the total cost of machinery and equipment.

Micro irrigation in horticulture crops

With a view to produce more crop per drop of water and also to obtain higher and qualitative yield from horticulture crops, assistance would be provided to the farmers who are willing to adopt drip irrigation system especially in fruit orchards and vegetable cultivation. Under this component, farmers will be promoted to adopt drip irrigation system. A unit cost of Rs. 0.80 lacs for establishment of drip irrigation in fruit orchards and Rs. 1.30 lacs for vegetable cultivation has been decided. Farmers would be provided 75% assistance for adoption of drip irrigation system. The total investment for this activity is Rs. 21.00 lacs.

Farmers training, Seminars, Exhibition Kisan mela

To upgrade the technical knowledge of the farmers, training programmes, exposure visits, seminars, kisan mela etc would be organized.

Proposed Cropping Pattern and Productivity of Crops, proposed procurement of inputs and planting material, Total activity wise investment and Qtr. wise proposed investment at Annexure A, B, C and D respectively..

Proposed Cropping Pattern and Productivity of Horticultural Crops in Palayatha Cluster for the Project Period

The proposed cropping area and cropping pattern (has been calculated on total cultivated area i.e. 8003 ha) and productivity of horticultural crops in Palayatha cluster for the project period is proposed to be as under:

Table 19 Proposed Cropping Pattern and Productivity of Horticultural Crops

Name of crop	Proposed Area (ha)	Proposed Cropping Pattern (%)	Current Productivity (Kg. / ha)	Proposed Productivity (Kg/ha)
Vegetable				
Brinjal	27	0.34%	833	917
Chilli	12	0.15%	12500	13750
Tomato	16	0.20%	7143	7857
Okra	20	0.25%	7000	7700
Total	**75**	**0.94%**		
Spices				
Garlic	2409	30.10%	6000	6600
Coriander	235	2.94%	2199	2419
Fenugreek	26	0.32%	1222	1344
Total	**2670**	**33.36%**		
Fruits				
Guava	42	0.52%	6000	7000
Lemon	16	0.20%	5500	6500
Total	**58**	**0.72%**		
Total Horticulture	**2803**	**35.02%**		

The investments under the horticulture sub component

Total **Rs.632.20 lacs** is proposed to be invested on inventions mentioned above of horticulture sub component to make farmers competitive for getting optimum water as well as horticultural productivity in Palayatha cluster. Out of this an amount of Rs.171.63 lacs would be borne by the farmers/beneficiaries and Rs.460.58 would be borne by the project. The investments are being summarized as under:

Table 20 Investment proposal under horticultural sub component

#	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Grand Total (Rs. In lacs)			
						Phy.	Financial		
							Farmer share	Project	Total
I.	**Component 1: Climate Resilient Agriculture**								
IB	**Sub Component 1B: Technology transfer and market led advisory services**								
1	**Promoting Adoption and Documentation of Improved Technologies**								
i.	**Assistance on production technologies for Fruit Cultivation**								
1	Wide spacing crops with inter cropping	ha	2.81	75	2.108	42	29.48	88.54	118.02
i.	First year Maintenance support	ha	0.58	75	0.435	11	1.60	4.79	6.38
ii.	Second year Maintenance support	ha	0.75	75	0.561	6	1.13	3.37	4.50
2	High density plantations	ha	5.57	75	4.178	0	0.00	0.00	0.00
i.	First year Maintenance support	ha	1.09	75	0.818	0	0.00	0.00	0.00
ii.	Second year Maintenance support	ha	1.32	75	0.986	0	0.00	0.00	0.00
3	Assistance on production technologies for vegetable Cultivation	ha	2.92	75	2.19	40	29.20	87.60	116.80
4	Assistance on green house	SqM	0.01	75	0.00816	8000	22.72	65.28	88.00
5	Assistance on shade net house	SqM	0.01	75	0.00647	0	0.00	0.00	0.00
6	Solar Pump Program	Nos	5.5	70	3.85	30	49.50	115.50	165.00
7	Post-Harvest Management	Nos	28	50	14	1	14.00	14.00	28.00
8	Horticulture Mechanization	Nos	7.5	50	3.75	5	18.75	18.75	37.50
9	Micro Irrigation in Horticulture Crops (Drip System)	Ha							
	Fruits		0.80	75	0.60	10	2.00	6.00	8.00
	Vegetable		1.30	75	0.975	10	3.25	9.75	13.00
	Sub Total IB						**171.63**	**413.58**	**585.20**
III.	**Farmer's Organization and Capacity Building**								
1	2 days Farmer's training (50 farmers in each)	Nos	1	100	1	12	0	12	12
2	Exposure visit for 50 farmers for 5 days	Nos.	2	100	2	6	0	12	12
3	Seminar for 100 participants for 2 days	Nos.	2	100	2	6	0	12	12
	Sub Total III					**24**	**0**	**36**	**36**
IV.	**Project Management & M&E**								

#	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Grand Total (Rs. In lacs)			
						Phy.	Financial		
							Farmer share	Project	Total
1	Operating cost including (Photostat, computer, printer, fax, manpower, services outsourcing, mobility (hired taxi), TA for District unit)p	0	LS	100	0	0		11	11
	Sub Total IV					**0**	**0**	**11**	**11**
	G. Total						**171.63**	**460.58**	**632.20**

5.2.3. Livestock

RACP envisage investing and working in a cohesive way with all the identified components for benefitting the farmers especially the small holders in a sustainable manner, up-scaling the successes and documenting the learning. For the purpose it is planned to prepare the Cluster Agriculture Competitiveness plan (CACP).The CACP have a defined objective and after analyzing the primary and secondary data of the cluster proposes interventions including investments, Community level Institutional Development, Water Conservation and Resource Management, Climate Resilient Agriculture, and Value Chain Development. The CACP provides detailed project report for the selected cluster. CACPs are prepared through a participative process involving a broad range of stakeholders, including private sector.

Based on the constraints identified with the community, project investments are planned to achieve the project development objectives (PDOs). The details of Identified and eligible Investments under project are as under.

Climate resilient agriculture –It is planned to improve productivity (milk and weight gain) through investment in breeding, feeding and animal health services.

Market and value Chain improving market access and local level small value addition.

Capacity building- supporting farmer advisory and training of the farmers, and training of existing Animal Husbandry Department's technical staff

Project management & Monitoring

The impact of investment will be derived from increased profit to farmers by getting a higher price for their goats (through access to market information and value chain development not only through sale of animal/milk & meat, but also products like manure, hair, and hides); increased sale of goats due to reduced mortality and higher fecundity; and increased productivity (as a result of better breeding, feeding and healthcare). Women in particular will benefit; they provide the majority of labour for goat production though they are often excluded in marketing.

Water Productivity in Goats

The economic gain to farmers through Goat rearing on the basis of per unit water consumption is estimated. Following assumptions has been taken to attain body weight of 30 Kg in one year; 245 Kg of feed and 249 litters of water consumption and feed cost Rs 10/-per kg and management cost is 30% of the feed cost with 10% mortality assumed.

Calculation of gains is based on cost of live weight at the rate of Rs. 200/- per Kg. For a flock of 100 goats considering 10% mortality net earnings to the farmer is Rs. 2533/- per Goat. Economic gain in terms of water consumption is Rs 5.18/- per litre of water.

Estimated Cost of Investments on Livestock activities

An estimated cost amounting of **Rs. 474.24 lacs** is to be incurred as tentative investments for the implementation of various activities in Palayatha cluster. Out of it, an amount of Rs. 26.80 lacs will be borne by the beneficiaries and Rs.447.44 lacs by the project. Detailed activities can be referred in Annexure 5.3. The tentative Action Plan & Cost Estimates for Palayatha cluster is being summarized as under:

Table 21 Estimated Cost of Investments on Livestock activities

#	Items	UNIT	Unit cost (Rs. In lac)	Assistance (Rs. In lac)	Physical	Total Financial (Rs. In Lacs)		
						Farmer Share	Project Cost	Total Cost
I.	**Climate Resilient Agriculture**							
1C	**Livestock Strengthening and Management**							
1	DISTRIBUTION OF BUCKS (FARMERS)	No.	0.100	0.075	250	6.25	18.75	25
2	DISTRIBUTION OF GOATS (WIDOWS & DISABLED) (One UNIT OF 4 GOATS)	No.	0.32	0.320	100	0	32	32
3	GOAT INSURANCE (8% PER ANNUM) OF UNITS RECEIVING IMPROVED BUCKS AND DOES	No.	0.008	0.006	650	1.3	3.9	5.2
4	Veterinary Health Camp support (one camp Per GP Per month)	No.	0.05	0.050	404	0	20.2	20.2
5	ESTABLISHMENT OF REGIONAL TECHNOLOGY CENTER (RTC)							0
i.	A- GRADE	No.	60	60.000	1	0	60	60
ii.	B- GRADE	No.	30	30.000	2	0	60	60
6	Vehicle for emergency animal health services	No.	10	10.000	1	0	10	10
7	Operating cost of RTC including POL for Vehicle	No.	3.6	3.600	6	0	21.6	21.6
8	Lady link worker/MF honorarium (One per Gram Panchayat)	No.	0.36	0.360	18	0	6.48	6.48
9	Azolla Demonstration	No.	0.065	0.065	400	0	26	26
10	HOUSING SUPPORTS	No.	0.66	0.495	50	8.25	24.75	33

#	Items	UNIT	Unit cost (Rs. In lac)	Assistance (Rs. In lac)	Physical	Total Financial (Rs. In Lacs)		
						Farmer Share	Project Cost	Total Cost
11	FEEDING & water TROUGHS DISTRIBUTION	No.	0.05	0.038	400	5	15	20
12	Travis installation in project villages (one per village)	No.	0.15	0.150	22	0	3.3	3.3
13	DISTRIBUTION OF CHAFF CUTTER	No.	0.08	0.060	300	6	18	24
14	ANIMAL IDENTIFICATION							0
i.	TAGS	5000 Nos	0.00018	0.00018	5000	0	0.9	0.9
ii.	NEEDLE	5000 Nos		0.000	360	0	0	0
iii.	TAG APPLICATOR	5000 Nos	0.015	0.015	10	0	0.15	0.15
15	Weighing Balance	No.	0.01	0.010	750	0	7.5	7.5
16	Feed Supplement Distribution	No.	0.00126	0.001	9340	0	11.7684	11.7684
17	ICT Support for LLW/MF	No.	0.1	0.100	9	0	0.9	0.9
18	ILD centre	N0	10	10.000	5	0	50	50
	Sub Total					**26.8**	**391.1984**	**417.9984**
II.	**Market & Value Chain**							
1	FORMATION OF MTG (Goat)	No.	0	0	50	0	0	0
2	ESTABLISHMENT OF RURAL HAAT	No.	200	200	0	0	0	0
3	Clean Milk Production	No.	0.01	0.01	1500		15	15
4	Goat Milk Collection & Value Add	No.	25	25	0		0	0
	Sub Total					**0**	**15**	**15**
III.	**Farmers Organisation & capacity Building**							
1	MTG members Goat Management	No.	0.02763	0.02763	750	0	20.7225	20.7225
2	MTG members Refresher Goat Management	No.	0.00545	0.00545	750	0	4.0875	4.0875
3	LLW training	No.	0.075	0.075	9	0	0.675	0.675
4	Professional staff training	No.	0.075	0.075	20	0	1.5	1.5
5	Goat Exhibition/Seminar	No.	0.5	0.5	2	0	1	1

#	Items	UNIT	Unit cost (Rs. In lac)	Assistance (Rs. In lac)	Physical	Total Financial (Rs. In Lacs)		
						Farmer Share	Project Cost	Total Cost
	Sub Total					**0**	**27.98**	**27.98**
IV.	**Project Management & M&E**							
1	Operating expenses of DD Office	No.	0.6	0.6	3	0	1.8	1.8
2	District Goat Development Plan Consultation (One at each District)	No.	2	2	0	0	0	0
3	Vehicle on Hire for Cluster /POL	No.	1.8	1.8	3	0	5.4	5.4
4	Incentive for different project activities (Rs 1500 per capm)	No.	0.015	0.015	404	0	6.06	6.06
	Sub Total					**0**	**13.26**	**13.26**
	TOTAL					**26.80**	**447.43**	**474.23**

5.3. Market and value chains

The objective of this component is to enable farmers to engage in profitable market oriented production, that is sustainable, and to promote partnerships and market linkages with other value chain participants and agribusinesses. The component will help producer groups, agro enterprises, and commodity associations, to actively engage in the development of commodity value chains by partially financing demand-driven investment proposals to producer organization through a matching grant. This will be done by further organizing members of MTG and developing their capacity and skills for input and output marketing. It is expected that aggregation will bring economies of scale in procurement of inputs and marketing of agricultural produce, thus enabling wider access to markets. These producer organizations will be an important vehicle for promoting market-oriented production in their geographical jurisdiction and can act as centres for technology dissemination and input/output marketing. Project will develop (a) value chains aiming to establish longer term partnerships and market linkages between farmer groups and agribusiness enterprises, facilitated through an Agri-Business Promotion Facility (ABPF); and (b) alternate market channels. It is in this context that the FPCs that are developed may serve as input facilitators of seeds, pesticides etc. operators of common facilities by way of primary processing facilities, custom hiring (of farm equipment) facilitators, seed producers as well as platforms for B2B linkages directly with secondary processors/marketers.

5.3.1. Value chain studies of identified commodities in the cluster

As discussed in Chapter 3, following commodities are selected for the value chain intervention in the cluster: Soybean, Wheat and Garlic. This was done based on broadly four set of parameters: 1) Existing size of the crop, 2) Potential for value addition, 3) Risk assessment and 4) Environmental parameter.

A comprehensive value chain study has been conducted that includes following activities, but not limited to: (i) participatory meetings with value chain stakeholders of each cluster such as – producers, aggregators, transport facilitators, storage facilitators, commission agents, wholesalers, retailers, (ii) analysis of potential for new value chains, volume & value of the

selected crop with respect to its production, postharvest management practices, processing, storage, transport and marketing), (iv) analysis of the data / information collected from various sources, (v) feedback from market participants & relevant agencies, (vi) understanding on the role of stakeholders (vii) cost contribution analysis per stakeholder wise (viii) Margins at each level of value addition (ix) study gaps and issues in value chains (x) suggested intervention (xi) SWOT analysis for each value chain for intervention. (xiii) Comparative study of stakeholders' role and cost contribution in each cluster separately.

5.3.2. Value chain analysis and key opportunities

As discussed in the chapter 4, there is scope in the selected crops for value chain interventions. As mentioned, intervention can be started with primary processing at common facilities (FCSC). Thus the income of farmers can be increased by 25% instantly.

1. **Soybean**

The concept of FPC as suggested in Chapter 4, will get complimented by an FCSC unit. A reference value chain map of pulses, post intervention, is shown in Annexure 5.4.

Farmers are exploited by traders based on the quality of the produce brought. Processors are willing to pay a premium based on FAQ (Fair Average Quality) parameters. Hence a small cleaning and grading unit can increase the returns by 20% because apart from getting premium, farmers will also save on the expenses as a result of aggregation. Farmers can then sell their cleaned and graded produce directly to processors. A small warehouse with the cleaning and grading unit can ensure better price realisation.

2. **Wheat**

Value chain map of Wheat, post intervention, is show in Annexure 5.4.

In Wheat, a Nano grader can help realizing better price with processors as market is ready to pay premium of cleaned and graded material. In addition to grader, a small four mill will assist in realising premium price through comparatively higher product. A small warehouse along with a vehicle makes the complete unit to ensure price stabilisation and to avoid distress selling.

3. **Garlic**

Value chain of Garlic, post intervention, is shown in Annexure 5.4. Since Garlic is a commonly grown commodity suffering from very high price fluctuations over the year hence intervention is necessary in this crop.

A processing unit can be set up for Garlic that can have grader, bulb cutter, peeler, electric/solar dryer, powder/paste grinder. Product can be sold after each step for eg. graded garlic, braided garlic, peeled garlic, dehydrated garlic, garlic powder or garlic paste. Hence with a small capital infrastructure there can be a variety of products that compliments other products in same unit.

Apart from the hard intervention, there is a need of soft interventions too. Based on the FPC model approach as discussed in Chapter 4, there is a requirement of other activities as listed below and a detailed description is in Annexure 5.5.

- Scouting of technologies and business ideas for identified commodities
- Incubation services to agri entrepreneurs
- Management and business training to FCSC and producer company personnel
- Facilitating reforms in agri policies

5.3.3. Value chain cost estimate

To promote Farmers' Producer Company along with the development of farmer common service center, it would require a support from the project as discussed below.

FPC registration and related licenses

Registration fees along with the fees of the facilitator can be budget under this amount. This component can also cover the fees to apply for other licenses as well like electricity, procurement etc. 100% assistance is required from the project as it is just the starting of the FPC hence there would be no other source of cash inflow for the unit.

S. No.	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total
i)	Registration expenses and other pre-operative expenses-FPC	FPC	1	100%	1	4	0	4	4

Human Resource

Dedicated resource person is required at each FPC to manage and control day to day activities along with other compliances and business as well. 100% assistance is required in manpower.

S. No.	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total
ii)	Manpower Expenses - FPC (Rs. 25,000 per month for 2 years)	FPC	6	100%	6	4	0	24	24

Office infrastructure

An office can be set up in a rented building with basic amenities like table, chair, computer, printer etc. Office is purely on the brand building basis to show the identity of the FPC hence a 50% support can be given by the project.

S. No.	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total
iii)	Office Establishment (only physical assets like chair, tables, computer, printer and other furniture)	FPC	1	50%	0.5	4	2	2	4

Common Facility

This is the component for the establishment of the common facility infrastructure. On an average and also as per the business models suggested in the previous section an FCSC along with an FPC has a capital expenditure of Rs. 30 lakh. It can be taken as a standard by the project to assist any unit by 75% or Rs. 22.5 lakh whichever is lesser.

S. No.	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total

1	**Value Added Unit (Common Facility) - FPC**	FPC	30	75%	22.5	4	30	90	120

Start-ups (Private investment)

Minimum 4 startups will be promoted in the cluster district with average investment of Rs. 20,00,000 per startup. The startups will be identified by conducting startup meets periodically in the region. The startups will mainly focus on the secondary processing activities and which may perform the part of backward or forward linkage for the FCSCs formed in the cluster area. The identified startup may invest based on commodity in following activities:

A. Wheat
   - Wheat flour, Maida and Rawa making activity
   - Bakery units
   - Wheat seed production unit

B. Soybean
   - Soya oil unit
   - Roasted soya unit
   - Soya milk unit
   - Soya panner unit
   - Soya flour unit
   - Soya feed unit
   - Soybean seed production Unit

C. Garlic
   - Garlic paste unit
   - Garlic peeling unit
   - Garlic pickle unit
   - Garlic dehydration unit
   - Garlic powder making unit

Team ABPF will support this startup in preparation of business plans and will provide technical support in formation of the unit and will guide the investor periodically.

S. No.	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total
1	**Start up**	Private	20	0%	0	4	80	0	80

For the suggested business models following table summarizes the estimated capital expenditure required in the FCSC.

Table 22 Capital expenditure for the common facilities

Suggested value chain interventions in the cluster	Amount (Rs.)
Soybean cleaning and grading unit	
Shed construction (1000 sq ft @ Rs. 700/sq ft)	700,000
Cleaning and grading unit (1 TPH)	800,000
Warehouse (100 MT)	850,000
Vehicle (1.5 MT)	650,000
Total	**3,000,000**
Garlic processing unit	
Shed construction (1200 sq ft @ Rs. 700/sq ft)	840,000
Processing machineries (Grader, Bulb cutter, Peeler, Electric/Solar dryer, Powder/Paste grinder) (5-10 QPD)	1,000,000
Storage structures (5 @ Rs. 1,00,000)	500,000

Vehicle (1.5 MT)	660,000
Total	**3,000,000**
Wheat processing unit	
Shed construction (1200 sq ft @ Rs. 700/sq ft)	840,000
Nano grader (5 QPH)	500,000
Flour mill and packaging (1 TPD)	400,000
Warehouse (80 MT)	760,000
Vehicle (1 MT)	500,000
Total	**3,000,000**

A summary of the expenditure and the assistance required through project is as follows:

Table 23 Estimated Cost of Investments on Value chain activities

#	Name of sub-component / Activity	Unit	Unit cost	Assistance (%)	Amount of Assistance	Phy.	Financial		
							Farmer share	Project	Total
I.	**Component 2: Market and Value Chain (Agri.)**								
	Sub Component 2B: Market Infrastructure and Agribusiness Support								
1	**Nurturing farmers group**								
i)	Registration expenses and other pre-operative expenses-FPC	FPC	1	100%	1	4	0	4	4
ii)	Manpower Expenses - FPC (Rs. 25,000 per month for 2 years)	FPC	6	100%	6	4	0	24	24
iii)	Office Establishment (only physical assets like chair, tables, computer, printer and other furniture)	FPC	1	50%	0.5	4	2	2	4
2a	**Value Added Unit (Common Facility) - FPC**	FPC	30	75%	22.5	4	30	90	120
3	**Start up (Private investment)**	Private	20	0%	0	4	80	0	80
	G. Total						**112**	**120**	**232**

5.3.4. Economic impact

The interventions proposed at the initial level are primary in nature and to build up the Agri business activities in the cluster. The process will lead to increase in business acumen of the farmers along with social and environmental development. At primary level, farmers can realize 15% - 20% more income at their farm.

With the model of FPC, there will be an advantage of aggregation which leads in cutting of cost hence increasing the income by 5%-10%. Members will also receive dividend on the profit

earned by FPC through business hence, indicatively, farmer will get 35%-40% increased income once a full model of FPC and FCSC along with market linkages gets established.

An indicative profitability study for all the FCSC units proposed are as given below:

Table 24 Profitability indicators on proposed value chain units

Particulars	Wheat processing unit (Rs.)	Garlic processing unit (Rs.)	Soybean CnG unit (Rs.)
Revenue	2,232,000	1,920,000	1,944,000
Total Revenue	**2,232,000**	**1,920,000**	**1,944,000**
Fixed Cost (HR, other fixed cost)	381,400	441,400	381,400
Variable Cost	984,326	693,600	731,520
Total Operational Expenses	**1,365,726**	**1,135,000**	**1,112,920**
Earnings Before Interest, Depreciation, Taxes and Amortization (EBITDA)	**866,274**	**785,000**	**831,080**
Depreciation	220,000	233,000	222,500
Amortization	0	0	
Earnings Before Interest and Taxes (EBIT)	**646,274**	**552,000**	**608,580**
Interest Expense	0	0	0
Earnings Before Taxes (EBT)	**646,274**	**552,000**	**608,580**
Tax (@ 30%)	193,882	165,600	182,574
Earnings After Taxes (EAT)	**452,392**	**386,400**	**426,006**
Financial Indicators			
Net Present Value (@ discount rate 10%)	**315,792**	**181,721**	**221,704**
Internal Rate of Return	13.62%	12.5%	13%
Payback period in years (Equity)	1.15	1.24	1.16
Payback period in years (Total)	3.65	3.8	3.73
Breakeven point	39.60%	43.96%	40.91%

Detailed Profit and loss statement for all the models including goat milk unit are given in Annexure 5.6.

5.3.5. Brief description of Implementing Arrangements

Above mentioned technological gaps would be addressed through various interventions suggested and through farmers groups (MTGs) formed under RACP. Group leaders of MTGs/MTAs can be trained on market led extension to spread adaption of technologies speedily. Also for better implementation role of ATMA, KVK would be crucial and they can be involved for registration of groups, trainings to farmers.

Implementation process for agri business units is proposed as follows:

1. Preparation of potential business model of units proposed above with the help of AB consulting agency.
2. Submission of project proposals to the PMU by the beneficiary.
3. Evaluation of projects by an appointed technical committee of PMU.
4. Approval of project by PMU/ EC RACPMIS for the proposed support through RACP.
5. Commissioning of the unit and business activity initiation
6. Phasing of subsidy during implementation:

a. 20% after mobilization of PC/entrepreneur fund
b. 40% during the purchase of the plant and machinery
c. 40% at the commencement of the unit

5.4. Investment per unit of water saved

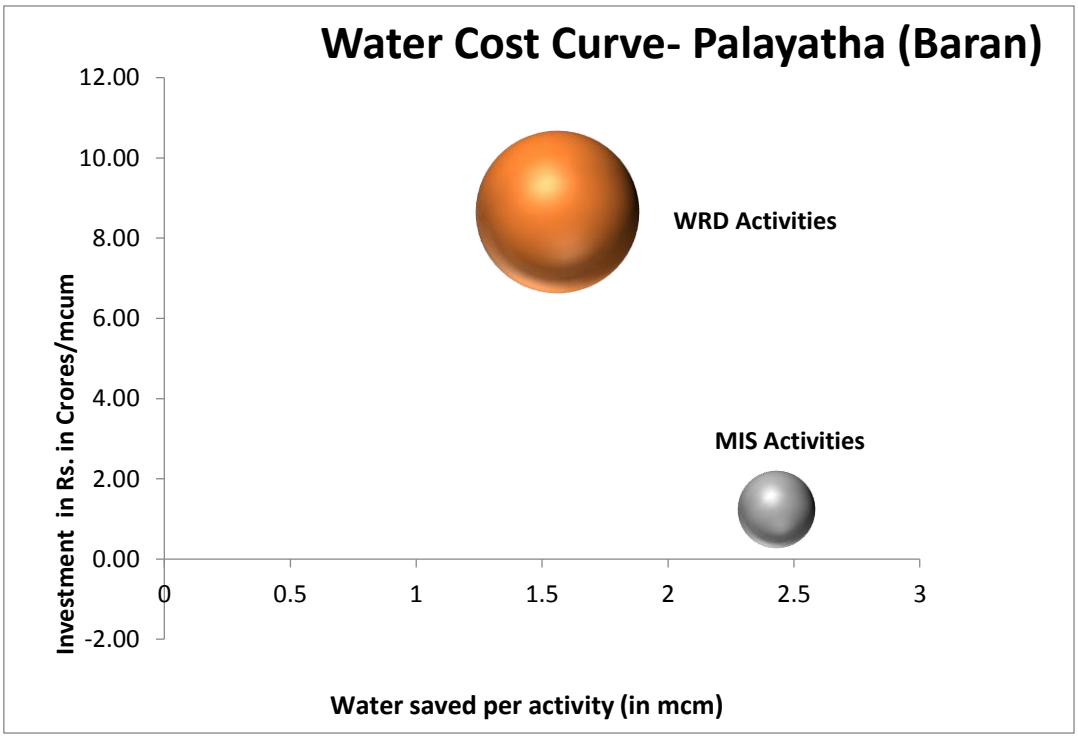
The comparison of investment (in Rs crore per mcm) is a useful tool for assessing data to understand the relative effectiveness and cost of the full spectrum of approaches to improving water security. When coupled with realistic assessments of operational risk, such comparisons can also help policy makers and investors to improve water-sector productivity.

In the case of Palayatha cluster, there are majorly two water saving activities taking place viz activities of Rehabilitation & modernization activities of WRD and the micro-irrigation system (MIS) activities of Agriculture and Horticulture department. Both these activities save water up to the extent of 1.56 mcm in project period and 2.43 mcm per year respectively. When the investment per unit of water saved is calculated, it is found that MIS activities are able to conserve more water at lower investment of Rs.1.24 crore per mcm of water saved per year. Thus, it could be said that MIS activities like installation of drips and sprinklers for the agricultural and horticultural crops has far reaching impact in the span of a year.

Table 25: Investment (in Rs/mcm) verses Water saved (in mcm) in Palayatha

Activities undertaken to save water	Water saved- per year in mcm	Investment- Rs crore/mcm	Total investment- Rs crore
WRD Rehabilitation & Modernization activities	1.56	8.66	13.51
MIS Activities	2.43	1.24	3.01

Figure 6: Investment (in Rs crore/mcm) verses Water saved (in mcm) in Palayatha

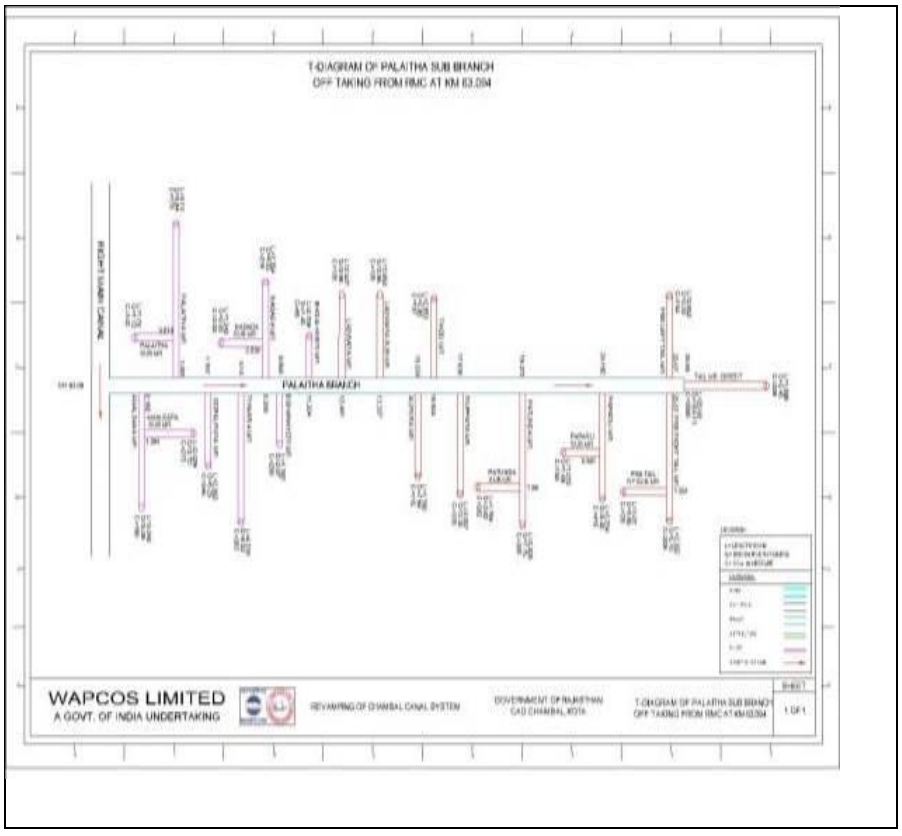


Chapter – 6: Water Resources Management of Cluster

6.1. Description of Chambal Canal System

The Palayatha Sub branch is off taking from Chambal Right Main Canal RD 63.11 Km (L/S) having CCA 8003 Ha. It consists 23 minors / sub minors. The activities under Agriculture, Horticulture and Livestock have been proposed for the whole CCA 8003 Ha. The revamping work of upstream 10 minors off taking from Palayatha sub branch km 0.00 to km 12.30 and the Palaiyaha Sub Branch from 00 to 25.75 (Tail) km has already been sanctioned under NABARD and the work has been started.

Under Surface Water component RACP, the rehabilitation of remaining 13 minors/sub minors off taking from PSB km 12.30 to Tail km 25.75 has been taken. The Culturable Command Area (CCA) of these 13 minors / sub minors is 2892.48 ha. The present irrigable command area (ICA) of these minors is 2024.40 Hectare. An additional ICA 380.50 Hectare will be available after rehabilitation of the project. The present field application irrigation efficiency of PSB system is 56% which will be increased after rehabilitation up to 65%. Cost of the project is 1351.26 lakh.



Salient Features/Technical Data

#	Particulars	Details
1	Name of the project	Rehabilitation & modernization works of direct off taking minors of Palayatha Sub Branch from km. 12.30 to Tail km 25.75 under RACP Project
1.1	District	Baran
1.2	Tehsil	Antah/ Mangrol
1.3	River / Tributary	Palayatha Sub Branch
1.4	Location Dam/Diversion Structures	63.11 km. of Chambal Right Main Canal
2	**Location**	
2.1	Longitude & Latitude	25° 11' N,
		72° 22' E.
3	**Socio – Economic Aspects**	
3.1	District (S) benefited	Baran
3.2	Land Holdings	1ha/ Farmer Approx.
4	**Hydrological data**	
4.1	Rainfall (mm)	Acc. To Last 15 Year data
4.2	Maximum annual rainfall	1412 mm (2011)
4.3	Minimum annual rainfall	365 mm (2002)
4.4	Mean annual rainfall	707 mm

Length of the Canal Distribution System

S. No	Name of Channel	Off-taking from	Length of Channel (Km)
1	Palayatha Sub Branch	Right Main Canal	25.68
2	Amalsara Minor	Palaihta Sub Branch	3.048
3	Amalsara Sub Minor	Amalsara minor	2.028
4	Palaihta Minor	Palaihta Sub Branch	4.133
5	Palaihta Sub Minor	Palaihta Minor	1.74
6	Gopalpura minor	Palaihta Sub Branch	2.882
7	Thikaria Minor	Palaihta Sub Branch	3.204
8	Nagada Minor	Palaihta Sub Branch	3.354
9	Nagada Sub Minor	Nagada Minor	1.241
10	Bishan Kheri Minor	Palaihta Sub Branch	1.392
11	Bhoja Kheri Minor	Palaihta Sub Branch	0.708
12	Ladwara minor	Palayatha sub branch	2.527
13	Ladwara Sub Minor	Palayatha Sub Branch	3.958
14	Alipura Minor	Palayatha Sub Branch	1.79
15	Tikod Minor	Palayatha Sub Branch	2.952
16	Roopura Minor	Palayatha Sub Branch	3.05
17	Patunda Minor	Palayatha Sub Branch	3.204
18	Patunda Sub Minor	Patunda Minor	1.793
19	Paperli Minor	Palayatha Sub Branch	3.253
20	Paperli Sub Minor	Paperli Minor	1.072
21	Tail minor Left	Palayatha Sub Branch	2.651

S. No	Name of Channel	Off-taking from	Length of Channel (Km)
22	Tail minor Right	Palayatha Sub Branch	3.3
23	Tail Sub minor Right	Tail minor right	1.106
24	Tail Direct minor	Palayatha Sub Branch	2.757
	Total		**82.823**

Full supply discharge at canal heads in cusecs

S. No	Name of Channel	Type of Channel	Off-taking from	Discharge (cusec)
1	Palaihta Sub Branch	Sub Branch	Right Main Canal	142.5
2	Amalsara Minor	Minor	Palaihta Sub Branch	6.79
3	Amalsara Sub Minor	Sub minor	Amalsara minor	3.94
4	Palaihta Minor	Minor	Palaihta Sub Branch	8.38
5	Palaihta Sub Minor	Sub minor	Palaihta Minor	3.57
6	Gopalpura minor	Minor	Palaihta Sub Branch	6.49
7	Thikaria Minor	Minor	Palaihta Sub Branch	4.24
8	Nagada Minor	Minor	Palaihta Sub Branch	4.69
9	Nagada Sub Minor	Sub minor	Nagada Minor	1.48
10	Bishan Kheri Minor	Minor	Palaihta Sub Branch	3.84
11	Bhoja Kheri Minor	Minor	Palaihta Sub Branch	1
12	Ladwara minor	Minor	Palayatha sub branch	2.25
13	Ladwara Sub Minor	Sub minor	Palayatha Sub Branch	2.99
14	Alipura Minor	Minor	Palayatha Sub Branch	1.74
15	Tikod Minor	Minor	Palayatha Sub Branch	3.78
16	Roopura Minor	Minor	Palayatha Sub Branch	5.3
17	Patunda Minor	Minor	Palayatha Sub Branch	8.26
18	Patunda Sub Minor	Minor	Patunda Minor	3.6
19	Paperli Minor	Minor	Palayatha Sub Branch	8.51
20	Paperli Sub Minor	Sub minor	Paperli Minor	2.28
21	Tail minor Left	Minor	Palayatha Sub Branch	2.75
22	Tail minor Right	Minor	Palayatha Sub Branch	5
23	Tail Sub minor Right	Sub minor	Tail minor right	1.88
24	Tail Direct minor	Minor	Palayatha Sub Branch	3.15

WUAs of Palayatha Canal System

S.N.	Name of WUA	CCA in ha
1	Palayatha	602
2	Gopalpura	466
3	Thikaria	283
4	Nagda	1154
5	Amalsara	453
6	Bishankhedi	791
7	Ladwara	767
8	Rooppura	335
9	Tikod	384
10	Patunda	818
11	Papadli	1226
12	PSB Tail	724
13	**Total**	**8003**

Availability of Irrigation Water in Palayatha Sub Branch			
S. No	**Year**	**Availability of Water in Sub Branch (MCM)**	**Availability of Water in 13 Minors under RACP (MCM)**
1	2003-04	32.18	11.23
2	2004-05	53.80	19.32
3	2005-06	38.88	14.18
4	2006-07	40.75	15.67
5	2007-08	50.61	19.09
6	2008-09	24.14	9.34
7	2009-10	11.67	4.44
8	2010-11	18.74	7.49
9	2011-12	39.61	16.24
10	2012-13	40.84	16.31
11	2013-14	36.62	16.17
12	2014-15	40.89	16.11
13	2015-16	53.90	16.34
14	2016-17	49.72	17.76
Total		**532.35**	**199.69**
Avg. Availability/Yr		**38.03**	**14.26**

Water Saving and Cost of Rehabilitation

Total 1.56 Mcum water is to be saved through Rehabilitation and modernization of Palayatha sub branch system with an estimated cost of Rs.1351.26 Lacs.

6.2. Objectives of the Water Management in Palayatha Canal System

To achieve the objective of sub component under Surface Water Clusters, the rehabilitation / modernization of canal system & structures and construction activities as per the need would be done in the cluster. Also installation and modernization of measuring devices would be taken up by the department under the project. The main objective of these works is to reduce the water losses and at the same time to improve the conveyance efficiency of the canal system so that water availability to the crops at the outlet level may be increased. With the increase in water saving crop production as well as other farm activities would be better in the cluster.

The formation and strengthening of the Farmers Organizations i.e. Water Users Associations, Distributary Committees & Project Committees formed under **Rajasthan Farmers Participation in Management of Irrigation Systems Act 2000 (Act No.21 of 2000) (RFPMIS) by Water Resource Department (WRD)**. The ultimate objectives of the water management in canal system are:

i. To promote the distribution of water among the command area farmers on equitable basis.
ii. To promote the participation of Farmers Organizations in preparation and implementation of activities, implementation of canal operation plan and maintenance of canal network and canal structures.
iii. To promote awareness regarding due share of water and its receipt among farmers.
iv. To promote awareness regarding prevention of water theft in canal system.
v. To promote awareness regarding availability of canal water and accordingly deciding its use.
vi. To promote awareness for collection of water charges and getting the due share from GoR for the canal maintenance.
vii. To promote regular meetings of FOs and resolution of dispute among members.

viii. To ensure optimum & judicious utilization of canal water for the production activities

Studies/Field Surveys

The detailed survey / studies have been conducted through a technical agency by the department and at the same time a walk through survey with members of Water User's Associations (WUAs) has conducted to identify the problems faced by the members during the operation of the canal. The problems have been listed and prioritize based on the financial limit and technical feasibility. There are 12 Water Users Associations formed by Water Resources Department under Rajasthan Farmers Participation in Management of Irrigation System Act 2000 (RFPMIS). These WUAs were consulted during walkthrough survey are attached at Annexure – 6.1.

Deficiencies in Palayatha Sub Branch Canal system

As the command of lies in plain area and people having very small land holdings. They usually adopt traditional practices of sowing crops & irrigation practices by flooding method. It caused to consume more water, more consumption of fertilizer & less quantum of production. Due to illiteracy, they do not level their fields & more water supplied to the crops as irrigation. They think that if more water is applied then they would get more produce. The main problems encountered in the channels in terms of operation and maintenance is as under:

a) Lined canals are irregular, resulting in to less discharge than designed.
b) Absence of measuring devices.
c) Outlets requiring renovation.
d) Channels causing undesirable seepage, weed growth (water hyacinth)
e) Leakages in the main channels, minors and cross drainage structures resulting in wastage of water.

The deficiencies, mentioned above relate to engineering side of the project and have been experienced during O&M operations over the long period; the system has been in operation. Deficiencies relating to agronomical, administrative and legislative side of the project have not been addressed, as their impact on day to day working of the project is not appreciable.

Justification / Need for Rehabilitation and Modernization

The system under this technical estimate was constructed in the year 1960 as earthen channel. The anticipated conveyance losses have increased due to seepage losses from canal. Due to rat holes and crab holes, there has been a continuous problem of piping and breaches since 1960.The protection works of structures have been deteriorated and some of the structures are damaged. The masonry part of head regulators like wing wall, toe wall and earthen portion require repair and strengthening. Also most of the gates of regulators are either damaged or not in operating position. Some gates require minor repairing, oiling, greasing, alignment, nut & bolt, rods etc. Some of the vulnerable reaches of the Sub Branch minors were lined as and when budget was available, even then the condition of system is deteriorating day by day. Major length of canal is unlined. Considering the deteriorated condition of above Sub Branch &minors it has been decided to renovate them. Hence the discharge of the channels has been kept the same as per existing discharge. Water users associations are functioning and looking after the distribution of water among the association members. As per demand of Chairman of WUA's and practical need at site of work the road work to make them fair weather roads along the 13 minors has been proposed in the estimate. Based on the above facts, the above 13 minors/canals/ structures need to be rehabilitated and modernized.

6.3. Proposed Activities in the Canal Water System

The works related to Rehabilitation and modernization of canal system and structures based on the problems identified during the field survey and studies as discussed earlier have been proposed to achieve the objectives of canal water management i.e. to reduce water losses and to improve conveyance efficiency of canal system and simplify the monitoring of canal operation. Although the rehabilitation and modernization of canal system and structures

includes various items / works are proposed to be executed on canal system but main site specific investments are being in a MS Word & PDF file i.e. estimates which has been annexed at Annexure – 6.2. Out of these works some important / major works are being described as under:

Earthwork

Earthwork in excavation / filling is required to complete the design section. The quantities have been calculated on the basis of detailed survey of minors. The expansive soil may be used for strengthening of embankments of canal. Some of the portion of canal is below bed, so provision of earth work in embankments in hard soil, by laying in layers of 20 cm to obtain 98% of Standard Proctor's density has been taken in the estimate. Provision of compaction of earth by mechanical equipment such as a sheep foot roller / pneumatic tyre roller and watering with lead of 1 km also has been taken in the estimate. In small sections of canals rate of mechanically operated vibro- compactor has been adopted. Although the rehabilitation and modernization of canal system and structures includes various items / works are proposed to be executed on canal system.

Lining of Canal

As per the walkthrough survey and working L-sections of minors, judicious lining at vulnerable and filling reaches have been proposed on priority basis. Old lining which was in patches has been damaged at some places, which is to be replaced by new lining or repair work of lining, has been incorporated in estimate. Provisions in the estimate of revamping work have been taken as per the walk through survey and consultation with the WUA.

Reconstruction of Existing Lining & Structures and Proposal of New Works

Head Regulators / X-Regulator

Re-Construction of 13 nos. of Head regulators for ladwara minor, Ladwara Sub minor, Alipura minor, Tikod minor, Roopura minor, Patunda minor, and Patunda sub minor, Paperli minor, Paperli sub minor, tail minor left, tail minor right, tail sub minor right & tail direct minor.

DRB / VRB

The VRBs on the following channels were found fully damaged and new single span VRBs have been proposed for construction in place of damaged VRBs for smooth flow of traffic. The Safe bearing capacity of the soil has been taken as140.00 kN/m² for design purpose.

Syphon / Crossing Drain

The provision for renovation of 5 nos. siphons at minors of Palayatha sub branch.

Tail Wall / Tail Cluster

Tail wall of all the channel of all the channels under this package are damaged and new tail wall has to be constructed. The provision for all the minors has been made in the estimate. (Total nos-13).

Outlets

At present, conventional pipe outlets are in use in the canal system. Due to revamping of the canal system, demand of the time is to provide modular outlets, which give proportional discharge to the fields, irrespective of water level of field channel, but these outlets are never liked by the cultivators and Water User's Associations. Their demand is for simple pipe outlet for distribution of water among the cultivators. Therefore conventional pipe outlets with gated system have been proposed to be installed. In the estimate of outlets a pucca field channel of 15 meter has also been taken as part of outlet.

Cattle Ghat / Bathing Ghat

The Provision for Cattle Ghats & Bathing Ghats has been taken in the estimate as per according to requirement of WUA's. (Total nos.- 2 & 3).

Demonstration Board, Kilometre Stone, Gauge Plate and Venturi-Flume

Provision of direction and place identification semi reflective sign board as per IRC: 67 and the fixing of Reinforced Cement Concrete M-15 grade kilometre stone /local stone of standard design as per IRC: 8 has been made in the estimate. Provision of making standard type cement gauge including engraving letter and painting has also been taken to facilitate canal regulation."

Installation of Measuring Devices

The Measuring devices have been provided for channels having discharge more than 3 cusecs in view of the discussions with CAD Authorities.

The Measuring devices are incorporated as under:-

For channels less than 3 cusecs discharges the Standard practice of Gate opening vis-à-vis Discharge shall be used for discharge measurements.

For discharges more than 3 cusecs Venturi-flume will be provided. In every minor provision for discharge measuring venturi-flume has been made in the estimate.

6.4. Phasing of activities in Canal Command Area

The total estimated cost of activities in Palayatha Cluster is Rs.1351.126 Lacs. Out of this an amount of Rs.4.24 lacs have been incurred by the year 2016-17. The remaining estimated cost of rehabilitation and modernization of canal and structures including other works like institutional, training, operational cost has been phased out from the year 2017-18 to 2018-19 but if these works could not be executed during the prescribed time then the time has to be extended further. It is universal truth the renovation or repairing works on canal system can be done during summer season from April to June only. It means the monsoon and canal operation time has to be taken in to consideration as off season because during this time new work or repairing work execution is not possible. Keeping in mind everything would be fine and work will be executed smoothly and available project period, the project activities under this sub component has been phased out from 2017-18 to 2018-19. Accordingly the phasing of project activities proposed under this sub component is being summarized here as under:

Table 26 Investments for rehabilitation & modernization of Palayatha Distributary canal system

S. No.	Work Details / Investments	Amount (Rs. In Lacs)
1.	**Component 1: Climate Resilient Agriculture**	
1.1	Renovation & Modernization of Canal System (Main Canal, Distributaries, Minors & its structures etc.)	
1.1.1	Lining of Direct off taking Minors of Palayatha sub Branch Km.12.30 to 25.75	799.48
1.1.2	Renovation of Existing Structures on direct off taking Minor of Palayatha sub Branch Km. 12.30 to 25.75 Km.	200.36
1.1.3	Construction of New Structures on direct off taking Minors of Palayatha sub Branch Km.to 25.7 Km.	240.52
1.2	Survey and Investigation of Canal System & Preparation of DPR , Tender document etc.	4.00
	Sub Total	**1244.46**
2.	**Component 2: Market & Value Chain**	
3.	**Component 3: Farmers Organization & Capacity Building**	
3.1	Formation/ updation of WUAs	2.00
3.2	Construction of new/ repairing of WUAs Office Building	60.00
3.3	Providing of Computer Set with Printer & Furniture to WUAs	10.80
3.4	Honorarium to Community Resource Persons (CRP) provided to FOs	15.00
3.5	Training of WUA Member through IMTI Kota and other as per need	9.00
	Sub Total	**96.80**

S. No.	Work Details / Investments	Amount (Rs. In Lacs)
4.	**Component 4: Project Management, Monitoring & Learning**	
4.1	PIU operating costs including photostat, computer typing & printing, fax, mobility support (hired taxi / POL), TA/DA etc.	10.00
	Sub Total	**10.00**
	Total Cost of Components 1 to 4	**1351.26**

Proposed Outcome of Rehabilitation and Modernization of canal system under RACP

Particulars	Existing	Proposed
Irrigated Culturable command area (ICA)	1879 ha	2140 ha
Intensity of Irrigation (% age of CCA)	65%	74%
Field Application Efficiency	60%	60%
Conveyance Efficiency	55%	75%

6.5. Benefit Cost Ratio

The Cost and Benefit ratio of this investment has been calculated keeping in mind agricultural and horticultural present and proposed cropping pattern and area irritated after rehabilitation of canal system. The final cost benefit ratio 1.72 has been driven in this cluster. The investment to be made on other sub component other than agriculture and horticulture has not been taken in to consideration. The B: C ratio of the project investments is being summarized at Annexure 6.3.

Institutional Activities

a. Total twelve (12) Water User Associations (WUAs) are formed by the department as per Rajasthan Farmers Participation in Management of Irrigation System (RFPMIS) Act 2000.
b. The construction of WUA's Office building have also been proposed in the cluster
c. Office furniture and Computer with printers will be provided to each WUA.
d. One Community Resource Person (CRP) to each WUA is to be provided for support of various activities like functioning of WUA's office, maintenance of office records and registers as per PIM Act, estimation of irrigated area, collection of water charges etc.
e. Training and capacity building of members of WUAs,
f. The WUAs would ensure quantity and quality of works of rehabilitation and modernization of canal and structures and other repairing works,
g. The WUAs will inform the department regarding any suggestions related to the works being implemented on the works,
h. The WUAs will also act as per the PIM Act 2000.

Trainings

The training is very significant activity towards achieving project development objective under RACP. The project success is totally depends on successful implementation of trainings under the project. The objective of this activity is to build capacity of Community Groups and farming community as well as project staff so that the objectives of Canal Water management may be achieved under RACP. Time bound and regular trainings programmes would be required under the project.

Training Needs for Surface Water Management:

Canal irrigated areas, with typically low water use efficiencies and out-dated irrigation management practices, are the only areas within Rajasthan where major saving of water are potentially possible for diversion to other, non-agricultural water uses, through appropriate system improvements, adoption of modern management practices/instruments, and appropriate policy interventions. In case of canal irrigated clusters, therefore, the focus will be

to reduce the water foot print in agriculture (without reducing the present area under irrigation or the cropping intensity/farmers income) through improving the water use efficiencies at all levels of the system, and using the water thus saved to other sectors of water uses (such as drinking water)

Mass Awareness and Orientation Programme for Farmers

All the farmers have equal rights to take benefit from the irrigation system. To ensure active participation of farmers in irrigation system Rajasthan Govt. has made provision of Farmer's Participation in Management of Irrigation System Act, 2000 and Rule 2002.

In the present situation, due to lack of farmer's participation there is unequal distribution of water amongst farmers and misuse of water. Powerful farmers get more benefits through illegal approach by interrupting in main canal, distributary and minor. Small and poor farmers and farmers of tail end area are getting less benefit and the disputes are taking place amongst farmers. So to ensure their active participation in irrigation management a mass awareness training camp on PIM has been proposed.

6.6. Phasing of Activities in Canal Command Area

The total estimated cost of activities in Palayatha Cluster is Rs.1351.26 Lacs. Out of this an amount of Rs.4.14 lacs have been incurred by the year 2016-17. The remaining estimated cost of rehabilitation and modernization of canal and structures including other works like institutional, training, operational cost has been phased out from the year 2017-18 to 2018-19 but if these works could not be executed during the prescribed time then the time has to be extended further. It is universal truth the renovation or repairing works on canal system can be done during summer season from April to June only. It means the monsoon and canal operation time has to be taken in to consideration as off season because during this time new work or repairing work execution is not possible. Keeping in mind everything would be fine and work will be executed smoothly and available project period, the project activities under this sub component has been phased out from 2017-18 to 2018-19. Accordingly the phasing of project activities proposed under this sub component is being summarized here as under:

6.7. Implementation Arrangement for all the planned activities in the Canal Command Area

Planning and implementation of the project activities are being done by the line department i.e. Water Resource Department. At the state level a Planning and Implementation Unit (PIU) has been established headed by a Nodal Officer under the control of Chief Engineer Quality Control & Vigilance for monitoring the planning and implementation activities of surface water sub plan. The planning and implementation including procurement activities will be done at zonal level by respective Chief Engineer / Addl. Chief Engineer of respective Water Resources zones. The detail for this cluster is as below:

Cluster	District	Concern Executive Engineer	Concern Superintending Engineer	Concern Zonal Officer
Palayatha Sub Branch of Chambal Right Main Canal	Baran	RMC Division – II, CAD, Antah	CAD, Chambal Project Circle, Kota	Chief Engineer CAD (East) Jaipur

At the State level, in addition to Steering Committee i.e. Apex Body & Executive Committee, Project Management Unit (PMU) has been established under the society i.e. RACPMIS and dedicated Project Implementation Unit (PIU).The PMU & PIU will be having an effective coordination and to provide a robust governance and coordination mechanism for the project. To support livestock activities and supply of bucks and does the Rajasthan University of Veterinary and Animal Sciences (RAJUVAS), Bikaner has been added in the project as Partner

Agency and similarly a MOU has been signed with the ARAVALI for support in community mobilization and other training activities for the project.

At District Level: At district level the concerning Executive Engineer Water Resource controlling the selected canal system is Project Implementation Agency (PIA) has been assigned for planning and implementation of project activities in the cluster. Although one Programme Assistant (Surface Water) has been deputed with the PIA but Executive Engineer and his office has been designated by the department for entire planning and implementation of the surface water sub plan activities in the cluster with the needed support of WUAs and field level NGO under overall supervision of PIU and District-Level Implementation Committee (DLIC). DLIC is headed by the District Collector with District Project Manager (RACP) as member secretary already established under the RACPMIS. DLIC will also maintain convergence at the district, Zilla Parishad level to PRIs at block and GP level.

At Cluster Level: A field level NGO has been deployed in the cluster to support implementation of activities in the cluster. In addition to Team Leader, Community Mobilization Specialist, Community Organizers, a Water Resource Assistant is with the NGO to support field level activities in the cluster. As per the operational guidelines issued under the project, the Multi Task Groups, Multi Task Associations, User's Groups and Farmer Producer Company are being formed in the cluster. Participation of these Institutions would be ensured in implementation of project activities to maintain quality and quantity. For support of other technical activities in the cluster the Agriculture & Horticulture Assistants are also deployed with the NGO to support related activities in the cluster.

Chapter – 7: Social & Environmental Management Plan

7.1. Social Management Plan (SMP)

The SMP is described to minimize or mitigate any adverse social and livelihood impacts emanating from various sub-projects supported by the RACP project. The SMP will be used for developing appropriate social mitigation strategies, and mechanisms for minimizing the risks and expected adverse impacts. In addition, the SMP also includes strategies for consultation and participation, social mobilization and inclusion, gender and women's empowerment and social risk management.

The SMP therefore provides guidelines to assess the social impact of all the sub-projects and design cluster-specific plans, including the tribal development plan and the resettlement/ rehabilitation assistance plans. Overall, the SMP aims to avoid/minimize risks, avoid exacerbation of social and economic disparities between and among social groups, ensure equitable spread of project investments and benefits, and contribute to long-term social and institutional sustainability of the RACP.

SMP consists of the following strategies:

- Social baseline information
- Consultant held - Key social issue of cluster
- Social mobilisation strategy
- Targeting and beneficiary selection criteria for project goods/services
- Subproject require social impact screening and rehabilitation assistance

Social baseline information (Palayatha Cluster):-

Project Area covers an area of 8003 hectare (ha) comprising ten (10) Gram Panchayats and twenty seven (27) villages. The Cluster village has a population of 27564 of which 14266 are males while 13298 are females as per field survey by NGOs. In the cluster scheduled caste 6049 and scheduled tribe category 2259 folk. Cluster had household of 5292 of which of which small farmer 2114, marginal farmer 1902, large farmer 792 and remaining farmer landless.

Consultant held - Key social issue of the Cluster

Major issues in the Palayatha cluster that emerged from the farmer and group consultations during field visit are summarized below.

a. Women folk believe that though they do most of the work in agriculture except for ploughing and selling, they have no role in decision making regarding purchase of inputs or selling of produce.
b. Women are not recognized as farmers in their own right.
c. Problem of access to credit by small and marginal farmers.
d. Lack of timely supply of agriculture inputs including seed and fertilizers.

e. Marginalization of small and marginal farmers in technologies and investments, training and capacity building.
f. Lack of breed improvement and livestock health care services.
g. Outreach of extension services very low in villages.
h. Community based organizations (multi task groups, multi task group - goat) should be integrated into the Farmer Producer Companies (FPC) that will be facilitated in the RACP.

The project does not envisage acquisition of any private land for purposes of storage, processing or any other activity. There will be no adverse impacts related to land acquisition. Therefore abbreviated resettlement plan does not require at cluster level. The detailed social management plan can be referred from Annexure 7.1.

7.2. Environment Management Plan (EMP)

The key interventions under RACP can be grouped as under:-

- Crop intensification
- Water Management
- Livestock management
- Value chain development activities

Environment Management Plan for Crop Intensification/Water management /Livestock Management/ Value Chain development activities

The key objective of interventions in crop production is to increase crop productivity so that farmer income is also enhanced. The dominant and "business-as-usual" approach to achieving this is to intensify crop production by introducing hybrid seed varieties that respond well to chemical fertilizers and apply chemical pesticides to control pests and diseases that attack the crop. The RACP proposes to adopt "green" agricultural practices that would promote Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) and therefore, the possibility of excessive use of agri-chemicals is largely mitigated.

Rehabilitation of distributaries has no major adverse environment impact since this related to only rehabilitation and not construction of new structures. Activities in rehabilitation are bring the canal components to their originally designed parameters i.e. restoring them to original section and the canal capacities etc. including remodelling /re-sectioning, re-aligning of canal

The project proposes to provide health care through organizing Animal Health Camps and also by providing permanent services through a Rural Technology Centre-cum-Animal Health Centre. The likely impacts of these are issues related to safe disposal of syringes, needles and vaccines used in treating the animals.

Storage and processing of produce are activities expected to be taken up under value chain development component of the RACP. The operations include input supply to its members, output marketing and processing support to its members, providing warehousing facility, Food processing Unit, etc. These activities when carried out in a "business-as-usual" manner would affect the environment in one way or the other.

The Line Department /NGO/ Design consultants/engineers /FPC for designing and executing the structures will abide by the Environmental measures listed in the Environment Management Plan (EMP) given below. The Line Department shall include the EMP requirements in the Programme of RACP Works. The requirements stated in the EMP should therefore be studied properly and implemented accordingly.

Chapter – 8: Consolidated investment plan with budget and source of funds

8.1. Procurement and Financial Management

The financial management and procurement aspects are at the core and are stated in the Loan Agreement, Project Agreement, Disbursement Letter and detailed in the Project Financial Management Manual (PFMM) and Project Procurement Manual (PPM). Accordingly both the PFMM and PMM have already been shared with all agencies (The PMU, DPMU, Jaipur the six Line departments and partner agencies) to ensure consistency and compliance. While the Financial Management aspects include: Planning and Budgeting, Funds Flow, Accounting, Reporting, Internal Control, including internal Audit and External Audit the Procurement aspects include procurement planning, use of standard bid documents, contract management aspects and procurement prior and post review based on threshold in agreed procurement plan.

The procurement is done as per the procurement plan approved by the World Bank and Procurement Manual & World Bank Procurement Guidelines are followed. As far as fund flow management is concerned, fund management is done as per the Financial Management Manual.

Financial Management and Procurement Framework for releases of funds to WUAs/FPCs/Individual Beneficiaries (IBs) under grants, as mentioned above the procurement will be done as per the Procurement Management Manual (PMM) and fund flow will be done as per the Financial Management Manual (FMM). In this cluster, WUAs have been formed and Farmer Producer's Companies (FPCs) are to be formed. The related activities are to be performed by these WUAs /FPCs/Individual Beneficiaries (IBs). A Community Resource Person (CRP) is being deployed with each of the WUAs and Chief Executive Officer (CEO) is to be deployed with each of the FPC in the cluster. These CRPs/CEOs will be paid based on the performance. The certain works have been assigned to them to be performed by them. Following actions are needed:

- A fiduciary capacity assessment of WUAs /FPCs/IBs shall be carried out by the Bank. (This shall be completed by assessing a representative sample of WUAs/FPCs/IBs, as determined by the Bank.)
- Based on the completed assessment, appropriate mitigation measures, including issuing the fiduciary guidelines; availability of procurement and financial management point person at their level and capacity building shall be adopted.
- Some activities like institutional & infrastructure support to Farmer's Producer Companies and Post-Harvest Management support to be given to individual farmers which are to be treated as **grant** in Agriculture and Horticulture departments. Upon

verification that above actions have been completed, funds flow to WUAs/MTAs/FPCs/IBs through Grants under approved sub projects as part of the CACPs can be initiated.

8.2. Investment Plan

The **consolidated investment plan** has been explained in the concerned chapters to make the area and farmers of the cluster competitive so that they can get optimum water as well crop's productivity. An estimated consolidated investment amount of **Rs.3404.86 Lakh** would be incurred on various activities. The source of funds is credit available in components of Rajasthan Agricultural Competitiveness Project (RACP). The department, major activity and component wise investment plan with budget are being summarized as under:

Table 27 Consolidated Investment Plan

S. No.	Department	Components (Rs. Lakh)				
		Climate Resilient Agriculture	Market & Value Chains	Farmer's Organization and Capacity Building	Project Management and M&E	Total
1	Water Resource management	1244.46	0.00	96.80	10.00	**1351.26**
2	Agriculture	559.88	232.00	144.67	10.62	**947.17**
3	Horticulture	585.20	0.00	36.00	11.00	**632.20**
4	Livestock	417.99	15.00	27.98	13.26	**474.23**
	Total	**2807.53**	**247.00**	**305.45**	**44.88**	**3404.86**

Above table reveals that investments related to improvement of water use efficiency, transfer of technology and market led advisory services, livestock strengthening, market infrastructure and value chain development an estimated total amount of **Rs.3404.86 lakh** likely to be incurred in the cluster to make the farmer and cluster competitive and to maximize water as well as agricultural productivity in the cluster.

8.2.1. Consolidated Investment Plan – by nature of expenditure:

Investments related to improvement of water use efficiency, transfer of technology and market led advisory services, livestock strengthening, market infrastructure and value chain development an estimated total amount of **Rs.3404.86 lacs** likely to be incurred in the cluster to make the farmer and cluster competitive and to maximize water as well as agricultural productivity in the cluster.

Table 28: Consolidated Investment Plan – by nature of expenditure

Type of Expenditure/ Line Dept.	Water Resource	Agriculture	Horticulture	Animal Husbandry	Total
Goods	10.80	412.03	393.57	208.12	**1024.52**
Works	1300.46	2.22	0.00	120.00	**1422.68**
Consultant Services	4.00	120.09	0.00	50.00	**174.09**
Operating Costs	10.00	18.13	11.00	41.33	**80.46**
Training	11.00	26.58	36.00	27.98	**101.56**
Grants	15.00	116.00	20.00	0.00	**151.00**
Beneficiary Contribution	0.00	252.12	171.63	26.80	**450.55**
Total	**1351.26**	**947.17**	**632.2**	**474.23**	**3404.86**

Note:

1. The column for "Grants" would state project's share for any goods/services provided to WUAs/FPCs/IBs and column for "Beneficiary contribution" will include share of WUAs/FPCs/IB.

2. The proposed activities in the CACP will be implemented as per the subject specific operational guidelines already approved. The revisions in the guidelines have been made as per the reply sent to the World Bank and committed during the Mid Term Review (MTR) and approved in the meetings of Executive Committee held till now. If any change in subject specific operational guidelines in future is to be made during the course of implementation, then it would be applicable accordingly.

Annexure 2.1 Gram Panchayat and Village wise area in Palayatha Cluster

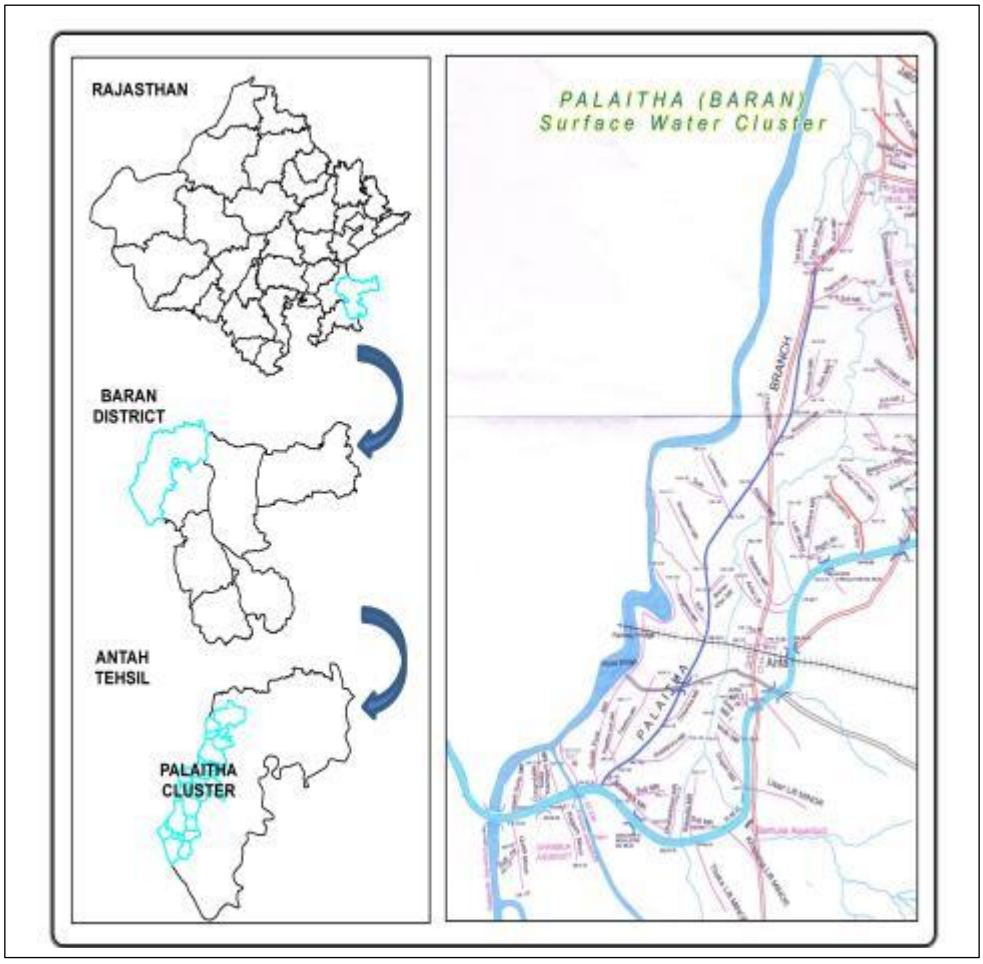
Table29. Gram Panchayat and Village wise area in Palayatha Cluster

Sr. No.	Name of Village	Gram Panchayat	Tehsil	Village wise CCA (ha)	% Village CCA of Cluster CCA
1.	Palayatha	Palayatha	Antah	749.20	9.36%
2.	Patunda	Patunda	Antah	720.40	9.00%
3.	Nagda	Thikariya	Antah	664.80	8.31%
4.	Baldara	Baldara	Antah	502.70	6.28%
5.	Thikariya	Thikariya	Antah	444	5.55%
6.	Udpuriya	Udpuriya	Mangrol	409.60	5.12%
7.	Dugari	Thikariya	Antah	406.40	5.08%
8.	Bhojya Khedi	Bhojya Khedi	Antah	380	4.75%
9.	Raipura	BhojyaKhedi	Antah	368	4.60%
10.	Dhakarkhedi	Bamuliya mataji	Antah	339.60	4.24%
11.	Bamori Anta	Nagarpalika Antan	Antan	335	4.19%
12.	Ladwara	BhojyaKhedi	Antah	332.40	4.15%
13.	Bishan Khedi	BhojyaKhedi	Antah	296.40	3.70%
14.	Balakhera	Balakhera	Antah	260	3.25%
15.	Sonwa	Udpuriya	Mangrol	216	2.70%
16.	Alipura	Balakhera	Antah	210.50	2.63%
17.	Pipalda	Udpuriya	Mangrol	200.80	2.51%
18.	Gopalpura	Amalsara	Antah	194.40	2.43%
19.	Tikhod	Baldara	Antah	170.40	2.13%
20.	Papadli	Udpuriya	Mangrol	170.40	2.13%
21.	Gulabpura	Amalsara	Antah	148.80	1.86%
22.	Roop Pura	Baldara	Antah	132.40	1.65%
23.	Amalsara	Amalsara	Antah	127.60	1.59%
24.	Seeswali	Seeswali	Mangrol	105	1.31%
25.	Singhpuri	Baldara	Antah	85	1.06%
26.	Ganeshpura	Baldara	Antah	20	0.25%
27.	Godawari	Udpuriya	Mangrol	13.20	0.16%
	Total CCA			**8003**	100.00%

(Source: Water Resource Department DPR of Palayatha Cluster)

The index map of Palayatha cluster is presented as under:

Figure 7: Index Map of Palayatha cluster



Annexure 2.2 Trend of change in cropped area and cropping over 10 years in Rajasthan & Baran district

Table 30 Area (in ha %) of Agricultural Crops in 2006-07 & 2015-16, increase / decrease over 10 years in State & Baran district

Crops	State							Baran district							
	2006-2007		2015-2016		Increase (+)/Decrease (-) over 10 Years		Average Area (ha) (06-7 to 15-16)	2006-2007		2015-2016		Increase (+)/Decrease (-) over 10 Years		Average Area (ha) (06-7 to 15-16)	% area in district over state average
	Area (ha)	% area	Area (ha)	% area	Area (ha)	% area		Area (ha)	% area	Area (ha)	% area	Area (ha)	% area		
Kharif															
Soybean	641114	3.51%	1204773	6.60%	563659	3.09%	**905231.70**	121157	34.32%	274452	77.75%	153295	43.43%	**213397.10**	23.57%
Rice	107758	0.59%	182877	1.00%	75119	0.41%	**140697.80**	1838	0.52%	182877	51.81%	181039	51.29%	**24156.70**	17.17%
Black Gram	107946	0.59%	298714	1.64%	190768	1.05%	**180374.40**	530	0.15%	20897	5.92%	20367	5.77%	**4963.90**	2.75%
Rabi															
Wheat	2564840	14.04%	3108973	17.02%	544133	2.98%	**2851321.60**	85963	24.35%	159434	45.16%	73471	20.81%	**134823.40**	4.73%
Mustard	3099570	16.97%	2532330	13.86%	-567240	-3.11%	**2561288.30**	168825	47.82%	92472	26.20%	-76353	-21.62%	**96821.70**	3.78%

Taramira	112107	0.61%	16792	0.09%	-95315	-0.52%	**206125.00**	164	0.05%	31	0.01%	-133	-0.04%	**366.30**	0.18%
Spices															
Garlic	18163	0.10%	69099	0.38%	50936	0.28%	**40127.70**	1978	0.56%	22888	6.48%	20910	5.92%	**10045.90**	25.03%
Fenugreek	40495	0.22%	157004	0.86%	116509	0.64%	**73448.30**	685	0.19%	1923	0.54%	1238	0.35%	**688.50**	0.94%
Coriander	131137	0.72%	212725	1.16%	81588	0.44%	**209083.40**	42961	12.17%	44953	12.73%	1992	0.56%	**58165.70**	27.82%

(Source: Agriculture department, Baran)

Table 31 Area (ha) in Major crops for 10 Years (2006-07 to 2015-16) in State as well as in Baran District

Crops	State										Baran District									
	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Soybean	641114	797587	829450	778382	765494	897042	1039838	1175502	923135	1204773	121157	200166	208708	194417	195086	234324	276189	307778	121694	274452
Rice	107758	127807	133418	150691	131126	134337	125635	145577	167752	182877	1838	3408	6401	8298	8231	6129	3698	6023	14664	15666
Black Gram	107946	144744	137230	116377	127792	255221	218009	195998	201713	298714	530	2159	1311	1049	2554	7836	5429	1212	6662	20897
Wheat	2564840	2591804	2294848	2394215	3036141	2935341	3063202	3205604	3318248	3108973	85963	106699	95802	105609	147930	142589	167037	162852	174319	159434
Mustard	3099570	2458197	2738014	2212339	2489906	2441254	2424956	2782539	2433778	2532330	168825	83203	108438	114176	77635	65192	89736	95202	73338	92472
Taramira	112107	38109	100120	97542	118873	60994	109785	296459	40604	16792	164	397	439	824	1508	188	80	18	14	31
Garlic	18163	35568	24118	24671	31440	59446	43601	45015	50156	69099	1978	5308	3796	5159	7446	17645	9901	11734	14604	22888
Fenugreek	40495	49797	62934	58917	80364	82350	65548	55375	81699	157004	685	1043	1934	402	232	307	45	28	286	1923
Coriander	131137	212841	245198	232139	198052	267827	158879	182726	249310	212725	42961	82808	90683	11423	59979	85432	45890	52713	64815	44953

(Source: Agriculture department, Baran)

Table 32: Cropping Pattern (%) of 10 Years (2006-07 to 2015-16) in State as well as in Baran District

Crops	State										Baran District									
	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Soybean	3.51 %	4.37 %	4.54 %	4.26 %	4.19 %	4.91 %	5.69 %	6.43 %	5.05 %	6.60 %	34.32%	56.70 %	59.12 %	55.07 %	55.26 %	66.38 %	78.24 %	87.19 %	34.47 %	77.75 %
Rice	0.59 %	0.70 %	0.73 %	0.82 %	0.72 %	0.74 %	0.69 %	0.80 %	0.92 %	1.00 %	0.52%	0.97 %	1.81 %	2.35 %	2.33 %	1.74 %	1.05 %	1.71 %	4.15 %	51.81 %
Black Gram	0.59 %	0.79 %	0.75 %	0.64 %	0.70 %	1.40 %	1.19 %	1.07 %	1.10 %	1.64 %	0.15%	0.61 %	0.37 %	0.30 %	0.72 %	2.22 %	1.54 %	0.34 %	1.89 %	5.92 %
Wheat	14.04 %	14.19 %	12.56 %	13.11 %	16.62 %	16.07 %	16.77 %	17.55 %	18.16 %	17.02 %	24.35%	30.23 %	27.14 %	29.92 %	41.91 %	40.39 %	47.32 %	46.13 %	49.38 %	45.16 %
Mustard	16.97 %	13.46 %	14.99 %	12.11 %	13.63 %	13.36 %	13.27 %	15.23 %	13.32 %	13.86 %	47.82%	23.57 %	30.72 %	32.34 %	21.99 %	18.47 %	25.42 %	26.97 %	20.78 %	26.20 %
Taramira	0.61 %	0.21 %	0.55 %	0.53 %	6.51 %	0.33 %	0.60 %	1.62 %	0.22 %	0.09 %	0.05%	0.11 %	0.12 %	0.23 %	0.43 %	0.05 %	0.02 %	0.01 %	0.00 %	0.01 %
Garlic	0.10 %	0.19 %	0.13 %	0.14 %	0.17 %	0.33 %	0.24 %	0.25 %	0.27 %	0.38 %	0.56%	1.50 %	1.08 %	1.46 %	2.11 %	5.00 %	2.80 %	3.32 %	4.14 %	6.48 %
Fenugreek	0.22 %	0.27 %	0.34 %	0.32 %	0.44 %	0.45 %	0.36 %	0.30 %	0.45 %	0.86 %	0.19%	0.30 %	0.55 %	0.11 %	0.07 %	0.09 %	0.01 %	0.01 %	0.08 %	0.54 %
Coriander	0.72 %	1.17 %	1.34 %	1.27 %	1.08 %	1.47 %	0.87 %	1.00 %	1.36 %	1.16 %	12.17%	23.46 %	25.69 %	3.24 %	16.99 %	24.20 %	13.00 %	14.93 %	18.36 %	12.73 %

(Source: Agriculture department, Palayatha)

Table 33: Area (in lac ha), Production (in lac MT) and Productivity (in Kg/ha) in the State

Crops	Details	State											
		2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Deviation over 10 year	Average of 10 Years
Soybean	Area	641114	797587	829450	778382	765494	897042	1039838	1175502	923135	1204773	563659	**905231.70**

Crops	Details	State											
		2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Deviation over 10 year	Average of 10 Years
	Production	771347	1071228	805717	914601	1118097	1385123	1468693	974987	956552	804066	32719	**1027041.10**
	Productivity	1203	1343	971	1175	1461	1544	1412	829	1036	667	-536	**1164.10**
Rice	Area	107758	127807	133418	150691	131126	134337	125635	145577	167752	182877	75119	**140697.80**
	Production	169823	259626	241082	228284	265545	2533620	222514	312564	366676	369780	199957	**496951.40**
	Productivity	1576	2031	1807	1515	2025	1886	1771	2147	2186	2022	446	**1896.60**
Black Gram	Area	107946	144744	137230	116377	127792	255221	218009	195998	201713	298714	190768	**180374.40**
	Production	31557	76643	40590	30572	94156	131689	125279	70561	112228	114592	83035	**82786.70**
	Productivity	292	530	296	263	737	516	575	360	556	384	92	**450.90**
Wheat	Area	2564840	2591804	2294848	2394215	3036141	2935341	3063202	3205604	3318248	3108973	544133	**2851321.60**
	Production	7755883	7124921	7287016	2384808	10424350	10160427	10766607	11020139	9823876	10468161	2712278	**8721618.80**
	Productivity	3024	2749	3175	3133	3433	3461	3515	3438	2961	3367	343	**3225.60**
Mustard	Area	3099570	2458197	2738014	2212339	2489906	2441254	2424956	2782539	2433778	2532330	-567240	**2561288.30**
	Production	3766923	2196676	3465942	2912294	3883300	2950312	3759937	3620846	2878935	3257987	-508936	**3269315.20**
	Productivity	1215	957	1266	1316	1560	1209	1380	1301	1183	1287	72	**1267.40**
Tarameera	Area	112107	38109	100120	97542	1188738	60994	109785	296459	40604	16792	-95315	**206125.00**
	Production	38691	10327	13586	35910	486366	25979	54634	176292	16772	7279	-31412	**86583.60**
	Productivity	345	271	365	368	409	426	498	595	413	433	88	**412.30**
Garlic	Area	18163	35568	24118	24671	31440	59446	43601	45015	50156	69099	50936	**40127.70**
	Production	96875	196854	115973	98411	186410	235979	184854	218217	172037	377486	280611	**188309.60**
	Productivity	5334	5535	4809	3989	5929	3970	4240	4848	3403	5463	129	**4752.00**
Fenugreek	Area	40495	49797	62934	58917	80364	82350	65548	55375	81699	157004	116509	**73448.30**
	Production	50062	48914	77369	70328	94182	87382	71565	64101	84186	190362	140300	**83845.10**

Crops	Details	State											
		2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Deviation over 10 year	Average of 10 Years
	Productivity	1166	982	1229	1194	1172	1061	1092	1158	1030	1212	46	**1129.60**
Coriander	Area	131137	212841	245198	232139	198052	267827	158879	182726	249310	212725	81588	**209083.40**
	Production	155101	166033	273693	287076	219077	329402	186894	117084	198764	227203	72102	**216032.70**
	Productivity	1183	780	116	1211	1106	1230	1176	641	797	1068	-115	**930.80**

(Source: Agriculture department, Palayatha)

Table 34: Area (in ha), Production (in Tonnes) and Productivity (in Kg/ha) in the Baran district

Crops	Details	Baran											
		2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Deviation over 10 year	Average of 10 Years
Soybean	Area	121157	200166	208708	194417	195086	234324	276189	307778	121694	274452	153295	**213397.10**
	Production	174412	270066	191400	224344	357107	444702	429819	124034	116008	155787	-18625	**248767.90**
	Productivity	1440	1349	917	1154	1831	1898	1556	728	953	568	-872	**1239.40**
Rice	Area	1838	3408	6401	8298	8231	6129	3698	6023	14664	15666	13828	**7435.60**
	Production	3571	10596	20058	18491	23800	13737	14322	16329	51391	39515	35944	**21181.00**
	Productivity	1983	3109	3134	2228	2892	2241	2791	2711	3505	2522	539	**2711.60**
Black Gram	Area	530	2159	1311	1049	2554	7836	5429	1212	6662	20897	20367	**4963.90**
	Production	294	944	684	971	1608	5614	2698	429	3248	6705	6411	**2319.50**
	Productivity	555	437	522	926	630	716	497	354	488	321	-234	**544.60**
Wheat	Area	85963	106699	95802	105609	147930	142589	167037	162852	174319	159434	73471	**134823.40**
	Production	311235	105541	346163	397171	514045	543296	73536	551485	667888	670807	359572	**418116.70**
	Productivity	3621	3281	3613	3761	3475	3810	4373	3386	3831	4207	586	**3735.80**
Mustard	Area	168825	83203	108438	114176	77635	65192	89736	95202	73338	92472	-76353	**96821.70**

Crops	Details	Baran											
		2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Deviation over 10 year	Average of 10 Years
	Production	221067	81582	105483	164496	122116	101185	155570	96818	110043	150010	-71057	**130837.00**
	Productivity	1309	1810	1403	1441	1573	1552	1734	1017	1500	1622	313	**1496.10**
Tarameera	Area	164	397	439	824	1508	188	80	18	14	31	-133	**366.30**
	Production	57	108	160	303	617	80	40	11	6	13	-44	**139.50**
	Productivity	348	272	364	368	409	426	500	611	429	419	71	**414.60**
Garlic	Area	1978	5308	3796	5159	7446	17645	9901	11734	14604	22888	20910	**10045.90**
	Production	11175	35406	23229	30152	42310	12829	6349	44473	53651	94314	83139	**35388.80**
	Productivity	5650	6670	8000	5845	5682	727	641	3790	3674	4121	-1529	**4480.00**
Fenugreek	Area	685	1043	1934	402	232	307	45	28	286	1923	1238	**688.50**
	Production	2036	1653	2414	571	272	498	67	17	376	2332	296	**1023.60**
	Productivity	1528	1585	1248	1420	1172	1622	1489	607	1315	1213	-315	**1319.90**
Coriander	Area	42961	82808	90683	11423	59979	85432	45890	52713	64815	44953	1992	**58165.70**
	Production	54045	81152	110647	100236	86179	115321	66071	30254	60824	63645	9600	**76837.40**
	Productivity	1258	980	1220	1295	1437	1350	1440	574	938	1416	158	**1190.80**

(Source: Agriculture department, Palayatha)

Annexure 2.3 Farmers' category wise Cultivated Area in Palayatha Cluster

Table35 Farmers' Category wise Cultivated Area in Palayatha Cluster

Type of Farmer	Total Households (Nos)	Area (in ha)			Area (in ha) Category wise			
		Command	Non Command if any	Total	General	SC	ST	OBC
(i) Large farmer	792	3108	0	3108	1146	156	108	1697
(ii) Small farmer	2114	4053	0	4053	1494	203	143	2213
(iii) Marginal farmer	1902	842	0	842	311	42	30	460
(iv) Landless person	484		0					
(V)No. of BPL households	1828		0					
Total (1 to 4)	**5292**	**8003**	**0**	**8003**	**2951**	**401**	**281**	**4370**
Category wise Cultivated Area in Palayatha (Command) Cluster in %								
Large farmer	14.97%	38.84%	0.00%	38.84%	14.32%	1.95%	1.35%	21.20%
Small farmer	39.95%	50.64%	0.00%	50.64%	18.67%	2.54%	1.79%	27.65%
Marginal farmer	35.94%	10.52%	0.00%	10.52%	3.89%	0.52%	0.37%	5.75%
Landless person	9.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
No. of BPL households	34.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total (1 to 4)	100.00%	100.00%	0.00%	100.00%	36.87%	5.01%	3.51%	54.60%

(Source: Watershed DPR of Palayatha Cluster)

Annexure 2.4 Status of Cropped area of Crops in Palayatha cluster

The cropped area has been compiled from the data collected while Participatory Rural Appraisal (PRA) which was performed by the NGO during the year 2016-17.

Table 36 The Status of Cropped area of Crops in Palayatha cluster

S. No.	Crops	2006-07		2015-16		Deviation over 10 Years	
		Area in ha	Area in %	Area in ha	Area in %	Area in ha	Area in %
A.	**Kharif**						
1	Soybean	5201	64.99%	6840	85.47%	1639	20.48%
2	Black Gram	960	12.00%	288	3.60%	-672	-8.40%
3	Paddy	70	0.87%	72	0.90%	2	0.02%
	Total	**6231**	**77.86%**	**7200**	**89.97%**	**969**	**12.11%**
B.	**Rabi**						
1	Wheat	5582	69.75%	4368	54.58%	-1214	-15.17%
2	Coriander	543	6.78%	156	1.95%	-387	-4.84%
3	Mustard	1482	18.52%	780	9.75%	-702	-8.77%
4	Garlic	311	3.89%	2496	31.19%	2185	27.30%
	Total	**7918**	**98.94%**	**7800**	**97.46%**	**-118**	**-1.47%**
	Grand Total	**14149**	**176.80%**	**15000**	**187.43%**	**851**	**10.63%**

(Source: Agriculture department, Palayatha & Watershed DPR, Palayatha)

Table37 Crop wise area (in ha) of Horticultural crops in Palayatha Cluster

Season/Crop	Area (ha)	Cropping intensity/pattern (%)
Vegetable		
Brinjal	24	0.30%
Chilly	8	0.10%
Tomato	14	0.17%
Okra	15	0.19%
Total	**61**	**0.76%**
Spices		
Garlic	2496	31.19%
Coriander	156	1.95%
Fenugreek	18	0.22%
Total	**2670**	**33.36%**
Fruits		

Guava	36	0.45%
Lemon	10	0.12%
Total	**46**	**0.57%**
Total Horticulture fruits	**2777.00**	**34.70%**

(Source: Agriculture department, Baran)

Table 38: Status of cropped area, Production and Productivity in Palayatha Cluster

S. No.	Season/Crop	Palayatha Cluster			Productivity (kg/ha)		
		Area (ha)	Cropping intensity/pattern (%)	Production (MT)	Palayatha	District	Increase (+) / Decrease (-) over district average
A.	**Kharif**						
1	Soybean	6840.00	85.47%	9576.00	1400	1157	244
2	Black gram	288.00	3.60%	230.00	799	491	307
3	Paddy	72.00	0.90%	432.00	6000	4335	1665
	Total	**7200.00**	**89.97%**				
B.	**Rabi**						
1	Wheat	4368.00	54.58%	19656.00	4500	3840	660
2	Mustard	780.00	9.75%	1560.00	2000	1425	575
	Total	**5148.00**	**64.33%**				
	Grand Total	**12348.00**	**154.29%**				
C.	**Vegetable**						
1	Brinjal	24	0.30%	20.00	833	14344	-13511
2	Chilly	8	0.10%	100.00	12500	1845	10655
3	Tomato	14	0.17%	100.00	7143	1152	5991
4	Okra	15	0.19%	105.00	7000	1599	5402
	Total	**61**	**0.76%**				
D.	**Spices**						
1	Garlic	2496	31.19%	14976.00	6000	2682	3318
2	Coriander	156	1.95%	343.00	2199	1048	1151
3	Fenugreek	18	0.22%				
	Total	**2670**	**33.36%**				
E.	**Fruits**						
1	Guava	36	0.45%	216.00	6000	24494	-18494
2	Lemon	10	0.12%	55.00	5500	2273	3228
	Total	**46**	**0.57%**				
	Total Horticulture fruits	**2777.00**	**34.70%**	**-**	**-**		**-**
	Grand Total	**15125.00**	**188.99%**				

(Source: Agriculture Department, Palayatha**)**

Annexure 2.5 Seed Replacement Rate (SRR) in Rajasthan and Baran District

Table 39: SRR in Rajasthan and Baran district

Crop	Rajasthan						District Baran					
	2013-14			2014-15			2013-14			2014-15		
	Area (lac ha)	Seed Dist. (Qtl)	SRR (%)	Area (lac ha)	Seed Dist. (Qtl)	SRR (%)	Area (lac ha)	Seed Dist. (Qtl)	SRR (%)	Area (lac ha)	Seed Dist. (Qtl)	SRR (%)
Kharif												
Soybean	11.76	220954	**23.49**	9.33	211668	**28.65**	3.08	35088	**14.24**	1.22	34554	**35.40**
Blackgram	1.96	9663	**11.9**	2.02	4398	**10.87**	0.012	162	**66.83**	0.07	23	**1.64**
Paddy	1.46	3677	**10.07**	1.68	4307	**1.46**	0.064	0	**0**	0.15	247	**6.59**
Rabi												
Wheat	32.06	1022634	**37.25**	33.18	1082866	**32.63**	1.63	36036	**22.13**	1.74	75930	**43.56**
Mustard	27.81	90171	**81.02**	24.33	87925	**90.32**	0.95	3721	**97.71**	0.73	3133	**100**

(Source: Agriculture Department, Palayatha**)**

Annexure 2.6 Area covered and Technical Grade Material (TGM) used under Plant Protection Measures

Table 40: The Area (in 000ha) Covered and Technical Grade Material (TGM) used under Plant Protection Measures during 2014-15

State/District	Season	Seed Treat	Soil Treat	Poly Treat	Intensive Treat	Rat Control	Weed Control	Total Area	TGM in tones
Rajasthan	K	6940	349	700	1178	138	355	9660	719
	R	4503	329	518	848	278	525	7001	1975
	K&R	11443	678	1218	2026	416	880	16661	2694
District	K	200	2	19	26	1	55	303	27
	R	188	23	33	45	12	35	336	561
	K&R	388	25	52	71	13	90	639	588
Rajasthan (%)	K	45.15 %	2.27 %	4.55 %	7.66%	0.90%	2.31%	62.85 %	4.68%
	R	48.38 %	3.53 %	5.57 %	9.11%	2.99%	5.64%	75.21 %	21.22 %
	K&R	46.37 %	2.75 %	4.94 %	8.21%	1.69%	3.57%	67.51 %	10.92 %
District (%)	K	123.94 %	1.24 %	11.77 %	16.11%	0.62%	34.08 %	187.78 %	16.73 %
	R	51.10 %	6.25 %	8.97 %	12.23%	3.26%	9.51%	91.34 %	152.50 %
	K&R	73.31 %	4.72 %	9.83 %	13.42%	2.46%	17.01 %	120.74 %	111.10 %

(K – Kharif, R – Rabi & T – Total)

(Source: Agriculture Department, Palayatha**)**

Table 41: Area Covered and Technical Grade Material (TGM) used under Plant Protection Measures during 2014-15 (Method of Plant Protection)

State/District	Season	Cereals	Pulses	Food Grains	Oilseed	Sugarcane	Cotton	Guar	Others
Rajasthan	K	4049	1277	5326	1856	16	775	1242	445
	R	2862	1160	4022	2289	0	0	0	690
	K&R	6911	2437	9348	4145	16	775	1242	1135
Baran	K	55	10	65	226	0	0	2	10
	R	145	9	154	95	0	0	0	87

State/District	Season	Cereals	Pulses	Food Grains	Oilseed	Sugarcane	Cotton	Guar	Others
	K&R	200	19	219	321	0	0	2	97
Rajasthan (%)	K	26.34%	8.31%	34.65%	12.08%	-	-	-	2.90%
	R	30.75%	12.46%	43.21%	24.59%	-	-	-	7.41%
	K&R	28.00%	9.88%	37.88%	16.80%	-	-	-	4.60%
Baran (%)	K	34.08%	6.20%	40.28%	140.06%	-	-	-	6.20%
	R	39.42%	2.45%	41.86%	25.82%	-	-	-	23.65%
	K&R	37.79%	3.59%	41.38%	60.65%	-	-	-	18.33%

(K – Kharif, R – Rabi & T – Total)
(Source: Agriculture Department, Palayatha**)**

Annexure 2.7 Number of Household and Enterprises owing Animal/Poultry Birds Household in Palayatha Cluster

Table42 Number of Household and Enterprises owing Animal/Poultry Birds Household in Palayatha Cluster

S. No.	Village	Cattle	Buffaloes	Goats	Sheep	Pigs	Backyard Poultry	Poultry Farm & Hatcheries
1	Aama	253	61	187	0	0	58	0
2	Amalsara	484	111	617	286	36	184	0
3	Antah (M)	626	327	617	6	22	74	0
4	Baldara	134	54	122	3	3	16	0
5	Bhojya Khedi	203	145	86	0	2	2	0
6	Bishan Kheri	20	21	16	0	0	0	0
7	Dugari	379	391	55	0	0	4	0
8	Ganeshpura	27	44	3	1	0	0	0
9	Ghorigaon	92	76	15	0	0	0	0
10	Gopalpura	272	144	37	0	0	0	0
11	Gulab Pura	103	40	23	0	5	0	0
12	Kashi Pura	50	55	0	0	0	0	0
13	Ladwara	18	16	11	1	0	0	0
14	Mandpur	81	30	22	0	0	0	0
15	Molki	32	26	6	0	0	0	0
16	Nagda	629	613	301	73	0	128	0
17	Nagda ki Jhopadiya	363	3130	20	0	0	0	0
18	Palayatha	284	147	141	7	8	13	0
19	Paparli	153	212	82	0	0	0	0
20	Patonda	161	61	28	0	0	0	0
21	Pipalda	74	103	64	15	0	19	0
22	Raipuriya	140	76	77	3	0	4	0
23	Rooppura	106	83	30	0	0	0	0
24	Seeswali	789	3967	572	7	21	88	0

S. No.	Village	Cattle	Buffaloes	Goats	Sheep	Pigs	Backyard Poultry	Poultry Farm & Hatcheries
25	Sindhpuri	26	29	0	0	0	0	0
26	Sonwa	430	0	265	82	0	0	0
27	Thikariya	314	286	13	112	0	9	0
28	Udpuriya	219	219	35	35	0	20	0
29	Thikhod	76	57	22	0	0	0	0
TOTAL		**6538**	**10524**	**3467**	**631**	**97**	**619**	**0**

(Source: Animal Husbandry department, Palayatha)

Annexure 2.8 Goat Population profile of Palayatha cluster

Table43 Goat Population profile of Palayatha cluster

Sr. No.	Village	Male			Female					Total Goats
		Under 1 Year	1 Year and Above	Total	Under 1 Year	1 Year and Above			Total	
						In Milk	Dry	Not Calved Once		
1	Aama	41	1	42	36	73	36	0	145	187
2	Amalsara	63	18	81	69	138	329	0	536	617
3	Antah (M)	153	191	344	383	453	439	118	1393	1737
4	Baldara	79	60	139	79	98	118	18	313	452
5	Bhojya Khedi	77	32	109	75	62	122	10	269	378
6	Bishan Kheri	4	3	7	30	25	21	1	77	84
7	Dugari	9	1	10	8	17	20	0	45	55
8	Ganeshpura	7	2	9	6	9	11	8	34	43
9	Ghorigaon	16	3	19	0	27	48	0	75	94
10	Gopalpura	5	2	7	5	10	15	0	30	37

Sr. No.	Village	Male			Female					Total Goats
		Under 1 Year	1 Year and Above	Total	Under 1 Year	1 Year and Above			Total	
						In Milk	Dry	Not Calved Once		
11	Gulab Pura	20	0	20	13	27	27	0	67	87
12	Kashi Pura	0	0	0	0	0	0	0	0	0
13	Ladwara	18	1	19	21	25	32	5	83	102
14	Mandpur	0	0	0	42	87	107	0	236	236
15	Molki	7	6	13	12	9	23	0	44	57
16	Nagda	45	6	51	51	87	112	0	250	301
17	Nagda ki Jhopdiya	24	5	29	21	23	70	38	152	181
18	Palayatha	174	25	199	28	184	155	13	380	579
19	Patonda	14	6	20	17	49	58	0	124	144
20	Paparli	19	0	19	13	20	27	3	63	82
21	Pipalda	15	1	16	10	22	16	0	48	64
22	Raipuriya	79	25	104	81	192	120	11	404	508
23	Roopppura	18	1	19	57	57	32	16	162	181
24	Seeswali	334	454	788	475	818	220	66	1579	2367
25	Sonwa	61	7	68	49	86	62	0	197	265
26	Sindhpuri	0	0	0	0	0	0	0	0	0
27	Thikariya	2	1	3	2	4	4	0	10	13
28	Udpuriya	60	16	76	55	71	81	38	245	321
29	Thikhod	3	0	3	13	16	23	0	52	55
TOTAL		**1347**	**867**	**2214**	**1651**	**2689**	**2328**	**345**	**7013**	**9227**

(**Source:** Animal Husbandry department, Palayatha)

Annexure 2.9 Village wise Resources in the Palayatha Cluster

Table 44: Village wise Resources in the Palayatha Cluster

S. No.	Village	Milking Machine	Mechanized Fodder Cutter	Chopper & Baler	Dung Collection & Disposal Equipment
1	Aama	0	0	0	0
2	Amalsara	0	0	0	0
3	Antah (M)	4	6	0	0
4	Baldara	0	0	0	0
5	Bhojya Khedi	0	0	0	0
6	Bishan Kheri	0	0	0	0
7	Dugari	0	0	0	0
8	Ganeshpura	0	0	0	0
9	Ghorigaon	0	0	0	0
10	Gopalpura	0	0	0	0
11	Gulab Pura	0	4	0	0
12	Kashi Pura	0	0	0	0
13	Ladwara	0	0	0	0
14	Mandpur	0	0	0	0
15	Molki	0	0	0	0
16	Nagda	0	0	0	0
17	Nagda ki Jhopadiya	0	0	0	0
18	Palayatha	0	0	0	0
19	Paparli	0	0	0	0
20	Pipalda	0	0	0	0
21	Patonda	0	0	0	0
22	Raipuriya	0	0	0	0
23	Rooppura	0	0	0	0
24	Seeswali	0	0	0	0
25	Sindhpuri	0	0	0	0
26	Sonwa	0	0	0	0
27	Thikariya	0	0	0	0

28	Udpuriya	0	0	0	0
29	Thikhod	0	0	0	0
Total		**4**	**10**	**0**	**0**

Annexure 2.10 Average Annual Rainfall in the last decade in Palayatha cluster

Table 45 Average Annual Rainfall in the last 10 years (decade) in Palayatha cluster

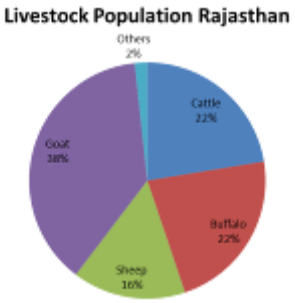
S. No	Year	Average Annual Rainfall (mm)
1	2006	778
2	2007	441
3	2008	888
4	2009	704
5	2010	566
6	2011	1130
7	2012	667
8	2013	1627
9	2014	771
10	2015	781
	Total	8353
	Average	835.30

(Source: Water Resource department, Palayatha)

Annexure 2.11 Overview of Goat sector in Rajasthan

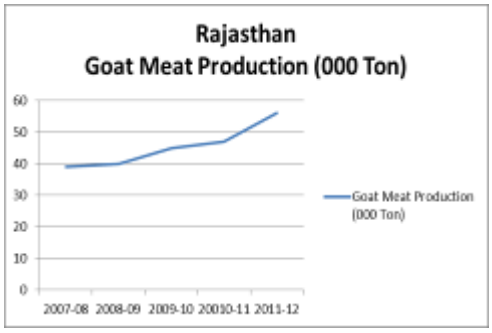
Overview of Goat sector in Rajasthan

Small ruminants have an important place in Rajasthan's rural economy. Goat and sheep rearing is done by most of the castes and classes of households in Rajasthan. According to the Livestock census-2012, 38% of the state's livestock population of 57.7 Million was goats. Goats (21.6 Million in 2012) of Rajasthan constitute 16% of the total goat population of the country (135.17 Million in 2012).



Goat Meat Production in Rajasthan:

Figure 8: Goat Meet Production in Rajasthan



In 2011-12, 56,000 tons of goat meat was produced in the state, which constituted around 6.18% of the total goat meat that was produced in the country in 2011-12. It is also visible from the graph here that there is steady increase in the production of goat meat in the state.

Goat Milk Production in Rajasthan: In 2011-12, 13512 (000 tonnes) of milk was produced in the state of which 12% {1,641 (000 tonnes)} was goat milk. The state was ranked first in the country in terms of goat milk production.

Annexure 2.12 SRR in Palayatha Cluster

Table 46: Seed Replace Rate of Palayatha Cluster

S. No.	Crop	Name of Certified / Improved varieties being shown in the cluster	2011-12	2012-13	2013-14	2014-15	2015-16
1	Soybean	JS 9560,JS 335	12.00%	15.54%	18.07%	18.83%	20.14%
2	Rice	Sugandaha, Pusa 4,1121	42.00%	51.66%	63.04%	65.23%	73.21%
3	Black Gram	PU31	8.00%	9.35%	10.71%	11.12%	12.00%
4	Wheat	Raj 4079, Raj 4037, RJ4120	16.70%	20.05%	25.37%	26.31%	29.04%
5	Mustard	Pusa Bold, bio 902	51.32%	61.07%	74.47%	80.14%	85.71%
6	Coriander	RCR 41,Ajmer 1	0.00%	0.00%	0.00%	0.00%	0.00%

Annexure 2.13 Crop Water Requirement of Agricultural and Horticultural Crops in Palayatha

Table 47: Crop Water Requirement of Agricultural Crops in the project area

Name of crop	Area in Ha	Requirement of water for crops per Ha (In cum)	Water Requirement in present time (in cum)	Proposed Area (ha)	Water Requirement in future when cultivated area increase (in cum)	Additional Crop water requirement (in cum)
Kharif						
Soybean	6840	2500	17100000	6840	17100000	0
Blackgram	288	1000	288000	378	378000	90000
Paddy	72	8000	576000	54	432000	-144000
Total	**7200**		**17964000**	**7272**	**17910000**	**-54000**
Rabi						-237303
Wheat	4368	5000	21840000	3500	17500000	-4340000
Mustard	780	3000	2340000	1648	4944000	2604000
Total	**5148**		**24180000**	**5148**	**22444000**	**-1736000**
Grand Total	**12348**		**42144000**	**12420**	**40354000**	**-1790000**
Vegetable						
Brinjal	24	8000	192000	27	216000	24000
Chilli	8	8000	64000	12	96000	32000
Tomato	14	8000	112000	16	128000	16000
Okra	15	8000	120000	20	160000	40000
Total	**61**		**488000**	**75**	**600000**	**112000**
Spices						
Garlic	2496	5000	12480000	2409	12045000	-435000
Coriander	156	3000	468000	235	705000	237000
Fenugreek	18	3000	54000	26	78000	24000
Total	**2670**		**13002000**	**2670**	**12828000**	**-174000**
Fruits						
Guava	36	9000	324000	42	378000	54000

Name of crop	Area in Ha	Requirement of water for crops per Ha (In cum)	Water Requirement in present time (in cum)	Proposed Area (ha)	Water Requirement in future when cultivated area increase (in cum)	Additional Crop water requirement (in cum)
Lemon	10	9000	90000	16	144000	54000
Total	**46**		**414000**	**58**	**522000**	**108000**
Total Horticulture fruits	**2777**		**13904000**	**2803**	**13950000**	**46000**
Grand Total	**15125**		**56048000**	**15223**	**54304000**	**-1744000**

(Source: Agriculture Department & Watershed DPR, Palayatha)

Annexure 2.14 Area, Production and Productivity from the year 2006-07 to 2015-16 in Baran district

Table 48. Total & average Area (in ha), Production (in MT) and Productivity (in kg/ha) from the year 2006-07 to 2015-16, in Baran district

Crops	Details	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	Average of 10 Years
Green Gram	Area	1931	3247	3081	2461	9981	12793	7331	5918	7351	17034	**7112.80**
	Production	392	305	316	98	6203	2628	2492	1933	1802	8555	**2472.40**
	Productivity	203	94	103	40	621	205	340	327	245	502	**267.93**
Guar	Area	340474	329752	374202	317496	424326	429305	499855	579924	525791	617101	**443822.60**
	Production	14532	19686	13208	2576	127179	138874	45242	53405	21893	203745	**64034.00**
	Productivity	43	60	35	8	300	323	91	92	42	330	**132.38**
Groundnut	Area	6085	7298	9215	9241	11221	14246	12659	13559	15406	17286	**11621.60**
	Production	7689	12215	10379	8563	16291	17609	10319	18289	17565	31233	**15015.20**
	Productivity	1264	1674	1126	927	1452	1236	815	1349	1140	1807	**1278.93**
Wheat	Area	13030	9696	9521	10768	15127	14076	13424	13709	10318	12514	**12218.30**
	Production	19197	8987	7878	12725	51937	18403	17467	18128	10022	17427	**18217.10**
	Productivity	1473	927	827	1182	3433	1307	1301	1322	971	1393	**1413.76**
Mustard	Area	97701	64021	7674	34680	69288	62909	57838	55886	45934	46266	**54219.70**
	Production	56292	19581	47574	22078	54207	35265	25848	42244	29357	47883	**38032.90**

Crops	Details	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	Average of 10 Years
	Productivity	576	306	620	637	782	561	447	756	639	1035	**635.90**
Taramira	Area	7412	351	12400	1148	23352	45467	474	414	299	235	**9155.20**
	Production	2260	65	1403	344	9927	7734	38	246	123	102	**2224.20**
	Productivity	305	185	113	300	425	207	80	594	411	434	**305.39**
Gram	Area	27854	70927	66962	52675	79529	94024	130493	143649	107829	131688	**90563.00**
	Production	26418	31752	35367	19044	52035	81007	80702	127053	48549	132675	**63460.20**
	Productivity	948	448	528	362	654	862	618	884	450	1007	**676.08**

(Source: Agriculture department, Baran)

Annexure 2.15 Supporting institutions and service providers in Baran

Table 49: Supporting institutions and service providers in Baran

#	Type of assistance	Name and address of agencies
1.	Provisional Registration Certificate (EM-1) & Permanent Registration Certificate (EM-II)	District Industries Centre Baran
2.	Identification of Project Profiles, techno-economic and managerial consultancy services, market survey and economic survey reports.	MSME-DI Industrial estate 22 godown Jaipur
3.	Land and Industrial shed	RIICO Office Baran
4.	Financial Assistance	RFC, Baran
5.	For raw materials under Govt. Supply	NSIC/Rajasthan Small Industries Corporation, Udyog Bhawan, Jaipur
6.	Plant and machinery under hire / purchase basis.	NSIC, Nehru Palace, Tonk Road, Jaipur
7.	Power/ Electricity	RVVNL, Baran
8.	Technical Know –how.	MSME-DI Industrial Estate 22 godown Jaipur
9.	Quality & Standard	BIS, Chitranajan Marg, C-Scheme, Jaipur
10.	Marketing /Export Assistance	NSIC/UPA/RSIC/MSME-DI/Jt. Director General, Foreign Trade, Udyog Bhawan, Tilak Marg ,Jaipur

Annexure 3.1 Parameters and their definition for selection of Value Chain crops

Parameters and Weightage for the selection of Value Chain reports

#	Parameters	Weightage
A.	**Existing size**	**30**
1	Cropped Area of the crop in the cluster (in acre)	10
2	Crop Production in the cluster (in quintals)	10
3	Crop Productivity (cluster level compared to national's average)	10
B.	**Potential for Value addition within Rajasthan (implying scope for increased value addition for local producers and processors)**	**45**
4	Price spread in Rs/Q (Price paid at APMC mandi- realization by farmer at farm level)	5
5	Price spread in Rs/Q (Price paid by customer at retail level realization by farmer at farm level)	5
6	Net profit in production (Rs per acre)	5
7	Scope for processing in the state	10
8	Scope for value addition (Primary/ secondary/ tertiary processing)	10
9	Growth in market demand 5 year	10
C.	**Risk assessment**	**10**
10	Price Volatility (last 5 years; due to monsoon, due to adverse agronomical conditions)	10
D.	**Others (Environmental & Social Parameter)**	**15**
11	Water requirement	15
Total		**100**

Definition of Parameters

1. **Area**

It is the cropped area in acres under cultivation of the particular crop in the concerned cluster as per data available with RACP for the year 2016-17. The area parameter has been accorded weightage of 10%. Crops have been given scores from 1 to 10 based upon their area of cultivation. The crop with the largest area is accorded the highest score of 10 while the remaining crops are given proportionately lower marks.

2. **Production**

It is the total production of the crop in quintal in the cluster as per data available with RACP for the year 2016-17. The area parameter has been accorded weightage of 10%. Crops have been allotted scores from

1 to 10 based on their production levels. The crop with maximum production gets highest score of 10 while the remaining crops get proportionately lower marks.

3. **Productivity**

The productivity value of the crop is the comparison of the productivity (Q/Acre) of the crop in the cluster (as per the data available from RACP for the year 2016-17) as against average national productivity (Q/Acre) of the same crop (as per the data by Directorate of Economics and Statistics). The area parameter has been given a weightage of 10%. Cluster level productivity of the crops has been scored from 1 to 10. The crop having average productivity of the cluster greater than or equal to that of national average will get 10 whereas the crop having average productivity of the cluster less than that of national average will get proportionately/ relatively less score. For eg. Crop having cluster average productivity of 5 Q/acre and national average of 10 Q/acre will get 5 marks. Similarly if crop has cluster productivity of 3 Q/acre then it will get 3 marks. If the crop is having either 12 Q/acre or 15 Q/acre then both will get 10 marks.

4. **Price spread at Mandi level**

The price spread at mandi level can be defined as the difference between the value realization by farmer at the farm level (as per field consultation) by selling the raw crop produce and the price of the same crop obtained at primary processor level (as per the data available on www.agmarknet.nic.in). It is measured in Rs per quintal. The price spread at mandi level (parameter) has been accorded weightage of 5%. The crops have been scored from 1 to 5 based upon their price spread at mandi level; with the crop with higher price spread at mandi level receiving a higher score.

5. **Price spread at retail level**

The price spread at retail level can be defined as the difference between the value realization of farmer at the farm level (as per field consultation) by selling the raw crop produce and the price of the same crop, with highest degree of value addition, paid by consumer at the retail level (as per field consultation). It is measured in Rs per quintal. The price spread at retail level parameter has been given a weightage of 5%. The crops have been scored from 1 to 5 based upon their production, with the crop with higher price spread at retail level receiving higher score.

6. **Net profit in production**

It is the net income accrued to the farmer by selling the raw produce (commodity) at the farm level after deduction of the total cost of production involved (as per field consultation). It is measured in Rs. per quintal. This parameter has been accorded a weightage of 5%. The crops have been given scores from 1 to 5 based upon their net profit. The crop with the maximum net profit from production is given the highest score of 5 while the remaining in the crops area are accorded proportionately lower marks.

7. **Scope for processing in the state**

It is the total number of functionally active processing units of a particular commodity in the state as per the data available from DICs. This parameter has been given a weightage of 10%. Commodities have been given scores from 1 to 10 based on the total number of functional processing units. The commodity with higher number of processing units in the state gets higher score because it portrays higher availability of ready market in the vicinity of the farms which reduces the intermediary logistics costs for the producers as well ensures steady returns.

8. Scope for value addition

The number of feasible value added products of a particular commodity in the concerned cluster indicates the scope for value addition (primary, secondary and tertiary) in the respective crop. This parameter has been accorded weightage of 10%. Commodities have been given scores from 1 to 10. The commodity with higher number of value added products gets a higher score.

9. Growth in market demand

In order to capture the growth in market demand of a particular commodity, an assumption has been formulated that consumption of that commodity for the last 5 years can be equated with the current growth in consumer level consumption of the commodity (as per data available on authentic public domain) This parameter has been given a weightage of 10% and commodities have been scored from 1 to 10 based on the basis of growth in their consumption demand. The commodity with higher growth in demand will get a higher score.

10. Price Volatility

Price volatility is per cent difference between the highest attained mandi price of a crop compared to the lowest attained mandi price during last 3/5 years (as per data available on www.agmarknet.nic.in). This parameter has been given a weightage of 10% and commodities have been scored from 1 to 10 based on the price volatility. The commodity with the higher range gets a higher score as they have greater scope for intervention in their existing value chain such that the farmer's risk gets reduced and higher returns could be ensured.

11. Water requirement

This is the water required by the crop in cubic metres per hectare at the cultivation stage in one season (as per data available from RACP for the year 2016-17). This parameter has been given a weightage of 15% and commodities have been scored from 1 to 15 based on the water requirement. The commodity with the lower water requirement gets a higher score as it could be promoted for crop diversification and efficient water use at the farm level.

Appendix 3.2 Scoring Matrix for prioritization of Value chain crops in Palayatha

The parameters as well as relative scores of commodities in the Palayatha cluster presented below:

Table 50: Parameters for prioritization of Value chain commodities in Palayatha cluster

Sr. No.	Parameters	Weightage	Garlic	Soybean	Wheat	Guar	Wheat	Wheat
A.	**Existing size**	**30**	**30**	**10.4**	**21.3**	**11.9**	**24.9**	**26.4**
1	Cropped Area of the crop in the cluster (in acre)	10	10	0.2	3.6	1.1	10.0	6.4
2	Crop Production in the cluster (in quintals)	10	10	0.2	7.6	0.8	4.9	10.0
3	Crop Productivity (cluster level compared to national's average)	10	10	10.0	10.0	10.0	10.0	10.0
B.	**Potential for Value addition within Rajasthan (implying scope for increased value addition for local farmers and processors)**	**45**	**45**	**26.0**	**31.8**	**25.4**	**33.6**	**22.0**
4	Price spread in Rs/Qtl (Price paid at APMC mandi- realization by farmer at farm level)	5	5	5.0	4.5	2.8	2.8	1.5
5	Price spread in Rs/Qtl (Price paid by customer at retail level- realization by farmer at farm level)	5	5	4.9	5.0	1.5	4.1	3.3
6	Net profit in production (Rs per acre)	5	5	2.8	5.0	0.9	0.8	1.2
7	Scope for processing in the state	10	10	4.0	4.0	10.0	6.0	5.0
8	Scope for value addition (Primary/ secondary/ tertiary processing)	10	10	6.0	10.0	6.0	10.0	8.0
9	Growth in market demand 5 year	10	10	3.3	3.3	4.1	10.0	3.0
C.	**Risk assessment**	**10**	**10**	**7.4**	**10.0**	**4.2**	**3.7**	**4.0**

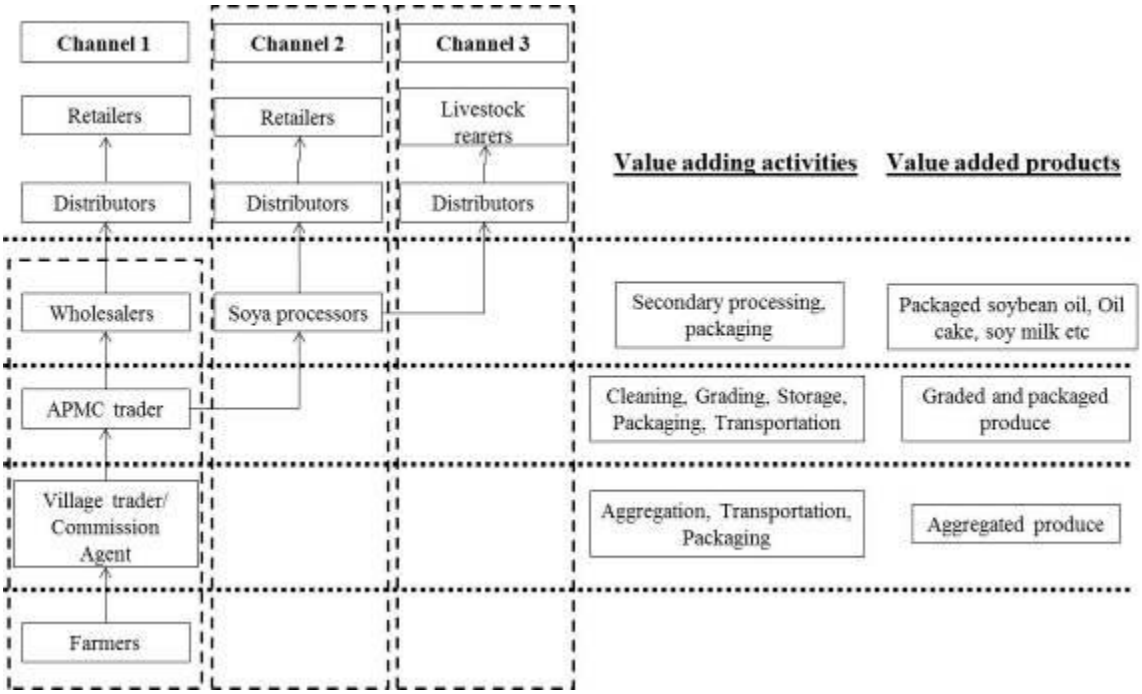
10	Price Volatility (last 5 years; due to monsoon, due to adverse agronomical conditions	10	10	7.4	10.0	4.2	3.7	4.0
D.	**Others (Environmental & Social Parameter)**	**15.0**	**15.0**	**9.0**	**0.0**	**10.5**	**15.0**	**6.0**
11	Water requirement	15.0	15.0	9.0	0.0	10.5	15.0	6.0
Total		**100.0**	**82.5**	**100.0**	**52.8**	**63.1**	**52.0**	**77.2**

Source: Data analysis by ABPF- Grant Thornton

Appendix 3.3 Current marketing chain of Value chain crops in Palayatha

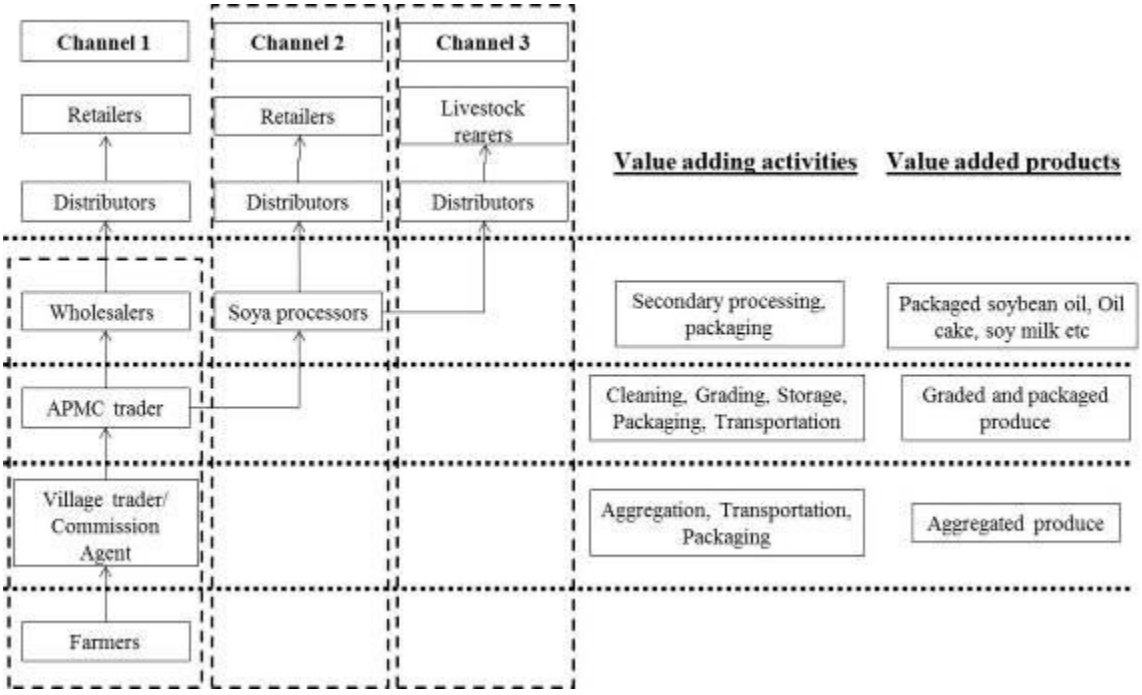
- **Garlic**

Figure 9: Current structure of marketing chains - Garlic



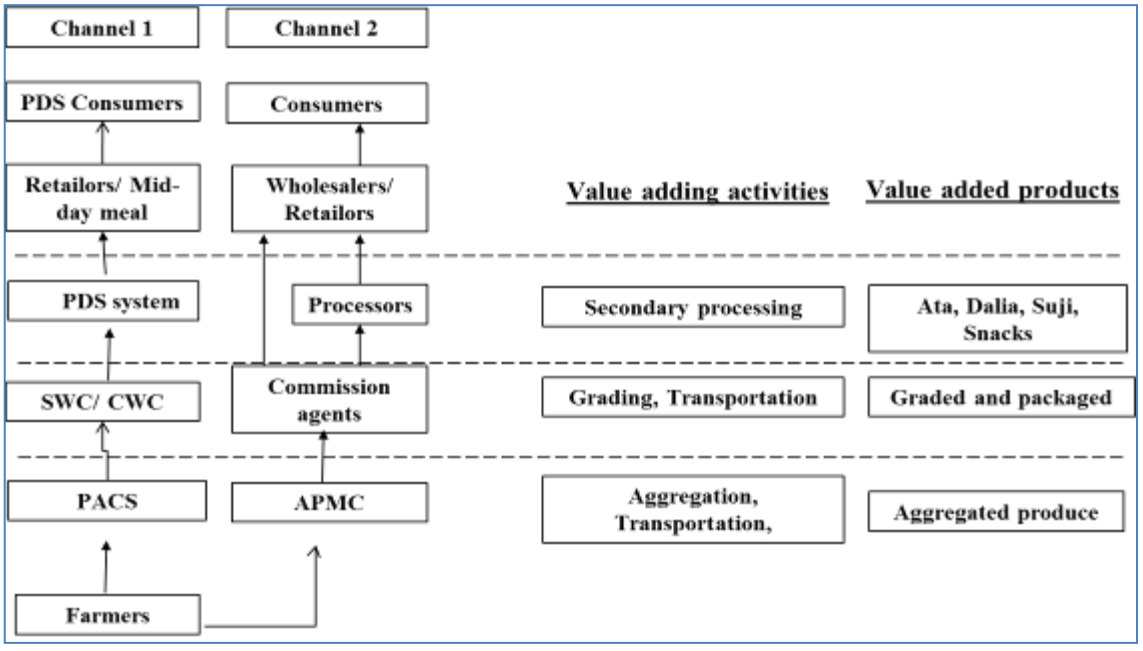
- **Soybean**

Figure 10: Current structure of marketing chains - Soybean



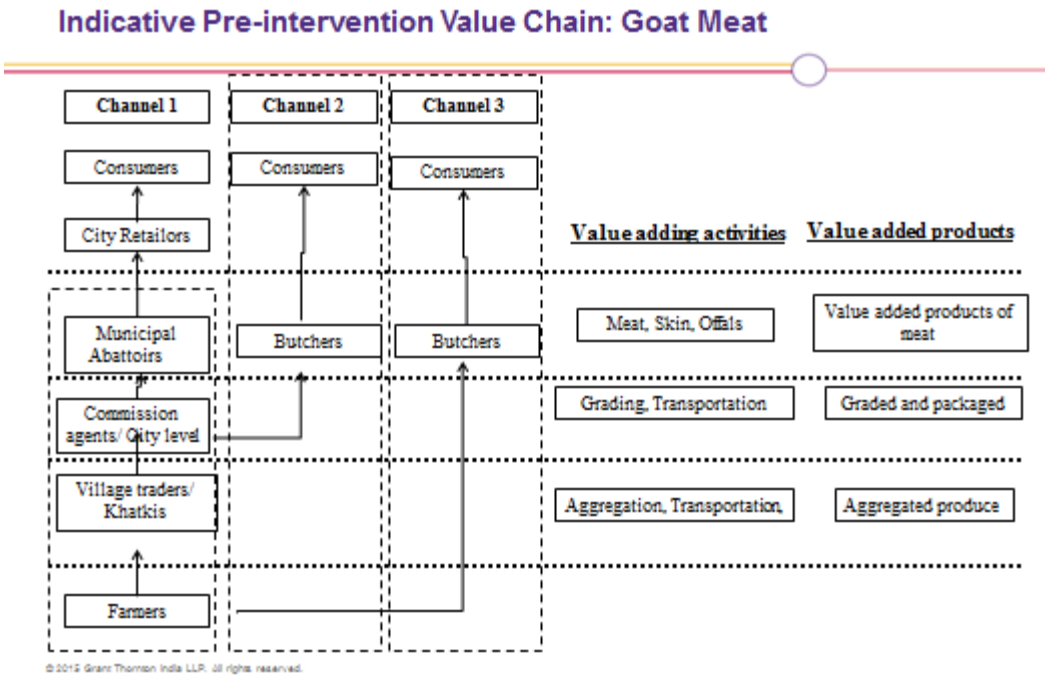
- **Wheat**

Figure 11: Current structure of marketing chains of Wheat



- **Goat Meat**

Figure 12: Current structure of marketing chains of Goat Meat



Appendix 3.4 Historical mandi/ farm gate prices (or farmer operating margins) trends of Value Chain crops

To identify the trend of the commodity, prices of 3 seasons have been gathered:

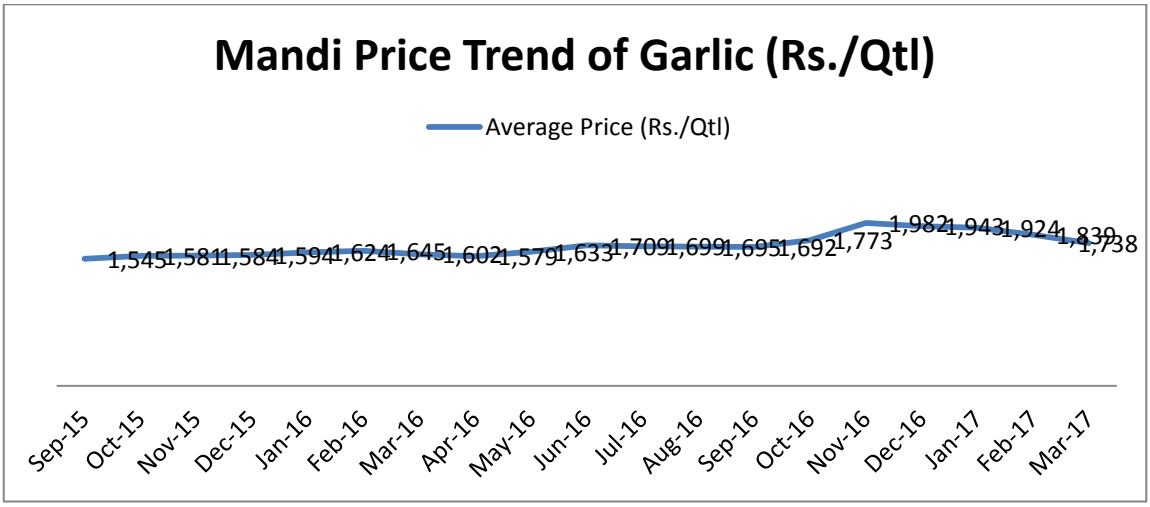
Garlic

Table 51: Price trend of Garlic in mandi for 2 years

Month	Price (Rs./Qtl)	Month	Price (Rs./Qtl)
Sep-15	1,545	Jul-16	1,699
Oct-15	1,581	Aug-16	1,695
Nov-15	1,584	Sep-16	1,692
Dec-15	1,594	Oct-16	1,773
Jan-16	1,624	Nov-16	1,982
Feb-16	1,645	Dec-16	1,943
Mar-16	1,602	Jan-17	1,924
Apr-16	1,579	Feb-17	1,839
May-16	1,633	Mar-17	1,738
Jun-16	1,709		

The trend shows that in Rajasthan, price of the commodity is varying over the period of 3 years. This is in respect to all the commodities that price dips to lowest at the harvesting time and rise to the highest during the cultivation time.

Figure 13: Price trend of Garlic in mandi for 2 years



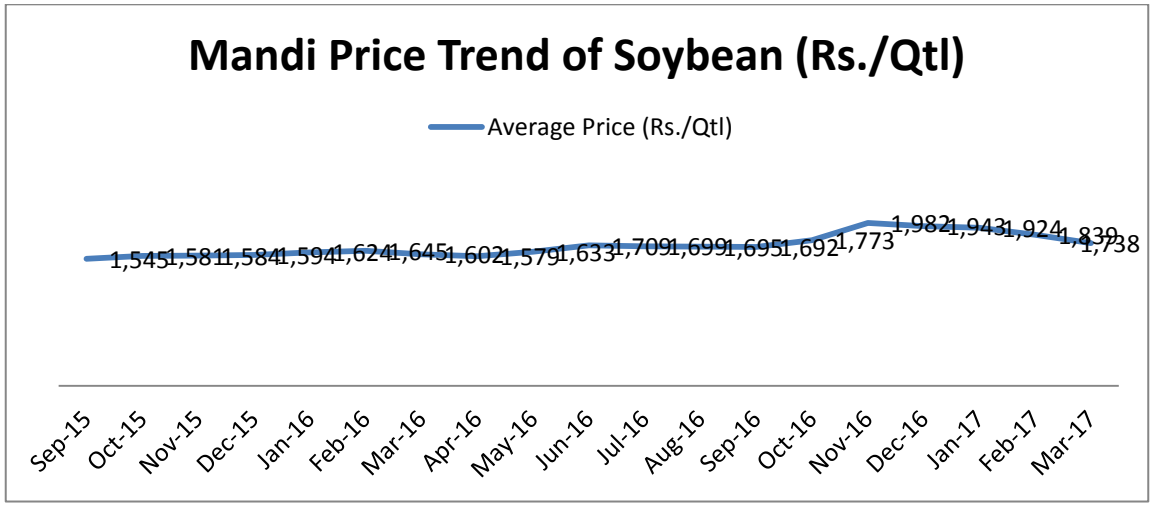
Soybean

Table 52: Price trend of Soybean in mandi in last 3 years

Month	Price (Rs./Qtl)	Month	Price (Rs./Qtl)
Jan-16	3,517	Sep-16	3,098
Feb-16	3,488	Oct-16	2,902
Mar-16	3,592	Nov-16	2,958
Apr-16	3,800	Dec-16	2,945
May-16	3,752	Jan-17	2,911
Jun-16	3,691	Feb-17	2,852
Jul-16	3,534	Mar-17	2,813
Aug-16	3,458	Apr-17	2,807

Price range of Soybean in past 3 seasons was from Rs. 2800 to Rs. 3800.

Figure 14: Price range of Soybean in past 3 seasons



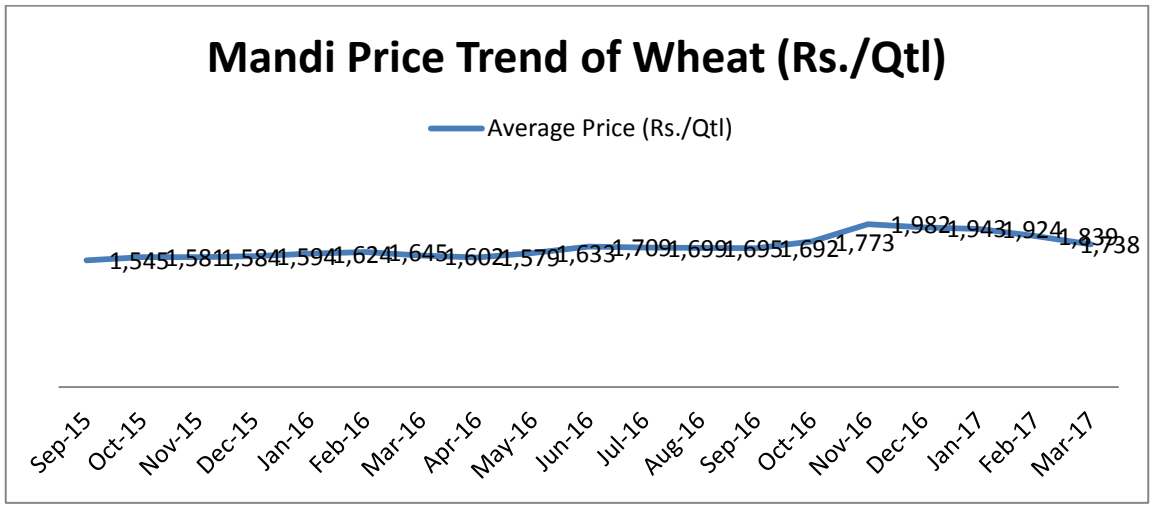
Wheat

Table 53: Price trend of Wheat in mandi for past 3 season

Month	Price (Rs./Qt)	Month	Price (Rs./Qt)
Sep-15	1,545	Jun-16	1,709
Oct-15	1,581	Jul-16	1,699
Nov-15	1,584	Aug-16	1,695
Dec-15	1,594	Sep-16	1,692
Jan-16	1,624	Oct-16	1,773
Feb-16	1,645	Nov-16	1,982
Mar-16	1,602	Dec-16	1,943
Apr-16	1,579	Jan-17	1,924
May-16	1,633	Feb-17	1,839
		Mar-17	1,738

Wheat crop has variation from Rs. 1,500 to Rs. 2,000. Currently it is selling at Rs 1738 per q considering the fact that this is harvesting time of the crop.

Figure 15: Price trend of Wheat in Jaisalmer mandi for last 3 season


Mandi Price Trend of Wheat (Rs./Qtl)
Average Price (Rs./Qtl)
1,545
1,581
1,584
1,594
1,624
1,645
1,602
1,579
1,633
1,709
1,699
1,695
1,692
1,773
1,982
1,943
1,924
1,839
1,738
Sep-15
Oct-15
Nov-15
Dec-15
Jan-16
Feb-16
Mar-16
Apr-16
May-16
Jun-16
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17

Appendix 3.5 Growth in demand of Value chain crops

Parameters as under are identified, which support in determination of future demand growth of a commodity. With the consultation of the various stakeholders of value chain, growth in upcoming 3 years for Soybean has been formulated which is shown in the table below.

With the consultation of the various stakeholders of value chain, growth in upcoming 3 years for Soybean has been formulated which is shown in the table below.

Soybean

The national consumption of Soybean in the year 2017-18 is 11.6 MT which has grown at CAGR of 12.18% in last 5 years.

National Demand Growth of Soybean (000 MT)					
2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
6,530	6,940	8,600	10,010	10,600	11,600

Garlic

As per a report global seasoning and spice market size will witness a CAGR of 5 % in next 5 years. China and India are the major driving force, which influence the demand of spices globally and at national level.

Wheat

The national consumption of Wheat in the year 2017-18 is 100,000 MT which has grown at CAGR of 3.59 % in last 5 years.

National Demand Growth of Wheat(000 MT)					
2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
83,824	93,848	93,102	88,551	97,500	100,000

Appendix 3.6 Economic Analysis of Selected Value Chain Crops

Cost of cultivation is the prerequisite aspect in the calculation of economics of a crop. Primary researches helped in getting the whole information related to economics of a crop.

Table 54: Cost of economics of commodities

#	Commodity	Cost of cultivation (Rs./acre)	Productivity (Qtl /acre)	Selling Price (Rs./Qtl)	Revenue from crop (Rs./acre)	Net surplus including fodder (Rs./acre)
1	Mustard	12,000	8.0	3,100	24,800	14,300
2	Wheat	16,000	18.0	1,600	28,800	17,600
3	Soybean	8,000	5.6	3,100	17,360	10,860
4	Coriander	8,000	8.8	5,500	48,345	40,345
5	Garlic	48,000	24.0	5,000	120,000	72,000

Annexure 3.7 Livestock scenario in cluster

Table 55 Livestock population and Fodder Requirement of Palayatha cluster

S. No.	Description of animals	Population in No.	Yield (milk/mutton/ Wool)	Units	Dry Matter Requirement per animal (KGPD)	Total requirement per year in M.T.
1	Cattle (Indigenous)	13375	3.093	Lit/day	7	34173
2	Cattle (CB)	132	6.386		7	337
2	Buffaloes	9355	4.856	Lit/day	7	23902
3	Goat	9227	0.50 – 1.00	Lit/day, kg/no.	1.2	4041
4	Sheep	1778	0.50 – 1.00/ 1-2	Lit/day, kg/Yr.	1.2	779
7	Piggery	1655			3.5	2114
	Total Livestock	**35693**				**65346**

(Source: Animal Husbandry Department, Baran)

Table 56 Fodder availability in Palayatha Cluster (Qty. in MT)

Name of crop	Proposed Area (ha)	Productivity (Kg/ha)	Production (in MT)
Kharif			
Soybean	7524.00	4000	30096
Blackgram	288.00	4000	1152
Paddy	54.00	6000	324
Total	**7866.00**		**31572**
Rabi			
Wheat	4324.32	4500	19459
Mustard	624.00	0	0
Total	**4948.32**		**19459**
Grand Total (K+R)	**12814.32**		**51031**
Vegetable			
Brinjal	14.40	0	0

Name of crop	Proposed Area (ha)	Productivity (Kg/ha)	Production (in MT)
Chilly	7.20	0	0
Tomato	12.60	0	0
Okra	14.73	0	0
Total	**48.93**	**0**	**0**
Spices			
Garlic	2246.40	0	0
Coriander	234.00	0	0
Fenugreek	27.00	1500	6
Total	**2507.40**		**6**
Fruits			
Guava	20.00	0	0
Lemon	20.00	0	0
Total	**40.00**		**0**
Total Horticulture	**2547.40**		**6**
Grand Total	**15361.72**		**51037**

(Source: Agriculture Department, Palayatha)

Annexure 5.1: Operational and Implementation Arrangements (Agriculture)

Operational and Implementation Arrangements

The eligible activities for investment under Agriculture subcomponent would be implemented through Agriculture Department. The Deputy Director, Agriculture (Extension) ZP of the concerned district who is also DPM, RACP is responsible for implementation of the activities.

Component 1: Climate Resilient Agriculture

On-farm Integrated Crop Management (ICM) demonstrations will be the core project intervention under this sub-component, and the main vehicle for the dissemination of improved technologies to the farmers. Demonstrations serve as an effective instrument for rapid dissemination of technology. The effectiveness of demonstrations would increase with organization of field days around the demonstrations. The demonstrations to be organized under this project would be preferably composite demonstrations, demonstrating complete technology package of production.

Adoption rate of demonstration's technologies will be recorded in the years following the year in which demonstrations are organized. The adoption rates (number of farmers adopting demonstrated technologies, area on which, the technologies are adopted and farm level yield gains achieved by the farmers) will be monitored in the following years. This is essential for evaluating the productivity/quality gains achieved by the farmers as a result of demonstrations and trainings.

Improved Water Use Efficiency: Micro-Irrigation (MI) based technology

Micro-irrigation (MI) is proved to be an efficient method in saving water and increasing water use efficiency as compared to the conventional surface method of irrigation, where water use efficiency is only about 35-40 per cent or sometimes even less. The on-farm irrigation efficiency of properly designed and managed drip irrigation system is estimated to be about 90 per cent, while the same is only about 35 to 40 per cent for surface method of irrigation (INCID, 1994). In sprinkler irrigation method, water saving is relatively low (up to 70 per cent) as compared to drip irrigation since SIM supplies water over the entire field of the crop (INCID, 1998; Kulkarni, 2005, A. Narayanamoorthy, Dr.S.Raman). Thus, saving over the surface irrigation method through sprinkler irrigation and drip irrigation method would be 75% and 125%, simultaneously. In addition to above use of pipelines is also important for improving field efficiency. About 30-40% water can be saved by reducing the conveyance losses through using Pipelines.

Based on the above, the project would support various institutional, physical and modern water management practices with a view to promote sustainable water use available for agriculture, and improved water use efficiency. The project will also support promotion of on-farm water use efficiency measures, including drip and sprinkler irrigation & pipelines for irrigation water.

A. Integrated demonstration for Drip Irrigation System with Automation and fertigation based techniques for field crops

Micro irrigation along with automation and fertigation is getting popularity in horticultural crops but still the same needs to be percolated in wide spaced agricultural crops. It has been planned to lay this technology by promotional support at the selected beneficiaries to demonstrate the effect of the technology and further replication. This will effectively improve the productivity and quality along with the water and labour saving. The package of technology along with the inputs required for first crop will be provided with an assistance of 75 per cent to the beneficiaries. Drip automation will be the optional/ need based item and it will be installed on the willingness of the beneficiary. The district unit will ensure the coordination of MI supplier and the Automation supplier (in case, they are separate entity) to make compatible commissioning and avoid duplication of the components. The estimated cost for the system with fertigation, automation along with crop demonstration is Rs.2.20 lac per ha. These technological demonstrations will be provided to the selected beneficiaries in the cluster by district unit of Agriculture department along with the other stakeholders.

B. Integrated demonstration for Mini/ Micro Sprinkler based techniques for field crops

Micro Irrigation based demonstrations for close space field crops like, Bajra, Sorghum, guar, pulses, Wheat, Mustard, Barley etc. has been proposed to improve the productivity per unit of water along with reduction in the production cost. The estimated cost for such demonstrations is Rs.1.45 lacs per ha including automation and crop demonstration. Implementation process will be similar as in the case of drip technology activity.

C. Micro Irrigation –Drip, Mini/ Micro Sprinklers and Sprinklers:

The micro irrigation systems viz. Drip, Mini/ Micro Sprinklers and portable Sprinklers would be promoted on large scale in the cluster with a view to cover most of the irrigated area under such techniques. The per ha model cost of Drip, Mini/ Micro Sprinklers and portable Sprinklers is estimated to be Rs. 1.30, 1.00 and 0.20 lacs respectively. The project assistance up to 75% is proposed to be provided to the beneficiaries.

D. Pipe line for piped conveyance of irrigation water:

Conveyance losses play a major role to increase/ decrease the irrigation efficiency. Traditionally, the farm water is conveyed through field channels which lead to leaching and evaporation losses. The conveyance of irrigation water at far ends of the farm through PVC/ HDPE pipelines leads to check such water losses. The estimated cost of 100 mts pipe line unit (generally sufficient to cover 1 ha) is Rs. 0.10 lacs and the project assistance of 75% has been proposed for this activity.

Technology Transfer and market led advisory services

Promoting adoption and documentation of improved technologies

This is the major activity where need based demonstrations to bridge the gap, improve productivity, to promote the efficient use of irrigation water, to enhance farm income, promote mechanisation and for the sustainability of agriculture have been proposed under the project. Field days, exposure visits, stakeholders' orientation and capacity building supportive activities have also been proposed for the effective adoption of the technologies. The detail of the activity is given as under:

b. Soil testing and distribution of Soil Health Cards

To know the fertility status of the farmer's field, soil testing will be done after taking soil samples from the farmer's field. After getting report of soil sample, the soil health card will be prepared and distributed to the farmers. The Dy. Director Agriculture would ensure soil testing and distribution of soil health cards to all the farmers of multi task groups of the cluster with convergence to the regular programme of the

department. This activity needs to be completed within first year with the support of NGO. The district unit will train Multi Task Groups regarding process of taking soil samples from the fields.

c. Demonstrations on production technologies for value chain crops to bridge gap

The ICM demonstrations will preferably include the complete package of practices for a particular crop from land preparation to harvesting of the crop. Majority of the demonstrations will be on the value chain crops with a focus on popularizing high payoff interventions and reducing water foot print of the crop in the cluster. Demonstrations will also be conducted 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, etc. Another set of demonstrations will be on promoting resource conservation technologies and for popularizing climate smart agricultural practices. These demonstrations will need to be integrated with the on-farm water conservation structures developed under water sub-component of the project. The estimated cost for these demonstrations is Rs.10000 per ha including inputs and operations.

d. Demonstrations on Farm Mechanization and Post-Harvest Management (PHM) technologies

The objective of these demonstrations will be on promoting farm mechanization and Post-Harvest Management. Mechanization is the effective tool to reduce the production cost, increase the efficiency of farm and reduction in chemical weedicides. Medium category power operated/ self-propelled machines for field preparation, hoeing, weeding, planting, sowing, spraying, grading, harvesting etc. operations is included to encourage by assistance. PHM activities like farm level drying; cleaning, grading and post-harvest management of the harvested produce has also been included. It will also include provision of low cost plastic sheets to be used as movable threshing floor as well as for protection against damage by rain and water. The district unit will identify the potential implements for the cluster and will be made available to the farmers on 25% beneficiary's contribution.

e. Demonstrations on forage/ fodder

There is limited scope/ range of prevailing varieties of fodder in package of practices (POP). The programme planned to be implemented through outsourcing the agencies specified in fodder seed production. The range of fodder crops/ varieties which still could not be included in POP/ release may also be considered in the programme to foster the demand of fodder and new introduction. All inputs may be provided for these demonstrations and a part of the demonstration plot may be used for seed production of the same to ensure the seed availability of fodder crops/ varieties in the cluster. The estimated cost for such demonstrations is Rs.10000 per ha.

f. Promotion to seed production and adoption support

Seed Production: Special attention will be paid to technology empowerment of the farming community for production of quality seed of high yielding varieties of self-pollinated crops by organizing seed production demonstrations, including grading, packaging and certification and this program will be facilitated by NGO though Multi Task Groups. Seed production activity will be interlinked with FPO/ FCSC activity. Focus will be on improving the SRR of the cluster along with the improved income of the farmers. Tie-up will be made with certification and production agencies by the PIA.

Adoption Support: Quality seed of high yielding crop varieties is a critical input for increasing productivity. It also acts as a catalyst for the adoption of other improved crop husbandry practices. In view of the importance of seed in increasing crop productivity and the low seed replacement rates in the selected micro-clusters, adoption support in terms of 50% cost of seed will be provided to the farmers in the selected villages provided they give an undertaking to adopt the package of practices demonstrated for the value chain crop in the ICM demonstrations organized in that village in the preceding year. This will also help in tracking adoption rates of the demonstrated improved technologies by the farmers.

g. Innovative Activities/ INM/ IPM

The for foliar spray of micro nutrients, bio fertilizers, organic products, bio pesticides, IPM kits, pheromone traps, solar based light traps, wormy-compost units, tank based low pressure drip units, deionization units, nano-products for crop, other innovative techniques etc. are the activities which are proposed to be implemented as per need of particular crop/ technology with an assistance level of 75 percent.

Information and communication technologies (ICT) based demand driven participatory extension system (modernization of extension research linkages)

This activity pertains to creation of model information infrastructure at cluster level to support the beneficiaries for all the agricultural related problems along with the marketing support. The theme is to revitalize the existing extension system compatible with the modern techniques and farmers friendly software to support the farmers and grass root level staff on pilot basis. The KSK (Krishi Sewa Kendra) at cluster level will act as the problem solution/ technical back up and information centre, strengthened with IT and interlinked with the team of experts through software application. Efforts will be made for real time problem solution through IT enabled system. The KSK will also be strengthened with the literature, especially, related to potential threats led/ Pro-P based to support the grass root level staff for the precise identification and solution of major crop threats. The provision of technical back up from the experts at higher level has also been kept. Formation of a core team at project level to visualise and implementation monitoring of the ICT activities will be the axis of this activity.

a. KSK strengthening as model in project area-to serve as level I platform for ICT

There is a provision of Kisan Sewa Kendra (KSK) among 2-3 Gram Panchayats in existing agriculture extension system of the state. It is felt that the KSK strengthening with modern information system is a must to fulfil the need of the beneficiary. Hence, 2 KSK in cluster have been proposed to be developed as modal KSK with modern infrastructure to serve as I level solution for the beneficiary. The model KSK will be strengthened by electronic devices, literature, furniture/ fixture, minor repairs and the operating costs.

b. Agriculture Research Institute strengthening to serve as level II/ III platform for ICT –

Each KSK needs to be backed up technically with the group of experts. It has been proposed that the existing Adaptive Trial Centre (ATC)/ Krishi Vigyan Kendra (KVK)/ Agriculture Research Station (ARS)/ Agriculture Research Sub Station (ARSS)/ ICAR Institute of the concerned district will be strengthened to support the model KSK.

c. Honorarium to the II/ III level experts for solution of the problems and facilitate field visits

ICT core team will assemble quarterly to review and monitor the progress of the activity. Expert at level I will be AS, AAO, AO, ARO and AD of concerned area. Expert panel for field problem solution at the level II and III will be finalised at PMU level. These will be provided excess to the software application where field problems in the form of text/ photo/ video will be uploaded by the farmer or KSK (which could not be solved at KSK level). The same may be got analysed by the panelled expert and online solution of the problem will be communicated. For each solution the honorarium will be provided to concerned expert. There should not be any repetition of problem/ solution. In some complex cases field visit may also be made. The main discipline of the experts will be Agronomy, Horticulture, Plant Breeding, Entomology, Plant Pathology, Nematology, Soil Science, Prop-P, Fertigation, Irrigation, Agribusiness, Post-Harvest Management etc. The honorarium in the range of Rs.200- 1000 will be provided to the different level of experts for providing the solutions of the farmers' problem. However, the honorarium will be decided at competent level.

d. Digital instruments to field coordinator/ staff–

It has been proposed that some kit of digital instruments viz. smart phone/ tablet, EC/ pH meter, digital/infrared thermometer/ hygrometer, GPS, digital camera, soil sample kit etc. to the field coordinator, technical experts/ AS/ AAO/ STA/ AO/ AD may be provided for the quick diagnosis of the problem. A set of some of these instruments will be provided according to the need of the particular cluster.

e. Potential threats led/ Pro-P based literature for crop crisis management on cluster specific crops

It is proved fact that each crop has some specific/ potential problems/ threats which are generally able to reduce the yield substantially. The Production with Protection (Pro-P) technique evolved by the departmental experts Dr. Prakash Kumar and Mr.Rajendra Singh provided a methodology to transfer and utilize high level diagnosis and treatment expertise to grass root level by prescribing a written treatment to the farmers on the base of 'diagnosis and recommendation photo sheets' prepared with the help of key subject experts. These prescriptions will promote the use of scientifically recommended biological pest control methods with specific and safe pesticides/ bio-products to control the identified problem. This technique has initiated on pilot basis in Kota Division during 2014-15. The 'diagnosis and recommendation photo sheets' will support and synergize the level I experts for the quick solution of field problems. These photo sheets will develop a professional way of prescription in departmental officials and discourage the practice of misleading prescription by some dealers/ sales persons. This literature is proposed to be made available to in the cluster for major potential crops.

f. Platform/ Software development to facilitate the problem solution at the I/II/III level and user interface-

Comprehensive platform/ software application will be developed to facilitate the beneficiaries and the expert to put the problems and solutions in a very simplified manner. The software will connect KSK, level I, level II, level lII, selected beneficiaries, other stakeholders and PMU. The problem related to crops, production, plant protection, PHM, marketing etc. will be uploaded at the level of KSK/ cluster in the form of text or photo or video. The online solution will be provided by level I/ II/ III expert in most simplified way. The solution will be available/ accessible at KSK computer for the beneficiary. It will also be tried to communicate through some applications on the smartphone of grass root level officials and selected beneficiaries. The Project Management Unit (PMU) will be able to monitor the activity through the software itself. The software will be developed at PMU level. The software will also contain a set of technical information related to Agriculture sector. No provision has been kept at cluster level because this activity would be supported at PMU level.

Farmer Organization and Capacity Building

Capacity Building

Capacity building component is to be implemented on the cost norms of the RACP training manual. The cluster specific activities and the action plan in the limit of provisions should be prepared by concerned district unit. These programmes will run on year round basis.

Field days, exposure visits, orientation, capacity building-

Field days-For dissemination of the improved technologies demonstrated in the ICM demonstrations to large number of farmers, field days will be organized in the villages in which these demonstrations are organized. The field days will be organized near the harvesting or critical stage of the crop so that the farmers are able to see the differences between the prevalent farmer practice and the improved package of practices for a particular crop. Selection of fields/ beneficiaries will be made by concerned AD/DD/ DPMU through field coordinators, field staff and NGOs (if functional). Organise field days by the field staff, NGO and district coordinator with experts. PMU will approve the plan for field days.

Exposure visits- Exposure visits for farmers will be organized within the state and outside the state so that the farmers are able to see the successful production, post-harvest handling and marketing innovations developed at different places. For selection of the proposed locations to be visited/ beneficiaries by AD/ DD/DPMU, a proposal has to be sent and get approved by PIU/ PMU.

Farmer's Training: These will cover 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.

Training of Service Provider Staff: These will cover training for program implementing staff about the project design, implementation arrangements, technical areas of crop production, post-harvest management and related aspects.

Orientation/ capacity building training- Orientation and capacity building training would be the on regular basis, as and when required.

Documentation of success stories: The success stories on specific issues may be documented in the form of text, photographs with text of small films/ movies. The proposals for the same may be sent to the PIU/ PMU.

To organize above several of trainings, Irrigation Management and Training Institute (IMTI) would be nodal agency. If specific trainings are needed during course of implementation, would be organized in state as well as national level Institute.

Procurement of inputs for technology demonstrations

The inputs viz. seeds, fertilizers, PP chemicals and bio-products need to be arranged for seed production program and adoption support, demonstrations on production technologies for value chain crops, fodder, integrated drip and mini sprinkler demonstrations. The agriculture inputs are to be procured from the Cooperative sector/ Govt Agri. Research Centre/ RSSC/ NSC/ SAUs/ RAJFED instead of competitive bidding because:

1. The cooperative/ public sector agencies have a strong network in the rural area through GSS, KVSS and their retail outlets which can cater the need of scattered beneficiary in the rural area.
2. These inputs have specific packing size but the project activities require different quantities which does not match the packing. The farmers/ beneficiaries and the field functionaries are in direct touch with these cooperative outlets. Thus, group of farmers may get the inputs collectively and distributed as per their requirement. It is practically not possible in the case of private suppliers.
3. Requirement of some inputs, especially, PP chemicals and bio-products depends on outbreak of particular insect/ pest/ disease/ weed which is practically not possible to predict precisely in advance. The procurement of such inputs within a very short notice is possible from these outlets to control the losses through infestation. The formalities of formal procurement will lose this beauty which may lead to worse consequences in the fields.
4. The inputs like seed, fertilizer and PP chemical are only sold by the licensed agencies/ firms. The licenses are governed as per respective Acts and regulations. Hence, supplies are restricted with the licensed firms only.
5. The major Fertilizers have the government control over rates. Hence, the rates for the same will be similar with each supplier. So procurement through tenders for such items does not make any logical sense.

The department of Agriculture has some set procedure to procure these inputs from the cooperative/ public sector agencies which prevails from long time. Moreover, field functionaries are not allowed to procure and store such inputs from private market. Hence, procurement through bidding process will be contradictory to the field functionaries.

Annexure 5.2: Operational and Implementation arrangements (Horticulture)

Procurement of Planting Material of Fruit Plants and Inputs

The cooperative/public sector agencies have a strong network in the rural area through GSS, KVSS and their retail outlets which can cater the need of scattered beneficiary in the rural area.

These inputs have specific packing size but the project activities require different quantities which does not match the packing. The farmers/beneficiaries and the field functionaries are in direct touch with these cooperative outlets. Thus, group of farmer may get the inputs collectively and distributed as per their requirement. It is practically not possible in private suppliers.

Requirement of some inputs, especially, P.P. chemicals depends on outbreak of particular insect/ pest/ disease/ weed which is practically not possible to predict precisely in advance. The procurement of such inputs within a very short notice is possible from these outlets to control the losses through infestation. The formalities of formal procurement will lose this beauty which may lead to worse consequences in the fields.

The inputs like seed, fertilizer and P.P. chemical are only sold by the licensed agencies/ firms. The licenses are governed as per respective Acts and regulations. Hence, supplies are restricted with the licensed firms only.

The major Fertilizers have the government control over rates. Hence, the rates for the same will be similar with each supplier. So procurement through tenders for such items does not make any logical sense.

The department of Agriculture has some set procedure to procure these inputs from the cooperative/ public sector agencies which prevails from long time. Moreover, field functionaries are not allowed to procure and store such inputs from private market. Hence, procurement through bidding process will be contradictory to the field functionaries.

The requirement of planting material is very small and cluster specific according to selected value chain crop. Most of the planting material is imported from other State like Gujarat, Maharashtra, and Uttar Pradesh etc. Planting material is very soft and succulent and intend to high motility during transport so that it is not feasible to procure the small quantity of different kind of planting material from different States. RAJHANS is the only option for timely supply of planting material due to availability of all kind of planting material in their local nurseries. RAJHANS grows planting material in their 27 nurseries and also procure the planting material from different State and provide quality hybrid or grafted planting material in State.

Annexure 5.3: Operational and Implementation arrangements (Livestock)

The following activities would be undertaken at Palayatha cluster under Livestock Strengthening and management component:

a. Climate Resilient Agriculture

Productivity enhancement

Breed improvement

Breed improvement and advisory services to ensure breeding cycle coincides with market demand, climatic conditions/ resources availability. This will include:

i. Improved Bucks distribution to MTG members

ii. Goat distribution to Widows and/or especially abled women for livelihood development

iii. Risk Coverage through Animal Insurance

Low milk yield and low weight gain in non-descript goat population of the cluster is the major constraint for improving the farmers income. Department of Animal Husbandry breeding policy recommends Sirohi breed for the cluster area, so it is planned to induct elite breeding bucks in the area. Project will support distribution of breeding bucks to those MTG (Goat) members have at least 10 breeding goats. It is found that in the cluster many women especially widows and disabled are in need of livelihood support and they are willing to adopt goat farming. It is planned to support these women to provide a unit of 4 Goats for adopting goat farming. Asset insurance is critical for the poor and small holder farmers; under the project distributed bucks and goats will be insured with project support.

Activity	Total Requirement	Year Wise requirement		
		I year	II year	III Year
Buck Distribution	250	50	100	100
Goat Distribution	100 MTG Members	30	35	35
Animal Insurance	650	170	240	240

The primary objective of investment under livestock strengthening and management component of RACP (Rajasthan Agriculture Competitiveness project) is to improve Goat productivity and provide market access for the produce. This will improve the competitiveness of the small holder and improve her income from the activity.

Goat productivity **majorly depends upon the breed** and also on nutrition & management. In context of the project cluster small goat rearer keeps non -descript (not true to breed) goats; this results in low milk production and weight gain. To improve the breed of the goat of the farmers in the project clusters; it is envisaged to induct quality bucks to those MTG members who are already keeping goats.

Project will primarily support **sourcing of elite bucks from open nucleus farm (RAJUVAS) for multiplier herds and from the multiplier herd to the MTG members.** Goat usually reared by small & medium landholders that too 50-100 in numbers (max) by a farmer; looking to the constraint of resources esp. fodder & space availability. These farmers keep very good quality goats and bucks and by selling the progeny maintain their herd size. These farmers are usually available on the breeding tract of the particular breed. So in a sense well organized suppliers/vendors in the form of large breeders are very limited for buck & goat procurement. The entry of a supplier in this value chain not only increases the price but also restricts the choice for the MTG member.

It is proposed to **procure buck and goats** by a cluster level committee (including MTG members & Veterinary doctor of the department of animal husbandry). The committee will procure from organized Farms (very few) and in case of non-availability/ suitability they may procure from private farmers of the breeding tract.

In the case of animals' procurement, **selection of each animal is important because standardization of all characters and uniformity among all is not possible**. In the project farmer's contribution for buck purchase is 25 percent of the purchase cost. Bucks & goats being the valuable asset of poor small holder farmer, it is always advisable to cover the risk factor of mortality of the animal or permanent disability through insurance coverage. Considering the importance of Buck/Goat insurance coverage, the component was included in the animal husbandry activities. MTG members will also contribute 25 percent of the insurance premium cost and rest 75 percent will be supported as project contribution.

Integrated Livestock Development Centres: Project will support establishment of Integrated Livestock Development Centers (ILD) for the Services of **Artificial Insemination and veterinary first AID to Cows & Buffaloes the doorsteps of the Farmers**. There shall be one ILD Centre for 1500 breed-able cattle & buffalo population in one or two panchayat having no Veterinary Institution. Depending upon the density of animal population, DAH may relax this condition in certain cases. Exact location would, however, be decided in consultation with the District officers of state department of Animal Husbandry

Improved feeding practices:

This may include better utilisation of local resources; improving fodder availability, silvi-pasture development on common lands and fodder demonstration on private lands, better integration of crops with livestock through simple storage, production and processing of crop residues to include, feed blocks, chaffing and fodder banks. This will improve feeding practices which proposed are described in the following points:

Azolla Demonstration to MTG members

The cost norm for demonstrations would cover the expenditure on provision of critical inputs i.e. know-how, seeds, fertilizers, insecticides, micronutrients etc. Fodder Demonstration will be organized/laid out on the field of members of MTGs linking up with Department of Agriculture.

The demand for milk and meat is creating new potential in the profitability of animal husbandry as an occupation. Yet, at the same time, there is a substantial decline in fodder availability. The area under forest and grasslands is decreasing as is the amount of various crop residues available for feed, largely due to the introduction of high yielding dwarf varieties. The shortage of fodder is therefore, compensated with commercial feed, resulting in increased costs in meat and milk production. Moreover, as commercial feed is mixed with urea and other artificial milk boosters, it has a negative effect on the quality of milk and the health of the livestock. The search for alternatives concentrates led us to a wonderful plant azolla, which holds the promise of providing a sustainable feed for livestock.

Azolla is a floating fern and belongs to the family of Azollaceae. Azolla hosts symbiotic blue green algae, Anabaena azollae, which is responsible for the fixation and assimilation of atmospheric nitrogen. Azolla, in turn, provides the carbon source and favourable environment for the growth and development of the algae. It is this unique symbiotic relationship that makes azolla, a wonderful plant with high protein content.

Demonstration of Azolla with capacity of producing sufficient Azolla for feeding minimum 20 +1 unit of goats daily (Approximately 3 KG. Daily) will be organised at MTG's field. AS being the new technology, initial 1-2 days field training & hand holding support and all inputs will be provided with project support. One demonstration is proposed to be given to a farmer.

Activity	Total Requirement	Year Wise requirement		
		I year	II year	III Year
Azolla Demonstration	400	0	200	200

Chaff cutter Demonstration to MTG members

To save the wastage and improve digestibility of fodder, the project will demonstrate and motivate chaff cutter use by small holder farmers. Good quality manually operated Chaff cutter as per BIS specification will be provided to goat rearer with project support**.** DAH through NGO will promote regular use of chaff cutter.

Activity	Total Requirement	Year Wise requirement		
		I year	II year	III Year
Chaff Cutter Distribution	300	0	150	150

Feed supplement to Goat & Buck of the cluster:

Goats have an ability to thrive in the harshest environments. Their high digestive ability enables them to deal with high cellulose/high fibre diets of a very coarse nature; with its relatively large digestive system in relation to its body size, the work of digestion involves the use, and loss, of large quantities of minerals. Goats are also prolific breeders; achieve sexual maturity at the age of 10-12 months. Gestation period is short and at the age of 16-17 months starts giving milk. Twining is common and triplets and quadruplets are also possible.

It is observed that growth rate (body weight gain) and timely fertility gain of female goat restricts goat farming economics in the cluster. One of the reasons in the cluster is absence of essential minerals and

vitamins in the goat feed. Small holder's lack resources to buy quality feed supplement and DAH resources usually exhaust with large dairy animals.

In this context project may support the goat population of the cluster for feed supplement (20 gm per day for 90 days in a year) to demonstrate the benefits:

Activity	Total Requirement	Year Wise requirement		
		Ist year	II year	III Year
Feed Supplement	9340	0	4670 Buck & Goat	4670 Buck & Goat

Animal Health Services

It is observed that timely availability of animal health services both prophylactic and curative are very important for ensuring productivity and this leads to better returns to the farmers. Common diseases like PPR, ET and kid mortality can easily be controlled by animal health management. For animal health management major identified needs in the cluster are:

a. Availability of animal health services at village level

b. Regular Deworming and Vaccination

c. Local Resource for motivation and support

d. Regular health check-up of the stock

e. Strengthening of Animal Husbandry institutions for providing quality animal health care

For the above proposed activities/facilities the following investments are planned for livestock owners especially the small holders

Establishment of Rural Technology Centers (RTCs)

Suitable existing institutions of Department of Animal Husbandry will function as Rural Technology Centres (RTCs) in the project clusters at the strategic location for livestock development with aim to provide health, prophylactic services and centres for technology demonstration & extension.

There would be two types of RTC: A & B Grade, "A" grade shall ideally be centrally located. Vet. Doctor placed at RTC 'A' grade will be responsible for organising all the project activities under DD LSD / OIC RACP supervision, in the cluster and also manage emergency animal health services.

DAH has 3 Veterinary hospitals (Anta,Siswali,Palayatha) and 5 sub centres (Sindhpuri, Amalsara, Patunda, Bhojyakhedi, udhpuria) in the project area. But available infrastructure is not sufficient to provide effective services to the livestock owners. Therefor additional support is required for extension and capacity building services at technology centres.

Following Locations in discussion with community and department of AH are identified for RTC's in the Palayatha cluster

RTC "A" Grade:- Palayatha

RTC"B" Grade;- 1. Patunda and 2. Bhojyakhedi

Project will support building construction and procurement of basic furniture, equipment's and recurring expenditure during project period for effective functioning of RTCs. RTC will have organic relation with DAH as after the project period, assets and functions will be transferred to DAH. The RTC will also have facility for feed & fodder, vaccine, medicines & mineral mixture Storage. Meeting place for MTA/PO/Cluster federation, RTC can be a place for organising health camps, training, exhibition and seminars.

RACPPMU & DAH with the help of construction expert will finalise the design of the RTC. RTC will also have required equipment and furniture etc. Facilities for organising trainings, meetings and farmer's workshop will also be created. The project will also support operating cost of the RTCs that will include office expenses, running and maintenance cost of the emergency mobile vehicle.

Health and Awareness camps

a. It is planned to organize need based health and sterility camps periodically through Rural Technology Centre (RTC)/ DAH institutions in order to cover all health related issues in the project area and provide services at the village level itself. The health camps will be organized for vaccination; deworming, etc. **at least once in a month in each gram Panchayat**. The cluster covers 10 Gram Panchayats, so 9 Animal Health Camps per month will be organised.
b. Organization of health care and awareness camps by RTC/ DAH institutions where activities like vaccination, de-worming, castration, Feed supplement distribution, treatment, extension, etc. will be undertaken.
c. Health check-up and treatment of infertile animals shall be covered in these camps. Department of Animal Husbandry in consultation with research institutions shall provide technical aid in addressing health related problems in the project area.
d. DAH will organise health camps under its free vet. Medicine and **"Pashu Chiktsayalya Pashu Palakke Dwar"** scheme and project will financially support Rs.5000 per camp for additional expenses. This will cover expenses towards registration/vaccination, cleaning, tent, sitting, water, publicity, small refreshment and miscellaneous/contingency.
e. Further the opportunity will be used for organising Farmer's meeting (Pashu Palak Goshti) of at least 50 farmers for disseminating the latest technical and other information and knowledge of animal husbandry.

Activity	Total Requirement (No)	Year Wise requirement		
		I year including 2015-16	II year	III Year
Animal health Camps (One per GP per month)	404	188	108	108

Mobile Emergency Animal Health Van cum Ambulatory clinic:

The mobile emergency animal health van cum ambulatory clinic is an excellent support tool for implementation of the activities related to the animal husbandry. The Mobile van will provide animal health services.

The Project will provide one Mobile animal health van cum ambulatory clinic in the cluster and 100% cost will be borne by the project and it will be procured by the project as per the World Bank procurement guidelines. The project will also support its running and recurring expenditure during the project period. It will be handed over to the DAH and will be used for providing the services in the cluster The Mobile vehicle shall be equipped with storage of medicine/ vaccines, primary testing and minor surgical interventions.

Installation of Travis in project cluster:

Project will support the animal health services in the project cluster villages, and for inspecting the animal it is essential to restrain the animal. This is safe for the professional and also comfortable for the animal.

It is planned to install Travis for restraining the animals in all the villages where already not available through department of animal husbandry. It is found that **22 villages** of project cluster do not have Travis installed for animal inspection, so 2 Travis will be procured and installed with project support.

Animal husbandry management and advisory support

Distribution of Feeding and water troughs to MTG members

It is observed that there no standardisation in feeding and watering appliances. The animals tend to contaminate the feed in most of these devices by voiding faeces and urine and by standing inside or over these feeders or keeping the fore legs inside these devices. Farmer incurs about seventy per cent running expenditure on feeding material. To minimise the cost it is of utmost importance to reduce the wastage and contamination of feed and to increase efficiency of feeders. It will also help in the prevention of goat diseases, caused due to contamination of feed and water. Design developed by CIRG (central Institute for Research on Goats) Makhdoom U.P. will be utilised as these feeders are suitable for various types of feed and fodder.

Activity	Total Requirement (No)	Year Wise requirement		
		Ist year	II year	III Year
Feeding & Water Trough	400	0	200	200

Goat Housing

Presently Goat rearing on zero input concepts is mainly sustained but this does not provide attractive returns to the farmers. Goat are exposed to harsh environmental conditions, does not provided balance ration and scientific health management; leads to underutilization of resources and lower returns.

Project will support adoption of intensive or semi intensive goat management system by the farmers. Goat housing is important in intensive system of production; in fact one must ensure proper comfort of animals for production to gain maximum profits. The main aim of housing is to protect animals from harsh, uneven climate as well as environmental stress. The goats shall be provided enough floor space to avoid crowding and proper ventilation.

Project will support construction of goat house for one (20 goats+1Buck) Unit with 220 Sq Feet floor space. The design will be prepared by utilising the local material to reduce cost.

As referred from the NREGA guidelines the goat house for 20 goats cost Rs.66000 per house. The same low cost houses may be supported in the project. Goat farming is primarily adopted by poor and small holders' farmers and their capacities to create asset is always limited. Project may support 75 per cent of goat house cost and remaining 25 per cent cost will born by the beneficiary.

Activity	Total Requirement (No)	Year Wise requirement		
		Ist year	II year	III Year
Goat House	50	0	25	25

Lady Link Worker cum Marketing Facilitator

Small Ruminant development especially for small holder is possible only through regular and timely help. This is only possible when a local resource person is available with information and professional linkage. Under the project it is envisaged that one progressive women farmer preferably MTG member per Gram Panchayat, will be trained as resource person i.e. Lady Link Worker cum marketing facilitator.

This worker will be the local common linkage both for the project and women farmer. She will maintain the inventory of MTG members', their goats, goat health status, project activities schedules etc. She will coordinate organisation of camps and Goat Haats for the project beneficiaries. In Palayatha cluster 9 Lady link workers will be selected as per the guidelines and trained for the responsibilities through ARAVALI.

Roles and Responsibilities:

a. LLW will facilitate extension services; make farmers aware about vaccination, de-worming and health care, feed - fodder and housing and other management practices.

b. LLW would support in timely implementation of various activities planned under AHD component of RACP

c. LLW would also facilitate formation and mobilising the MTG (goat)

d. LLW shall play a role in creating awareness about animal health, safety in case of outbreak of contagious diseases, extreme climatic changes like heavy Rainfall, flooding, extreme cold and hot temperatures, food scarcity due to drought.

e. LLW shall creating awareness in neo-natal care of young kids and does, weaning and milking of goats.

f. Lady Link Worker shall play role of entitlement facilitator and enhancing outreach of schemes of Department of Animal Husbandry to marginalized farmers.

g. She will maintain an inventory of ready to market animals for organizing rural haats and also motivate farmers to sell animals on weight basis.

These LLWs will be supported for monthly worked related honorarium.

b. Market and Value Chains

To improve market and value addition, the project will support:

Formation of Farmer Producer groups

Multi Task Groups (MTG) for Goats that would enable the producer to access diversified markets, better access to inputs and services on a gender equitable basis and access to market information. The Goat farmers are to be organized into MTGs @10-15 farmers per MTG through NGO selected by PMU RACP. On the basis of the potential of goat farming and available resources a total of **50 MTGs (Goat) will be organized in the project cluster**. Selection criteria for Small Ruminants (SR) farmers to become member of MTG would be as follows. Farmer should be:

i. Only women and preferably small or marginal goat rearer

ii. possess at least 3 goats (not essential for widows and specially abled)

iii. Willing to participate in the programme and willing to contribute her investment as per pattern of funding.

iv. Members of SC/ST community must be included at least as per the funding pattern.

The list of members shall be informed to Gram Panchayat, if Gram Panchayat have any observation/suggestion shall be communicated to Implementing Agency for improvement.

Distribution of weighing scale to MTG members

Live goat sale is the largest adopted method by the small holder farmers. Some time in case of urgent need it becomes ready cash for the farmer. Goat sale usually occurs through middle man, who are taking the

benefits of approximation and cheats the farmer by paying less in comparison to animal's actual weight. Project may provide advisory to MTG members for weighing the animals before selling and will also provide weighing scale for ready use. Weighing scale will also help farmers to know the weight gain of animals for supporting the right quantity of feed intake.

Activity	Total Requirement	Year Wise requirement		
		I year	II year	III Year
Weighing Scale	750	0	750	0

c. Capacity Building and Training

Goat Management training of MTG members

A training need analysis has to be done for various stakeholders like goat farmers, NGO, and AHD staff. Accordingly the relevant training programs will be organized for all the stakeholders. It will be ensured that majority of the members of MTG receives basic training involving skill upgradation and orientation on the technical and organizational aspects.

Project will support to organize exposure visits of successful Animal Husbandry projects for members of MTGs and professional staff with the aim to adopt best practices and improved technologies. Project will also support refresher training of the professional staff engaged in project implementation at national level institute in relation to goat development.

In each village all the members of the MTG will be given Goat management 3 Days training at RTC/GP/Village level. This will cover General Management, Breeding, feeding esp. fodder development and Goat marketing esp. synchronization as per the market demand.

Activity	Total Requirement (No)	Year Wise requirement		
		Ist year	II year	III Year
3 days MTG Goat Management Training & 1 day refresher course	750 MTG Members	0	400	350

Professional Training

It is observed that the knowledge of the veterinary professionals in the project cluster is also limited for goat management practices especially for latest development for feed and breeding.

Professionals training of the DAH and project staff will be organized at reputed national institutes.

Goat Exhibition cum Seminars

Goat Exhibition cum Seminars will be organised to motivate farmers for rearing quality animals and showcasing the best practices. RTC will take the initiative with the help of NGO and under JD/DD LSD supervision. The goat exhibition cum seminars will be organised at the cluster level and as per the approved action plan and Project guidelines

Annexure 5.4: Post intervention value chain map

1. Soybean

The post intervention value chain map for Soybean may be visualised as one with three production-distribution or activity-marketing channels: edible oil, feed and value added products like soy paneer, tofu and Soybean flakes. It is also envisaged that PCs of producers with FCSCs is evolved. Such FCSCs only undertake storage, grading and sorting and packaging of produce activity. These FCSCs may offer other related services in terms of input facilitation, custom hiring, facilitating B2B connectivity etc.

Farmers' income from Soybean cultivation may be enhanced. Presently, the gross yield per acre is 12 quintals per acre. The market rate of sale is about Rs.3300 per quintal or Rs.39, 600 per acre. The cost of cultivation is about Rs.12, 044 per acre. The net realization is Rs 27, 556 per acre. Other than good harvest practices, input facilitation (high seed prices during cropping season) needs to be provided/disseminated amongst farmers.

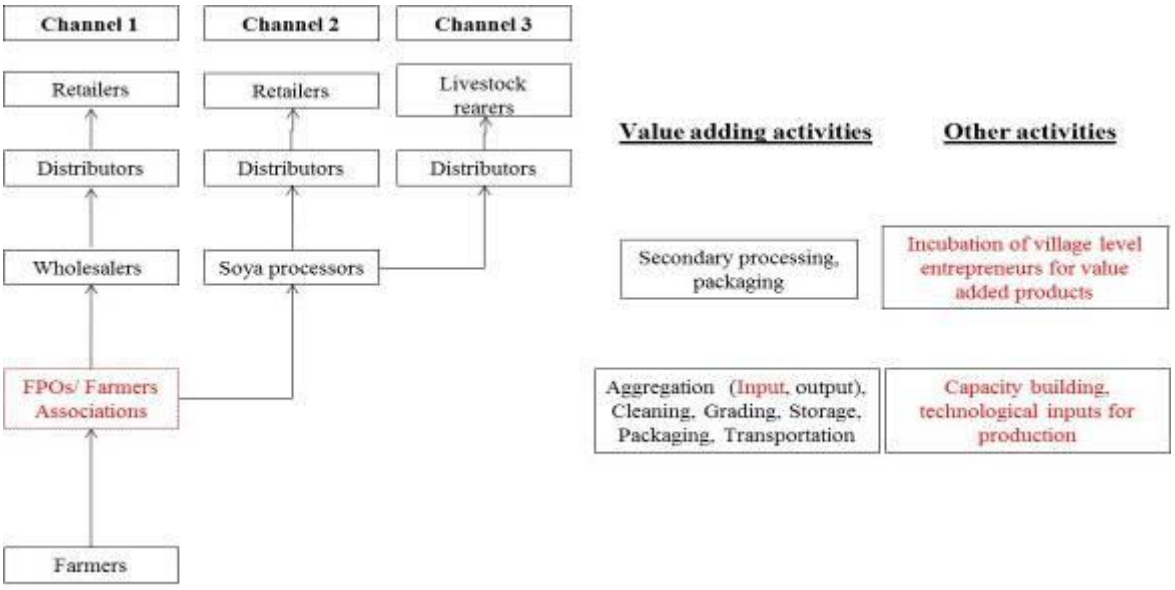


Figure 16: Indicative post-intervention value chain map of Soybean

2. Wheat

The post-harvest value chain may be viewed in terms of one additional channel being developed into value added products through start-ups in fortified atta, wheat flakes etc. where there are also large players like ITC (ashirwad atta) and Kellogs. Also, PC of farmers could be evolved to undertake primary processing, grading, sorting, storage activities and also promote alternate markets.

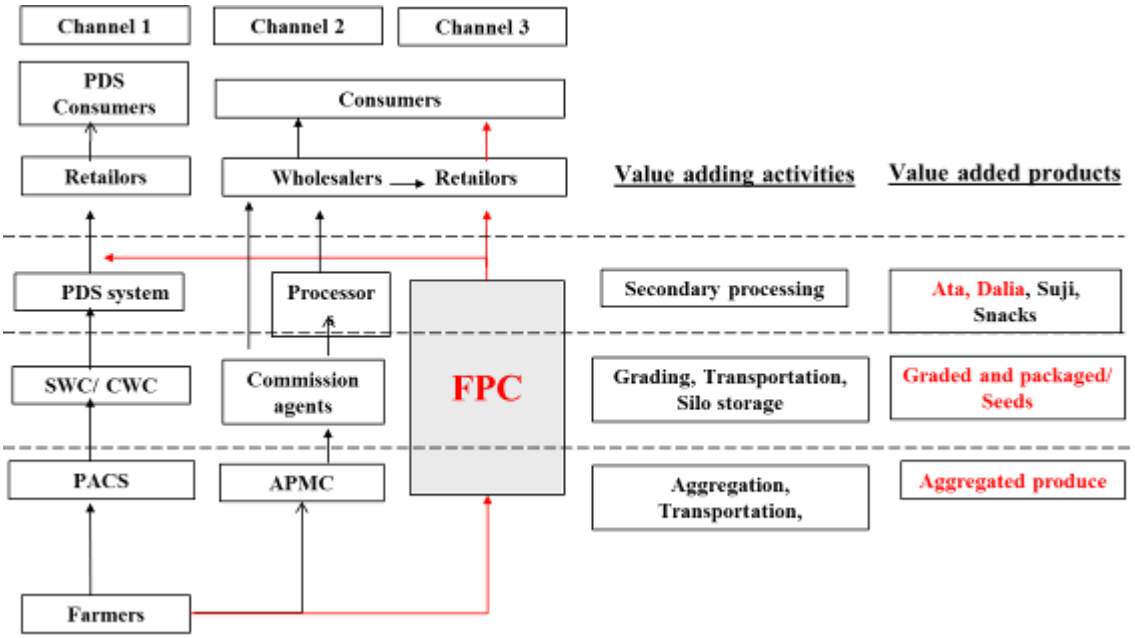
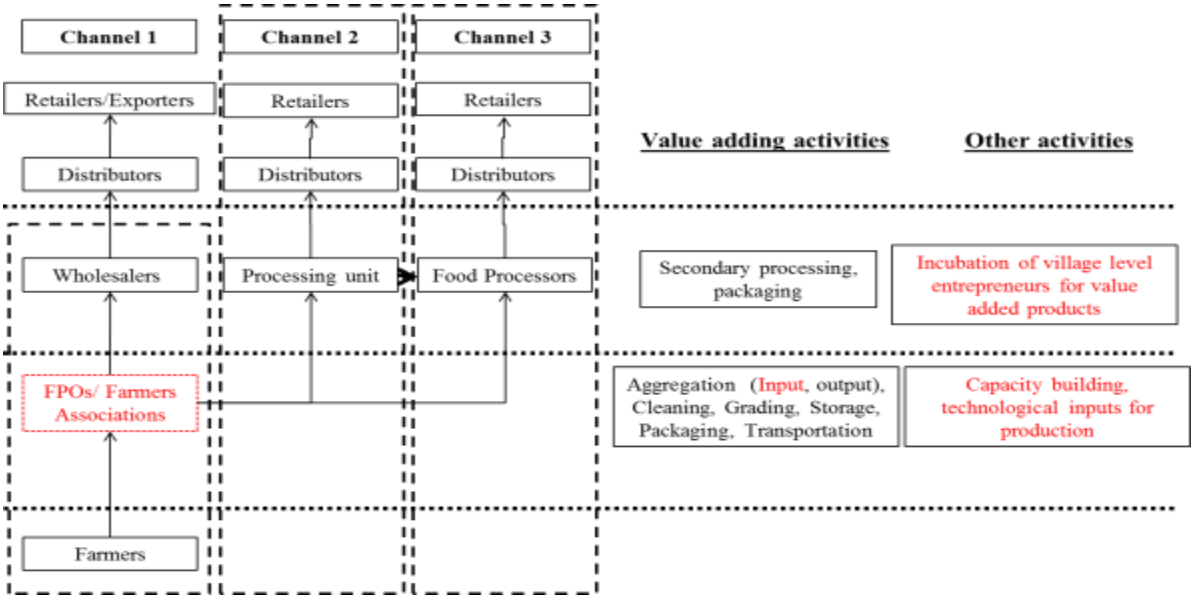


Figure 17: Indicative post-intervention value chain map of Wheat

3. Garlic

The post intervention value chain map for Garlic may be visualised as one with the production-distribution or activity-marketing channels: raw garlic and value added products like dehydrated garlic, Garlic paste, garlic pickle, Garlic powder, vinegar. It is also envisaged that PCs of producers with FCSCs is evolved. Such FCSCs undertakes cold storage, drying, curing, grading and sorting and packaging of produce activity. These FCSCs may offer other related services in terms of input facilitation, custom hiring, facilitating B2B connectivity etc.

Figure 18: Indicative post-intervention value chain map of Garlic



4. Goat

An indicative post intervention value chain map for goat milk is shown below:

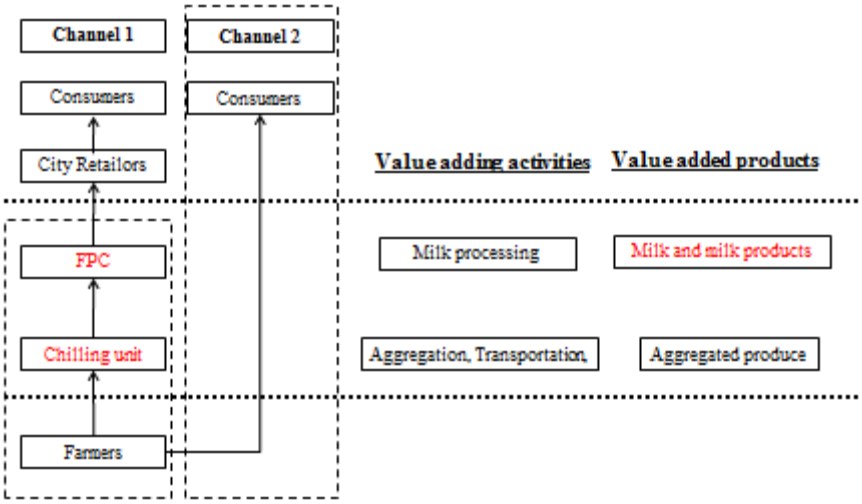


Figure 19 Indicative Post intervention value chain map of Goat milk

A value chain study on goat meat has been done and the value chain map for goat meat is shown below:

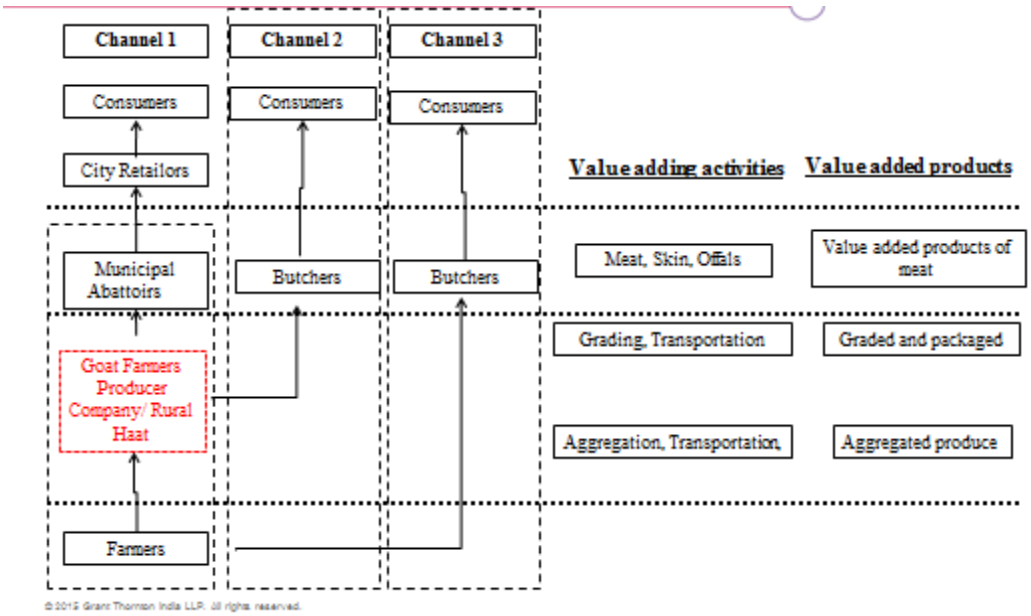


Figure 20 Indicative Post intervention value chain map for goat meat

Annexure 5.5: Activities for soft intervention

Scouting of technologies and business ideas for such identified commodities

The ABPF shall scout for new and innovative models in agriculture and allied sector for developing local entrepreneurship for providing productive services to value chain stakeholders.

It shall include the following activities, but not limited to: (i) review of literature, (ii) participatory meetings with market participants and representatives of relevant business models such as – producers, aggregators, transport facilitators, storage facilitators, commission agents, wholesalers, retailers and ultimate consumers, (iii) field work (surveys on existing cold stores, pack houses, ripening rooms etc., surveys to assess the potential for establishing new marketing venture for FCSC, E-Trading and the role of local aggregators), (iv) analysis of the data / information, (v) feedback from market participants & relevant agencies, (vi) sharing the business models on a web platform.

Incubation services to Agri-entrepreneurs

ABPF shall provide agri-business incubation services, with the objective to identify, mobilize and groom emerging agro entrepreneurs and CBOs.

Training on market research methodologies, business proposals, business skills, business plan preparation, grants access, financial linkages and market linkage, legal framework, etc. to establish own business through competent trainers subject to approval from PMU-RACP.

ABPF shall also empower the youth and women to start their agri-business resulting in their social and economic development. At least 10% women candidates are desirable among the candidates trained under incubation program. The ABPF will be responsible for networking with other entrepreneurs, customers and other support agencies; provide mentorship support through development of a resource base of mentors, and subsequently ensure their deployment.

Management and Business Training to FCSC and Producer Companies personnel

The ABPF shall undertake training for management & business skill building for personnel of the Producers' Companies (PCs) and Farmer Common Service Centres (FCSCs) under the project. The ABPF shall develop comprehensive training plan.

Training is provided to personnel with an objective of enhancing the knowledge & skills of PC personnel (related to management of FCSC) for efficiently facilitating management & business of the FCSC.

#	Name of Component	Name of sub-component
1	Capacity building	Field days, exposure visits, orientation, capacity building
		Field days

		Exposure visits (Within state)
		Exposure visits (Out of state)
		Orientation
		Capacity Building

Facilitating Agri Policies

Agro-Processing and Agri-Marketing has been included as a Thrust sector in RIPS 2014. All Agro-Processing and Agri-Marketing Units shall be eligible for benefits under RIPS 2014.

Following additional incentives would be admissible under this Policy after obtaining the entitlement certificate under RIPS 2014.

Incentive for market development and diversification:

- Transport subsidy on export of the spices
- Subsidy on the export insurance
- Vehicle Registration Concession (Reefer vans and chilled milk transportation vehicles
- Incentives for quality and certification
- Incentive for project development
- Transport subsidy on export of Fruits & vegetables
- Incentive for Research & Development
- Incentives in Land Related Issues

It shall also facilitate agriculture policy seminars thereby providing a forum for stakeholders (agri industry, NGOs, PCs, Govt. bodies, etc.) in Rajasthan to discuss improvements to the agribusiness investment climate.

Linking producers and producer groups to the market

The ABPF shall retain the important role to identify and develop linkages between producers and processors so that return realized should be greater and major part of the consumer money should go down to the producer.

Market Information services

After the analysis of the existing information services, there is a scope of development of online portal based on the inputs from mobile based application as well as conventional method. As a pilot intervention, such portal can be developed to cater to the cluster area and which can gradually be rolled over to the whole district and eventually the state.

Existing sources of information services are as follows:

a. Mobile based applications

- **Agmarknet**

AGMARKNET portal also providing market information by connecting more than three thousand regulated markets of country to the farmers but due to lack of awareness and computer system, farmers are unable to access it. AGMARKNET Portal provides following information to farmers:

  - Dissemination of market information for arrivals and prices of crops grown across the states without the limit of geographical boundaries
  - Provides information on weather forecast, crop advice, use of fertilizers & pesticides etc.

- Up loads latest research reports related to marketing and analysis of information and trends in prices, demand on continual basis.

The sampled farmers were not using this facility as they are unaware about these facilities. However, they get market information from fellow farmers and traders.

IKSL –Iffco Kisan Samridhi ltd. is offering voice based message services in this area.

b. Conventional method

- **Kisan Call Center (1800-180-1551)**[2]

The country today has an impressive telecom network both in the private and Government sector. Over 5 lakh villages have a public telephone in the country. It has been felt for long that this impressive telecom network could be put to effective use for delivering knowledge and information to the farming community. A call centre based extension service will be delivering knowledge and information exactly as per the requirements of the farming community. This system would also help to keep a record of what is being delivered to the farmers in terms of knowledge and information. The Kisan Call Centre scheme is available throughout the country. The Kisan Call Centre scheme has been functioning from 21.1.04.**The Call Centres can be accessed by farmers all over the country on common Toll Free Number 1800-180-1551.** Since 10th June, 2004, the Call Centres service has been made available right from 6 A.M. to 10 P.M. except on Sundays and gazetted holidays, beyond these hours the calls are attended in the voice recording mode.

The calls are received at 13 Call Centres wherein 116 Agriculture Graduates attend to answer the queries of the farmer in the local language. 123 experts located in different parts of the country at State Agriculture Universities, ICAR institutes, State Department of Agriculture, Horticulture and other developments are answering the calls at Level –II.

The SMS service has been started by the National Bank for Agriculture and Rural Development (NABARD) in collaboration with the India Meteorological Department (IMD, agrimet division). The focus of the project includes meteorological advisory services to the farmers, bringing together experts and grass-root level communities with the objective of making knowledge accessible to farmers, dissemination of agriculture advisory and feedback from farmers through the involvement of farmers clubs, joint liability groups, village watershed committees in area where watershed projects are being implemented and research and development in operational agriculture meteorology.

- **India Meteorological Department**

The service is provided by the India Meteorological Department, under the Ministry of Earth Sciences of Government of India. The IMD has set up nine agromet field units (AMFU) in the state. After these units get the forecast, they prepare agro advisory with the help of experts. This advisory is sent to IMD where the bulletin is composed and then disseminated to farmers through SMS, radio, newspapers and other means.

- **Tata Consultancy Services (TCS)**

The Tata Group's information and technology firm created a customizable Mobile Agro Advisory System called mKrishi that would address farmers' specific queries in real time. The name mKrishi combines "m" for mobile and "krishi," which refers to agriculture in many Indian languages.

[2] http://liferajasthan.blogspot.in/2011/04/know-kissan-call-center-1800-180-1551.html

Annexure 5.6 Profit and loss statements of selected business models

Table 57: Profit and loss statement of Wheat processing unit

Figures in Rs.

Particulars	Y1	Y2	Y3	Y4	Y5
0					
Cleaning and grading	720,000	819,000	926,100	1,041,863	1,166,886
Flour mill	1,512,000	1,719,900	1,944,810	2,187,911	2,450,461
Total Revenue	**2,232,000**	**2,538,900**	**2,870,910**	**3,229,774**	**3,617,347**
Fixed Cost	381,400	400,470	420,494	441,518	463,594
Variable Cost	984,326	1,119,671	1,266,090	1,424,351	1,595,273
Total Operational Expenses	**1,365,726**	**1,520,141**	**1,686,583**	**1,865,869**	**2,058,867**
Earning Before Interest, Depreciation, Taxes and Amortization (EBITDA)	**866,274**	**1,018,759**	**1,184,327**	**1,363,905**	**1,558,479**
Depreciation	220,000	220,000	220,000	220,000	220,000
Amortization	-	-	-	-	-
Earnings Before Interest and Taxes (EBIT)	**646,274**	**798,759**	**964,327**	**1,143,905**	**1,338,479**
Interest Expense	-	-	-	-	-
Earnings Before Taxes (EBT)	**646,274**	**798,759**	**964,327**	**1,143,905**	**1,338,479**
Tax	153,349	215,144	279,028	345,554	415,260
Earnings After Taxes (EAT)	**492,925**	**583,615**	**685,299**	**798,350**	**923,220**

Table 58: Profit and loss statement of groundnut oil mill unit

Figures in Rs.

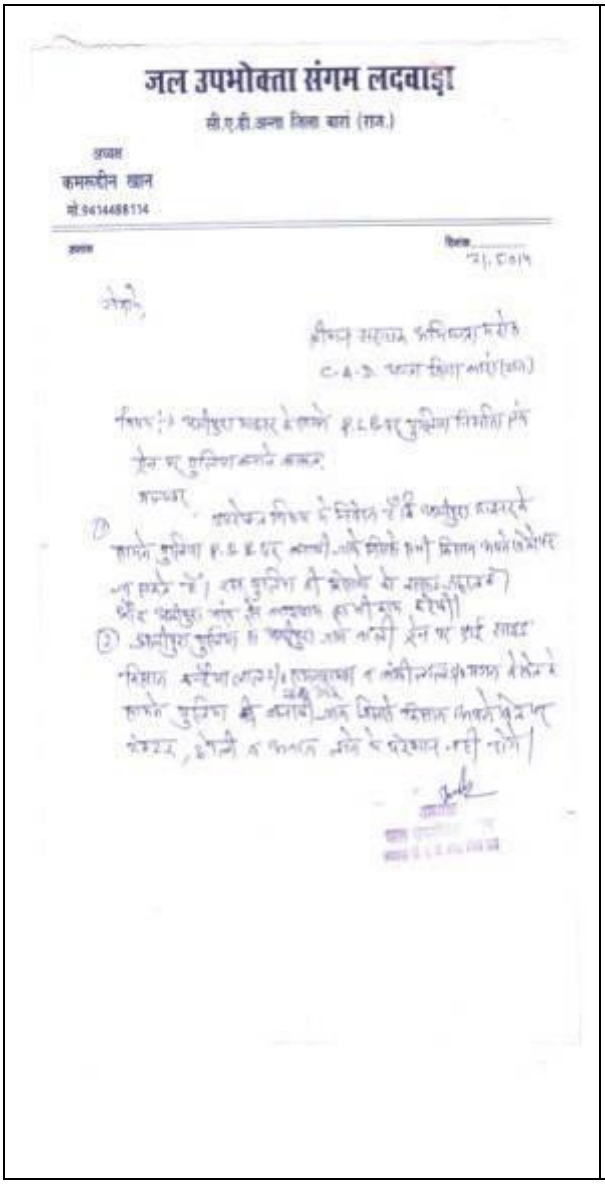
Particulars	Y1	Y2	Y3	Y4	Y5
Garlic Grading	360,000	415,800	476,280	541,769	612,615
Garlic Peeling	840,000	970,200	1,111,320	1,264,127	1,429,435
Garlic Drying	300,000	346,500	396,900	451,474	510,513
Garlic Powder/ Paste	420,000	485,100	555,660	632,063	714,718
	-	-	-	-	-
Total Revenue	**1,920,000**	**2,217,600**	**2,540,160**	**2,889,432**	**3,267,281**
Fixed Cost	441,400	463,470	486,644	510,976	536,524
Variable Cost	693,600	801,108	917,633	1,043,807	1,180,305
Total Operational Expenses	**1,135,000**	**1,264,578**	**1,404,276**	**1,554,783**	**1,716,830**
Earning Before Interest, Depreciation, Taxes and Amortization (EBITDA)	**785,000**	**953,022**	**1,135,884**	**1,334,649**	**1,550,451**
Depreciation	233,000	233,000	233,000	233,000	233,000
Amortization	-	-	-	-	-
Earnings Before Interest and Taxes (EBIT)	**552,000**	**720,022**	**902,884**	**1,101,649**	**1,317,451**
Interest Expense	-	-	-	-	-
Earnings Before Taxes (EBT)	**552,000**	**720,022**	**902,884**	**1,101,649**	**1,317,451**
Tax	124,218	191,819	261,859	334,970	411,759
Earnings After Taxes (EAT)	**427,782**	**528,203**	**641,024**	**766,679**	**905,692**

Table 59: Profit and loss statement of goat milk processing unit

Figures in Rs.

Particulars	Y1	Y2	Y3	Y4	Y5
Cleaning and Grading	1,944,000	2,211,300	2,500,470	2,813,029	3,150,592
Total Revenue	**1,944,000**	**2,211,300**	**2,500,470**	**2,813,029**	**3,150,592**
Fixed Cost	381,400	400,470	420,494	441,518	463,594
Variable Cost	731,520	832,104	940,918	1,058,532	1,185,556
Total Operational Expenses	**1,112,920**	**1,232,574**	**1,361,411**	**1,500,050**	**1,649,150**
Earning Before Interest, Depreciation, Taxes and Amortization (EBITDA)	**831,080**	**978,726**	**1,139,059**	**1,312,978**	**1,501,442**
Depreciation	222,500	222,500	222,500	222,500	222,500
Amortization	-	-	-	-	-
Earnings Before Interest and Taxes (EBIT)	**608,580**	**756,226**	**916,559**	**1,090,478**	**1,278,942**
Interest Expense	-	-	-	-	-
Earnings Before Taxes (EBT)	**608,580**	**756,226**	**916,559**	**1,090,478**	**1,278,942**
Tax	141,701	202,194	264,617	329,521	397,439
Earnings After Taxes (EAT)	**466,879**	**554,032**	**651,942**	**760,957**	**881,503**

Annexure 6.1: The Detailed Survey Done By Technical Agency


जल उपभोक्ता संगम लदवाड़ा

सी.ए.डी. अन्ता जिला बारां (राज.)

अध्यक्ष

कमालुद्दीन खान

मो.9414488114

दिनांक 21.5.2019

सेवा में,

[illegible] सहायक अभियन्ता महोदय

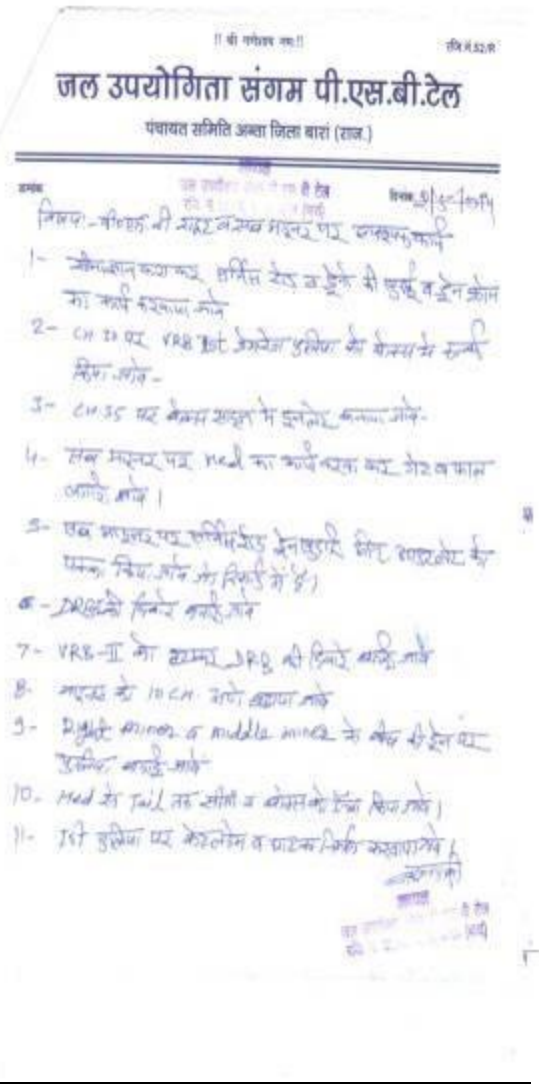
C-A-D [illegible] बारां (राज.)

विषय :- पालीपुरा मायना के सामने R.L.B.C. पुलिया निर्माण हेतु ड्रेन पर पुलिया बनाने बाबत्

महोदय,

उपरोक्त विषय के संबंध में हमें पालीपुरा मायना के सामने पुलिया R.L.B.C. पर बनानी और सिंचाई हेतु पानी उपलब्ध नहीं हो सके। इस पुलिया की वजह से मायना-महुआना और पालीपुरा गांव के लगभग 150 परिवारों को बहुत परेशानी होती है।

2) पालीपुरा पुलिया से पालीपुरा और लदवाड़ा ड्रेन पर कई साल पहिले कर्मचारी (लाइनमैन) व ठेकेदारों द्वारा लकड़ी के खोखे के सामने पुलिया की बनावट, जो कि पहिले पानी निकलने के हिसाब से बनाई, होनी व पानी आने के परेशान नहीं होवे।


!! श्री गणेशाय नमः !!

जल उपयोगिता संगम पी.एस.बी.टेल

पंचायत समिति अन्ता जिला बारां (राज.)

दिनांक 5/6/2019

विषय:- चौथाई की गहरा व उथल महुना एवं लालसागर

1- जोमेशवान कच्चा चक, सर्वित खेड़ा व डूंगरे की खुदाई व ड्रेन लोग का कार्य करवाना होवे

2- CH 0 पर VRB Bot केनाल पुलिया की बनावट के सम्बन्धि लिया होवे

3- CH 35 पर केनाल साइड में ड्रेनेज बनाना होवे

4- सब माइनर पर Head का कार्य पक्का कर गेट व पाल लगाये होवे।

5- सब माइनर पर सिंचाई हेतु खुदाई लिए रास्ता लेवल कर पक्का किया होवे जो किसी से ना हो।

6- DRG को लिंक बनाई होवे

7- VRB-II को छाया DRG की लिंक बनाई होवे

8- माइनर को 10 CM ऊंचा बढ़ाया होवे

9- Right minor व middle minor के बीच की ड्रेन पर पुलिया बनाई होवे

10- Head से Tail तक सीमेंट व बोल्डर की ड्रेन किया होवे।

11- RD पुलिया पर रेलिंग व पाइप लिंक व्यवस्थापक

जल उपयोगिता संगम पी.एस.बी.टेल

पंचायत समिति अन्ता जिला बारां (राज.)

क्रमांक [illegible] दिनांक 3/5/014

विषय:- [illegible] पर आवश्यक कार्य

1- Head to Tail तक पक्का किया जावे
2- VRB [illegible] से UP [illegible] बनाई जावे
3- VRB [illegible] पुलिया [illegible] किया जावे
व [illegible] का निर्माण कराया जावे
4- Head से Tail तक [illegible] पर सर्विस रोड व [illegible] की खुदाई [illegible] करवाई जावे।
5- [illegible] पुलिया का निर्माण किया जावे व [illegible] पुलिया की मरम्मत की जावे
6- VRB से DRB तक [illegible] का निर्माण कराया जावे
7- DRB [illegible] 10 cm [illegible] [illegible] हुए हैं।
8- सभी आउटलेटों के पक्का किया जावे [illegible]
9- Head पर किसान विश्राम गृह का निर्माण करवाया जावे।

[illegible]

जल उपभोक्ता संगम लदवाड़ा

सी.ए.डी.अन्ता जिला बारां (राज.)

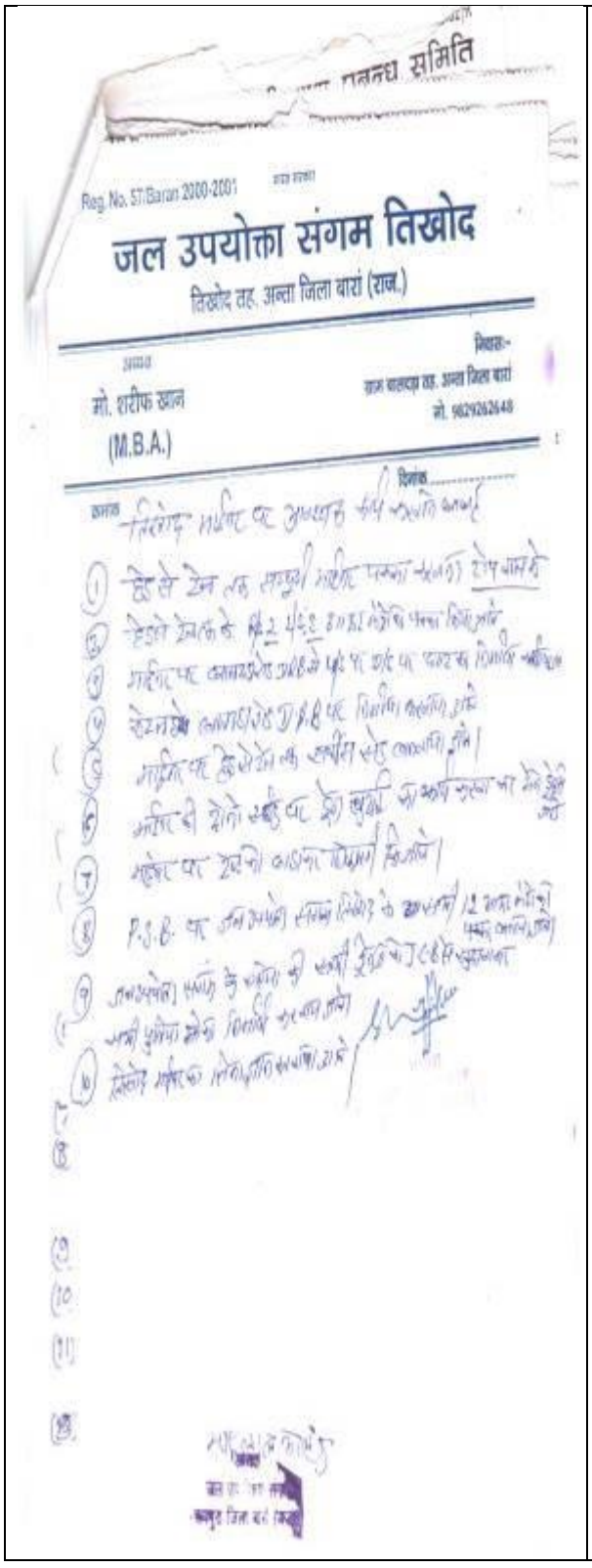
अध्यक्ष
कमरूद्दीन खान
मो.9414488114

क्रमांक 170 दिनांक 21.5.014

विषय:- लदवाड़ा माइनर, लदवाड़ा सब माइनर [illegible] पर आवश्यक कार्य करवाने हेतु।

1. लदवाड़ा सब माइनर चेनेज 0 से 150 चेन तक पक्का निर्माण कार्य
2. लदवाड़ा सब माइनर चेनेज [illegible] पर [illegible] का निर्माण कार्य
3. लदवाड़ा माइनर, लदवाड़ा सब माइनर [illegible] अलीपुरा माइनर के सभी आउटलेटों को पक्का किया जावे।
4. लदवाड़ा माइनर पर [illegible] टेल तक [illegible] सर्विस रोड बनाया जावे।
5. लदवाड़ा सब माइनर चेनेज 50 से टेल [illegible] पर सर्विस रोड बनाया जावे।
6. अलीपुरा माइनर के दोनों [illegible] पर सर्विस रोड का कार्य।
7. लदवाड़ा माइनर, लदवाड़ा सब माइनर एवं अलीपुरा माइनर को हेड से टेल तक पक्का किया जावे।
8. [illegible] करीब 20 पुलिया का निर्माण कार्य किया जावे।

अध्यक्ष
जल उपयोक्ता संगम
[illegible]

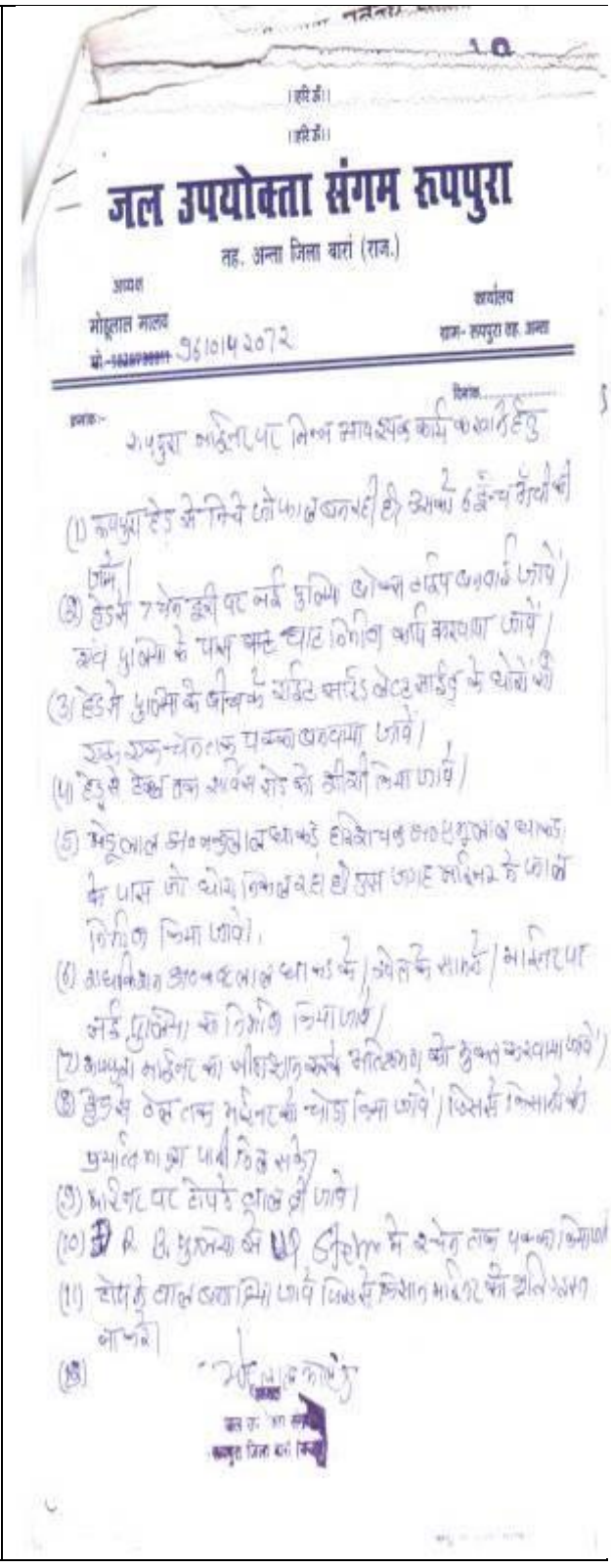


Reg. No. 57/Baran 2000-2001

जल उपयोक्ता संगम तिखोद

तिखोद तह. अन्ता जिला बारां (राज.)

मो. शरीफ खान
(M.B.A.)

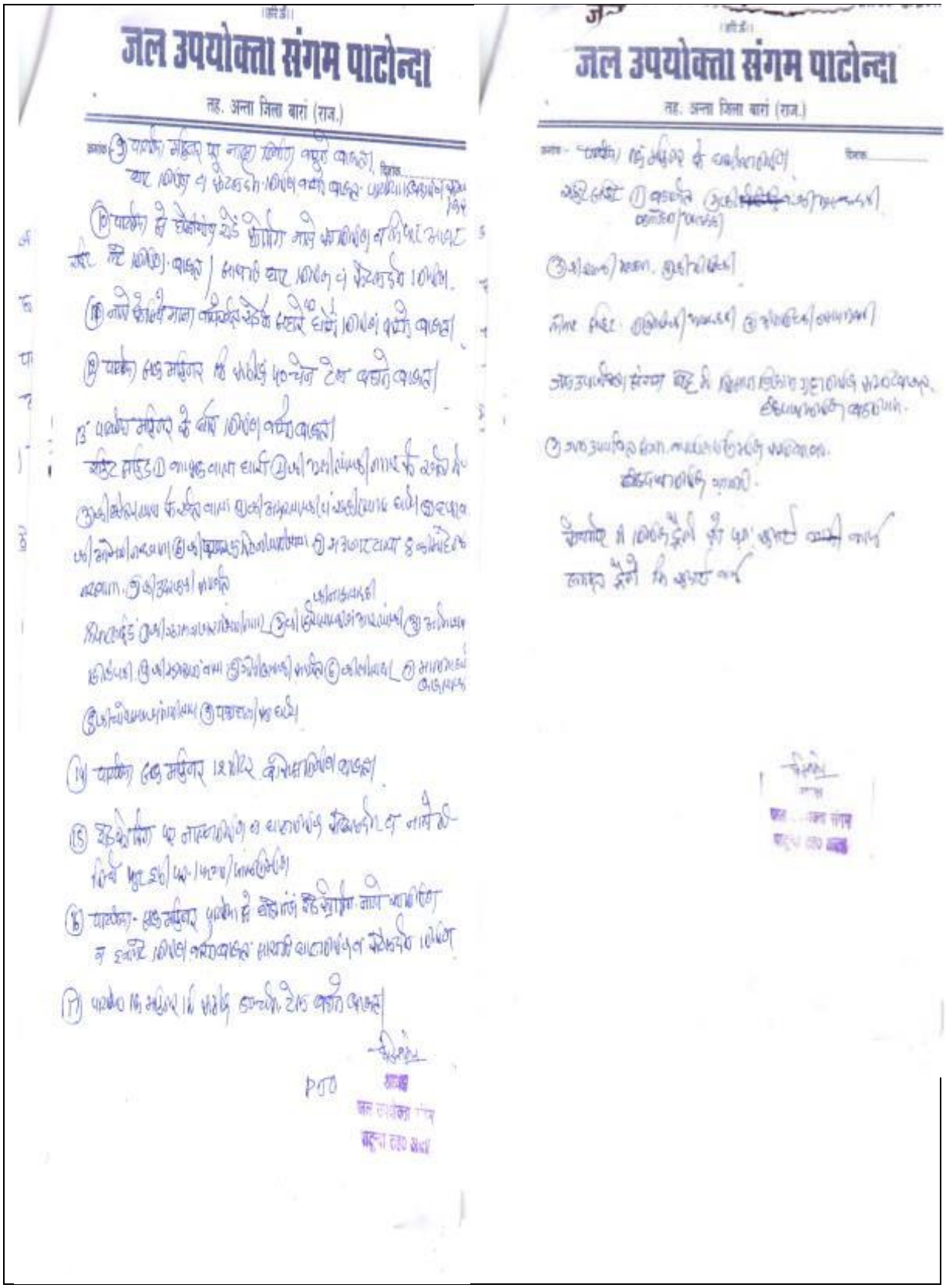


जल उपयोक्ता संगम रुपपुरा

तह. अन्ता जिला बारां (राज.)

मोहलाल मालव
मो.-9610142072

कार्यालय
ग्राम- रूपपुरा तह. अन्ता



जल उपयोक्ता संगम पाटोन्दा

तह. अन्ता जिला बारां (राज.)

जल उपयोक्ता संगम पाटोन्दा

तह. अन्ता जिला बारां (राज.)

जल उपयोक्ता संगम पापड़ली

तह.मांगरोल, जिला बारां (राज.)

दिनांक 20/5/201[illegible]

क्रमांक

विषय- जल उपयोक्ता संगम पापड़ली मे आवश्यक काम कराने हेतु

(1) पापड़ली माइनर पर हेड पर गेट नये लगाना व दोनो साईड पर सुरक्षा दिवार का निर्माण।

(2) पापड़ली माइनर पर पापड़ली सब माइनर के सामने पाल निर्माण [illegible]

(3) पापड़ली माइनर पर पुलिया की मरम्मत व पुलिया के नीचे तरफ [illegible] F तक सुरक्षा दिवार।

(4) पापड़ली माइनर पर V.R.B. से लिये इन्लेट है उनको [illegible] कार्यवाई किया जावे।

(5) पापड़ली माइनर पर हेड से टेल तक सर्विस रोड [illegible]

(6) पापड़ली माइनर की टेल 20 चैन बढ़ाकर नाले मे मिला[illegible] अतिक्रमण [illegible]

(7) पापड़ली माइनर का सीमाज्ञान कराया जावे [illegible]

(8) पापड़ली माइनर पर ड्रेन कालिम के पास सुरक्षा दिवार [illegible] धोरे की ड्रेन क्रोस किया जावे।

(9) पापड़ली माइनर पर V.R.B. पापड़ली से अतिरिक्त पुलिया [illegible] व नीचे तरफ दिवार बनाई जावे।

(10) पापड़ली सब माइनर पर हेड बनाकर गेट लगाया जावे।

(11) पापड़ली सब माइनर की पुलिया की [illegible] मे कार्यवाई किया [illegible] एंव नीचे तरफ दिवार बनाई जावे।

(12) पापड़ली सब माइनर पर हेड से टेल तक सर्विस रोड [illegible]

(13) पापड़ली सब माइनर की टेल को 20 चैन आगे बढ़ाया [illegible]

(14) पापड़ली सब माइनर पर सीमाज्ञान कराया जावे।

(15) पापड़ली माइनर पर धोरा न. 2 को हेड से टेल तक [illegible] बना कर धोरे को पक्का किया जावे।

3/5/14 [illegible]

[illegible]

जल उपभोक्ता संगम लदवाड़ा

सी.ए.डी.अन्ता जिला बारां (राज.)

अध्यक्ष

कमरूद्दीन खान

मो.9414488114

क्रमांक

दिनांक 21.5.014

सेवा मे,

श्रीमान सहायक अभियन्ता महोदय
C.A.D. अन्ता जिला बारां (राज.)

विषय :- अलीपुरा माइनर के सामने R.L.B पर पुलिया निर्माण एंव ड्रेन पर पुलिया बनाने बाबत्

महोदय,

(1) उपरोक्त विषय मे निवेदन है कि अलीपुरा माइनर के सामने पुलिया R.L.B पर बनानी जाने जिससे किसान [illegible]

[illegible] और अलीपुरा गांव [illegible]

(2) अलीपुरा पुलिया से अलीपुरा [illegible] ड्रेन पर [illegible] किसान [illegible] पुलिया भी बनायी जाये जिससे किसान [illegible] होने व [illegible] परेशान नही होगे।

[illegible]

अध्यक्ष

जल उपभोक्ता संगम

[illegible]

!! श्री गणेशाय नमः !!

जल उपयोगिता संगम पी.एस.बी.टेल

पंचायत समिति अन्ता जिला बारां (राज.)

दिनांक 11/6/2014

विषय :- पौध रोपण के उपरान्त खेत पर आवश्यक कार्य करने हेतु

1- फाल आउटलेट नं. 1 पर दी जाने वाली आउटलेट क्षमता पुनर्निर्धारित की जाये।

2- ऐलाइनमेन्ट करा कर ड्रेन खुदाई का कार्य करवाया जावे चौड़ाई ड्रेन नाले में मिलाये जावे।

3- CM 25 पर स्लोप व हेड से CM 33 तक लेवल मिलवाया जावे उनाई 1½ फुट

4- CM 25 की दूरी से बेलन में कार्य किया जावे

5- CM 30 पर एक फाल बनाई जावे इसके साथ आउटलेट लगाई जावे

6- VRB नेचुरा से खेतों तक बोल्डर से नाली बनवाई जावे

7- खेतों के VRB पर केटलडेम व छोटे नं. निर्धारित करवाया जावे और DRB खेतों में सीमाओं से अलाईनमेन्ट से चलावें

8- DRB से DB 8 CM पर स्लोप व पक्के लिंटर चौड़े बोल्डर लगवा छुड़वा जावे।

9- DRB से टेल तक अनिवार्य डेड देकर लेवल करवाया जावे चौड़ा आवश्यक मापदण्ड से छोटा बनाया जावे।

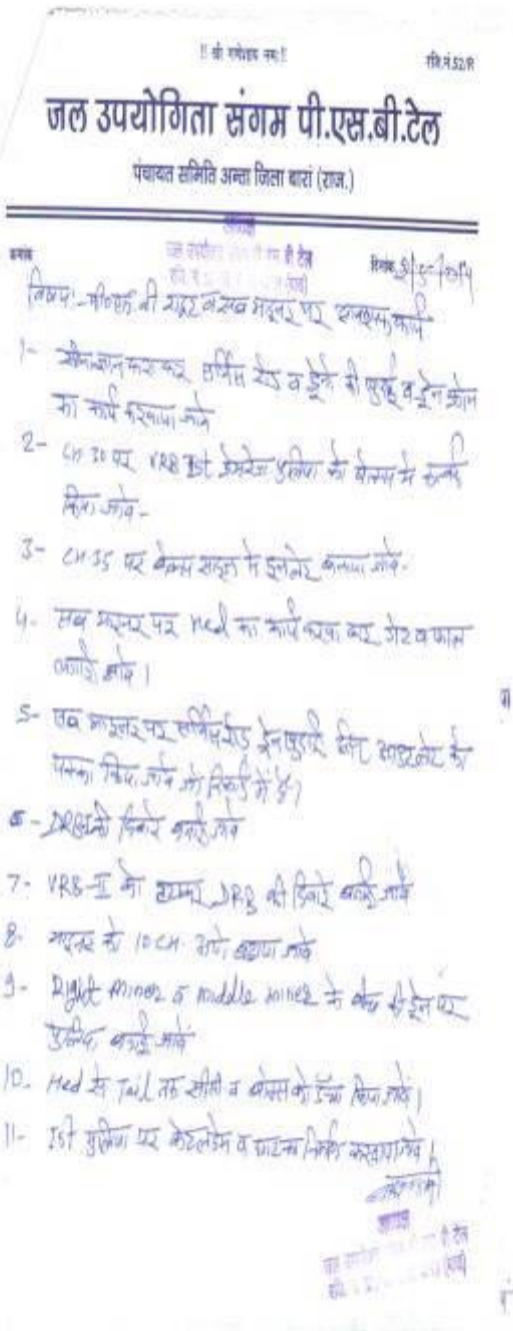
10- सभी आउटलेटों को क्रमांक किया जावे।

11- मापदण्ड के दोनों तरफ ड्रेनों की खुदाई व ड्रेन साफ किया जावे।

12- आउटलेट EST पर चाट बनाया जावे।

13- Head से Tail तक सीसी व लाइनदी जावे।

14- नालाबहाला तालाब के पेटे के पास नई पुलिया का निर्माण करवाया जावे



!! श्री गणेशाय नमः !!

जल उपयोगिता संगम पी.एस.बी.टेल

पंचायत समिति अन्ता जिला बारां (राज.)

दिनांक 3/6/2014

विषय :- फील्ड की साइट लेवल मापदण्ड पर उपलब्ध कार्य

1- ऐलाइनमेन्ट करा कर डिजाईन डेड व ड्रेनों की खुदाई व ड्रेन फ्लो का कार्य करवाया जावे

2- CM 30 पर VRB 1st आउटलेट पुलिया के बेलन में कार्य किया जावे।

3- CM 35 पर बेलन साइज के इलेवेट बनाया जावे।

4- लेवल मापदण्ड पर Head का कार्य पक्का कर गेट व फाल बनाई जावे।

5- एवं मापदण्ड पर डिजाईन डेड ड्रेन खुदाई लेवल आउटलेट के पक्का निर्धारित जावे जो निम्नानुसार है।

6- DRB सभी खेतों में बनाई जावे

7- VRB-II को छोड़ DRB की लिंटर बनाई जावे

8- मापदण्ड से 10 CM. ऊपर छोड़ा जावे

9- Right Minor & middle minor के बीच की ड्रेन पर पुलिया बनाई जावे

10- Head से Tail तक सीसी व बोल्डर को ऊँचा किया जावे।

11- IST पुलिया पर केटलडेम व चाट का निर्माण करवाया जावे।

WALK THROUGH SURVEY PHOTOGRAPHS

<table>
<tr><td colspan="2">  </td><td>  </td><td>  </td></tr>
<tr><td colspan="2">WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF ALIPURA MINOR</td><td colspan="2">WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF DIRECT TAIL MINOR</td></tr>
<tr><td colspan="2">  </td><td>  </td><td>  </td></tr>
<tr><td colspan="2">WALK THORUGH SURVEY WITH WUA</td><td colspan="2">WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF DIRECT TAIL MINOR</td></tr>
<tr><td colspan="2">  </td><td>  </td><td>  </td></tr>
<tr><td colspan="2">WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES</td><td colspan="2">WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES</td></tr>
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WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF LADWARA MINOR



WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF PAPERLI MINOR



WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF PAPERLI MINOR	WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF TIKOD MINOR	WALK THORUGH SURVEY WITH WUA CHAIRMAN & BENIFICARIES OF PATUNDA MINOR



CONSULTING WITH WUA CHAIRMAN OF ROOPPURA MINOR
MINOR

Structure photographs

		
ALIPURA MINOR HEAD REGULATOR	ALIPURA MINOR VRB AT KM. 1.037	ALIPURA MINOR VRB AT KM. 1.470
		
ALIPURA MINOR SYPHONE	ALIPURA MINOR OUTLET CONDITION	DIRECT TAIL TAIL MINOR HEAD REGULATOR
		
DIRECT TAIL MIINOR VRB AT KM. 26.520	DIRECT TAIL MIINOR OUTLET CONDITION	LADWARA SUB MINOR HEAD REGULATOR

		
LADWARA SUB MINOR VRB AT 3.210 KM	LADWARA SUB MINOR SYPHONE AT 0.528	LADWARA SUB MINOR SYPHONE AT 1.649 KM.
		
LADWARA SUB MINOR SYPHONE AT 3.058KM.	LADWARA MINOR HEAD REGULATOR	LADWARA MINOR VRB
		
LADWARA MINOR VRB 2	LADWARA MINOR OUTLET	LEFT TAIL MINOR HEAD REGULATOR
		

LEFT TAIL MINOR VRB AT KM. 3.005	LEFT TAIL MINOR VRB AT KM. 2.425	PAPERLI MINOR HEAD REGULATOR
		
PAPERLI MINOR VRB AT KM.0.980	PAPERLI MINOR OUTLET CONDITION	PAPERLI MINOR VRB AT KM. 2.661
		
PAPERLI SUB MINOR	PAPERLI SUB MINOR SYPHONE AT KM. 0.401	PAPERLI SUB MINOR OUTLET CONDITION
		
PATUNDA SUB MINOR HEAD REGULATOR	PATUNDA SUB MINOR VRB AT KM. 0.518	PATUNDA SUB MINOR VRB AT KM. 1.740

		
PATUNDA SUB MINOR OUTLET CONDITION	RIGHT TAIL SUB MINOR HEAD REGULATOR	RIGHT TAIL SUB MINOR VRB AT KM. 1.835
		
RIGHT TAIL SUB MINOR VRB AT KM. 3.005	RIGHT TAIL SUB MINOR OUTLET CONDITION	RIGHT TAIL MINOR HEAD REGULATOR
		
ROOPPURA MINOR HEAD REGULATOR	ROOPPURA MINOR VRB AT KM.2.914	TIKOD MINOR HEAD REGULATOR

		
TIKOD MINOR VRB AT 1.225 KM	TIKOD MINOR VRB AT 2.415 KM	TIKOD MINOR OUTLET CONDITION

Annexure 6.2 General Abstract of Cost

General Abstract of Cost					
Name of Work :-Rehabilitation & Modernization Works of Direct Offtaking Minors of Palayatha Sub Branch From Km 12.30 To Km 25.75					
S. No	Item	Total Quantity	Rate	Unit	Amount in Rs.
1	Cutting & clearance of jungle , bushes , shrubs Ankra / ipomoea , Julicflora typha etc. on canals and bunds in dry / moist / slushy conditins including disposal as per instructions of the Engineer - in - charge. cost of wood has been deducted from rates and thus will be property of contractor after cutting.				
(a)	Thick Jungle	367543.00	0.8	sqm	294034.40
2	Dismantling Cement Concrete including disposal of material within 50 m lead, inclusive of de-watering wherever required.	1503.68	213	Cum	320284.09
3	Demolishing stone rubble masonry including stacking of useable material and disposal of unuseable material wihtin 50 m lead inclusive of de-watering wherever required in cement mortar	2733.14	151	sqm	412704.41
4	Cutting and uprooting of trees including removing of roots and filling of hole, . Cutting / up rooted would be property of the department				
(a)	over 15 cms to 30 cms dia	620.00	86	Each	53320.00
5	Earthwork in excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5 m in dry or moist including dressing of excavated area dewatering wherever required complete in all respect in Hard/dense soil.	30739.71	65	Cum	1998081.03
6	Earth work in rough (Borrow area) excavation for embankments in hard soil, morrum or highly weathered strata dry or moist including dewatering, laying in layers of 20 cm.(before compaction) breaking of clods, sorting of grass pebbles etc., and dressing compacted by sheep foot roller / pneumatic tyred roller to obtain dry density of 98% of standard proctor's density with initial lift of 1.5 m (Excluding charges for compaction & watering) including loading and unloading where ever required complete in all respect with initial lead of 250 m.	30656.44	86	Cum	2636453.92
6-A	(b) With lead beyond 250m and upto 750m (1/2 km)	30656.44	93	Cum	2851049.01
6-B	(c)Add extra for each subsequent lead of 500m or part, there of beyond ½ Km and up to 5 km	30656.44	64.8	Cum	1986537.37
6-C	(d)Add extra beyond 5km for each subsequent km. or part there-of. up to 18.50 km lead	30656.44	104	Cum	3188269.86
7	Add extra charges of watering of earth when source of water is beyond 250 m but up to 1 km.	37705.76	7.4	Cum	279022.62

General Abstract of Cost					
Name of Work :-Rehabilitation & Modernization Works of Direct Offtaking Minors of Palayatha Sub Branch From Km 12.30 To Km 25.75					
S. No	Item	Total Quantity	Rate	Unit	Amount in Rs.
8	Compaction of Earth or highly weathered strata by mechanical equipment such as sheep foot roller/pneumatic tyred roller to obtain dry density of at least 98% of Standard Proctor's density.	37705.76	21	Cum	791820.96
9	Add extra over item no. 9 (Item no. 20 (b) as per BSR) compaction of earthwork by mechanically operated vibro compactor. (10% of Rs. 21)	37705.76	2.1	Cum	79182.10
10	Extra charges for water spray by nozzle on subgrade of canal including bed and side slops before laying plaing concrete for lining work.	103745.31	1.5	sqm	155617.97
11	Lip cutting & final dressing as per designed section including re-handling and disposal of excavated earth in layers 20 cm on embankments etc. with cost of dewatering whenever required and complete in all respect.	75292.06	19	sqm	1430549.07
12	Random Rubble stone masonary (using R.R.stones where 75 % stones to be not less than 15 cm in size in any direction and weighing not less than 23 kg) for foundation including curing all leads of all construction materials including curing etc. complete in cement sand mortar (1:6)	98.80	2668	Cum	263598.40
13	Random Rubble stone masonary (using R.R.stones where 75 % stones to be not less than 15 cm in size in any direction and weighing not less than 23 kg) for super structure including curing all leads of all construction materials including curing etc. complete in cement sand mortar (1:6)	1234.90	2785	Cum	3439196.50
14	Providing and laying 75mm thick sand layer on side slope (over clays sub grade) dully stabilized with cement slurry (1:10) including all leads and lift of material.	15058.41	75	sqm	1129380.85
15	Plaster in cement sand mortar 1:4 including racking of joints, smooth finishing & curing etc. complete including all leads of all construction materials complete of thickness : 20 mm	6913.05	206	sqm	1424087.89
16	R.R. stone pitching, hammer dressed with packing of voids from small stones including all leads & lifts, in required profile of (c) 30cm thickness (+/- 5% thickness tolerance)	19.51	1221	Cum	23821.71
17	Providing and laying Cement concrete coping in (1:2:4) with maximum size of crusher broken aggregate up to 20 mm including shuttering etc. with all leads of material complete in all respect in thickness of 75 mm.	2018.42	308	sqm	621673.36
18	Providing and laying cast in Situ plain cement concrete M-13.5 grade (minimum cement content 250 kg./cum of concrete) for lining , using well graded crushed broken aggregate of maximum nominal size of 20 mm confirming to IS 383 -1970, including proportioning of the ingredients by weight batching and mixing by mechanical mixer including finishing of concrete lining, cutting of grooves for construction joint ,water curing in bed & on side slopes, complete as per technical specification with all leads and lift of material complete in all respect. (currying for bed & side slopes must be done by Water Only				
	In Bed for 7.5 cm thickness	600.00	317	sqm	190200.00
	In Bed for 10 cm thickness	28453.25	413	sqm	11751192.25
(b)	In Side Slopes 7.5 cm thick		325	sqm	
19	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement in Aqueduct troughs, siphon conduits, box type sluice barrels, domes, spiral shafts or stair cases (thin walled section) and	199.86	288	Cum	57561.06

General Abstract of Cost					
Name of Work :-Rehabilitation & Modernization Works of Direct Offtaking Minors of Palayatha Sub Branch From Km 12.30 To Km 25.75					
S. No	Item	Total Quantity	Rate	Unit	Amount in Rs.
	ogee crests, baffle or chute blocks, end sills, buckets, projects coping, extended sill etc.				
20	Centering and shuttering for slabs, beams, lintels, columns, trough with or without caps and base including propping and remove.	656.40	180	sqm	118152.00
21	Side shuttering including proping etc complete (to achieve finish F2) for Block joints of foundation ,stilling basins, buckets, a prons, etc. (Non suspended horizontally laid mass concrete) for dowels etc.	12648.69	105	sqm	1328112.45
22	Supplying of MS reinforcement including labour charges for bending, binding and placing in position all reinforcement as per drawing including cost of binding wire and all leads and lifts using. Tor or ribbed bars(IS :1786-1985)	39038.07	59	kg	2303246.19
23	Cement concrete (1:3:6)M-10 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.	850.60	3491	Cum	2969440.41
24	Cement concrete (1:2:4) M-15 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.	3339.34	4048	Cum	13517667.19
25	Cement concrete (1:1.5:3) M-20 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.	1205.73	4692	Cum	5657274.60
26	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement in foundation, rafts, beams, columns bases, stilling basin ,buckets, aprons, etc (non suspended horizontally laid mass concrete)	367.45	103	Cum	37847.74
27	Extra charges for using mobile transit mixture.	8785.65	210	Cum	1844985.88
28	Extra charges for using suitable admixtures..	6176.02	75	Cum	463201.16
29	Extra charges for complete weigh batching and mixing plant.	8785.65	210	Cum	1844985.88
30	Flush or ruled pointing on stone masonry including racking of joings and curing etc. complete including all leads of all constuction materials in mortar ratio in cements & mortar 1:3	601.88	101	Sqm	60789.88
31	Supplying and fixing of sluice /regulator gates using MS plates, channels, tees, angles, girders ,gears etc. of given size and design having suitable brass/gun metal lining, rubber seals etc, and desired rod length clamps, keys, wire ropes, ladders, supports, etc complete (excluding civil work) including painting with red oxide paint and delivery at site (Size up to 1 sqm)	15050.00	85	kg	1279250.00
32	Providing laying & fixing in position RCC spun or hume pipe (IS 458-2003) with collars in required size packed in gasket for hume or spun yarn & neatly finished with rich grout of cement mortar (1:3) perfectly air tight including testing of joints class NP-3				
A	900 mm dia	112.50	4630	Rmt	520875.00
B	600 mm dia	125.00	3523	Rmt	440375.00
C	225 mm dia	322.50	244	Rmt	78690.00
D	150 mm dia	250.00	164	Rmt	41000.00

General Abstract of Cost					
Name of Work :-Rehabilitation & Modernization Works of Direct Offtaking Minors of Palayatha Sub Branch From Km 12.30 To Km 25.75					
S. No	Item	Total Quantity	Rate	Unit	Amount in Rs.
33	Providing bitumen joint filter sheet confirming to IS: 1838-1983, 20mm thick	84.00	479	Sqm	40236.00
34	Providing and erecting direction and place identification for semi reflective sign board as per IRC:67 made of 2 mm thick M.S. Sheet dully stove enameled paint in white colour in front and gray colour on back with red reflective border of 70 mm width in required message letter, figures with reflective Engineering grade tape as per MORD specification of required shade and colour ,supported and welded on 47 mm x 47 mm of 12 SWG square tube of 3050 mm height dully strengthened by 25 mm x 5 mm M.S. flate iron on edge on back firmly fixed to the ground by mean of properly designed foundation with M-15 grade cement concrete 450 mm x 450 mm x 600 mm , 600 mm below ground level as per approved drawing and technical specification clause 1701 semi reflective traffic sign.	14.04	3956	sqm	55542.24
35	Reinforced Cement Concrete M 15 grade kilometer stone /local stone of standard design as per IRC:8 fixing in position including painting and printing etc as per drawing and technical specification clause 1703 (i) Ordinary Kilometer stone (Precast)	26.00	1569	each	40794.00
36	Making standard type cement gauge including engraving letter and painting including scaffolding etc.	15.23	304	Rmt	4631.14
37	Preparation and dressing of sub grade including removal of irregularities up to 7.5 cm in soil, Morrum mixed with pebbles, small boulders and highly weathered rock for Bed	28453.25	7	sqm	199172.75
38	Dismantling of masonary with care inclusive of dewatering wherever required.				
(a)	Dry stone masonary or pitching	18.39	36	cum	662.21
39	Venturi flumes (Measuring device): Supply and fixing of glass reinforced plastic (FRP) molded cut throat flume without any joint, accurate in dimensions and having accuracy of +/- 1mm smooth & uniform surface with 0.13 as value of rougosity of flowing capacity with as below with bell mouth entry minimum 45cm and 55cm with engraved gauge marking in cm and liter per second on both side of flow directions at u/s and d/s end. Capacity marking and chart showing calculation discharge variation at every 0.50 cm and flow measured at submerged condition etc. complete in all respect. The flumes shall be light in weight and easy in handling including stiffeners hold fast, sand treatment on the back side of flume.				
(b)	Discharge in cusec upto 3 cusec	6.00	13890	No.	83340.00
(c)	Discharge in cusec upto 4 cusec	3.00	17050	No.	51150.00
(d)	Discharge in cusec upto 6 cusec	2.00	33200	No.	66400.00
(f)	Discharge in cusec upto 10 cusec	2.00	40400	No.	80800.00
40	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement I Colums slabs, Cntiliver Projections, Staircases, lintels, beems, chachaas, retaining walls, Piers, abutments, galleries, arch covers, Bed plates, sluice capastan bases etc.	949.31	145	Cum	137650.20
41	Supply of Qyarry rubbish not more than 10 vm in site including all lead and lift	40095.60	250	Cum	10023900.00

General Abstract of Cost					
Name of Work :-Rehabilitation & Modernization Works of Direct Offtaking Minors of Palayatha Sub Branch From Km 12.30 To Km 25.75					
S. No	**Item**	**Total Quantity**	**Rate**	**Unit**	**Amount in Rs.**
42	Spreading & Consolidation/ compaction of quarry ribbish /spall to required grade & camber by plain roller by manually watering	133652.00	47	sqm	6281644.00
43	Providing and laying cast in situ concrete sleeper 15 cm x7.5 cm in cement concrete (1:3:6) with maximum size of crushed stone aggregate up to 20 mm well graded including all lead of all construction materials including curing, finishing and form work etc. complete as per specification (in bed)	2454.00	41	Rmt	100614.00
44	Providing and laying canal lining with PCC blocks 50mm thick made of cement concrete (1:2:4) grade M-15 with aggregate size up to 20mm crusher broken including manufacturing of PCC block mechanically vibrated at site in size of 300 x 300 x 50 mm including all leads and lifts of material, transportation of blocks from manufacturing site to lining site, laid over 6mm thick 1:3 cement mortar filling and smooth finishing of joints laid over 15.5mm thick sandwich plaster in cement sand 1:3 laid over 12mm thick base plaster in cement 1:6, including curing and machinery charges with mixture vibration etc., complete as per technical specifications.(IN SIDE SLOPE)	75292.06	375	sqm	28234522.50
45	Providing and laying CNS (Cohen-sive nonswelling) layer below PCC block /c.c lining in required thickness comprising of clay silt and gravel mixed in desired ratio including excavation in borrow area / quarry, transportation to work site with all lead and lifts of all ingredients, mixing homogeneously by suitable method, laying in layers of 15-20 cm watering and compaction by mechanical vibro compactor to achieve a density of 98% of standard proctor's density including dewatering wherever necessary and complete as per Technical specification. Ingredients of CNS layer are (i) Clay 20 % (ii) Silt 35 % (iii) Sand 40 % (iv) gravel 5 %	24859.27	423	Cum	10515472.06
46	Filling of construction joints with sealing compound, including painting the concrete sleepers below lining and sides of lining panel as per specification provided in IS: 3384-1986 and all leads of all construction materials including cost of sealing compound, complete in all respect.	368.10	132	sqm	48589.20
47	Providing and laying 75mm thick sand layer in bed (over clays sub grade) dully stabilized with cement slurry (1:20) including all leads and lift of material.	2683.48	70	sqm	187843.60
	TOTAL				**124036496.12**
	Say (IN LACS)				**1240.36**

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	Item	Lining of PSB Minors		Construction of new structures	Renovation of Existing Structures	Total Quantity
		Sub Branch	Minors	Minors	Minors	
1	2		3	4	6	8
1	Cutting & clearance of jungle , bushes , shrubs Ankra / ipomoea , Julicflora typha etc. on canals and bunds in dry / moist / slushy conditins including disposal as per instructions of the Engineer - in - charge. cost of wood has been deducted from rates and thus will be property of contractor after cutting.					
(a)	Thick Jungle		167065.00	200478.00		367543.00
2	Dismantling Cement Concrete including disposal of material within 50 m lead, inclusive of de-watering wherever required.			51.14	1452.54	1503.68
3	Demolishing stone rubble masonry including stacking of useable material and disposal of unuseable material wihtin 50 m lead inclusive of de-watering wherever required in cement mortar			79.71	2653.43	2733.14
4	Cutting and uprooting of trees including removing of roots and filling of hole, . Cutting / up rooted would be property of the department					0.00
(a)	over 15 cms to 30 cms dia		620.00			620.00
5	Earthwork in excavation including loading, unloading, disposal and dressing of excavated earth within initial lead of 50m and lift up to 1.5 m in dry or moist including dressing of excavated area dewatering wherever required complete in all respect in Hard/dense soil.		26031.58	1540.54	3167.59	30739.71
6	Earth work in rough (Borrow area) excavation for embankments in hard soil, morrum or highly weathered strata dry or moist including dewatering, laying in layers of 20 cm.(beforecompaction) breaking of clods, sorting of grass pebbles etc, and dressing compacted by sheep footroller / pneumatic tyred roller to obtain dry density of 98% of standard proctor's density with initial lift of 1.5 m (Excluding charges for compaction & watering) including loading and unloading whereever required complete in all respect. with intial lead of 250 m		30656.44			30656.44
6-A	(b) With lead beyond 250m and upto 750m (1/2 km)		30656.44			30656.44

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
6-B	(c)Add extra for each subsequent lead of 500m or part, there of beyond ½ Km and up to 5 km		30656.44			30656.44
6-C	(d)Add extra beyond 5km for each subsequent km. or part there-of. Upto 18.50 km lead		30656.44			30656.44
7	Add extra charges of watering of earth when source of water is beyond 250 m but upto 1 km.		37705.76			37705.76
8	Compaction of Earth or highly weathered strata by mechanical equipment such as sheep foot roller/pneumatic tyred roller to obtain dry density of at least 98% of Standard Proctor's density.		37705.76			37705.76
9	Add extra over item no. 9 (Item no. 20 (b) as per BSR) compaction of earthwork by mechanically operated vibro compactor. (10% of Rs. 21)		37705.7599			37705.76
10	Extra charges for water spray by nozzle on subgrade of canal including bed and side slops before laying plaing concrete for lining work.		103745.31			103745.31
11	Lip cutting & final dressing as per designed section including re-handling and disposal of excavated earth in layers 20 cm on embankments etc. with cost of dewatering whenever required and complete in all respect.		75292.06			75292.06
12	Random Rubble stone masonary (using R.R.stones where 75 % stones to be not less than 15 cm in size in any direction and weighing not less than 23 kg) for foundation including curing all leads of all construction materials including curing etc. complete in cement sand mortar (1:6)				98.80	98.80
13	Random Rubble stone masonary (using R.R.stones where 75 % stones to be not less than 15 cm in size in any direction and weighing not less than 23 kg) for super structure including curing all leads of all construction materials including curing etc. complete in cement sand mortar (1:6)				1234.90	1234.90
14	Providing and laying 75mm thick sand layer on side slope (over clays sub grade) dully stablized with cement slurry (1:10) including all leads and lift of material.		15058.4113			15058.41
15	Plaster in cement sand mortar 1:4 including racking of joints, smooth finishing & curing etc. complete including all leads of all			67.55	6845.498	6913.05

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
	construction materials complete of thickness : 20 mm					
16	R.R. stone pitching, hammer dressed with packing of voids from small stones including all leads & lifts, in required profile of (c) 30cm thickness (+/- 5% thickness tolerance)			19.51		19.51
17	Providing and laying Cement concrete coping in (1:2:4) with maximum size of crusher broken aggregate up to 20 mm including shuttering etc. with all leads of material complete in all respect in thickness of 75 mm.			7.34	2011.08	2018.42
18	Providing and laying cast in Situ plain cement concrete M-13.5 grade (minimum cement content 250 kg./cum of concrete) for lining , using well graded crushed broken agregate of maximum nominal size of 20 mm confirming to IS 383 -1970, including proportioning of the ingredients by weight batching and mixing by mechanical mixer including finishing of concrete lining, cutting of grooves for construction joint ,water curing in bed & on side slopes, complete as per technical specification with all leads and lift of material complete in all respect. (curring for bed & side slopes must be done by Water Only					0.00
	In Bed for 7.5 cm thickness		0.00	30.00	570.00	600.00
	In Bed for 10 cm thickness		28453.25			28453.25
(b)	In Side Slopes 7.5 cm thick		0.00			0.00
19	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement in Aqueduct troughs, siphon conduits, box type sluice barrels, domes, spiral shafts or stair cases (thin walled section) and ogee crests, baffle or chute blocks, end sills, buckets, projects coping, extended sill etc.			0.00	199.86	199.86
20	Centring and shuttering for slabs, beams,lintels,columns,trough with or without caps and base including proping and remove.			42.00	614.40	656.40
21	Side shuttering including proping etc complete (to achieve finish F2) for Block joints of foundation ,stilling basins,buckets,aprons,etc. (Non suspended horizontally laid mass concrete) for dowels etc.		7975.80	2695.19	1977.70	12648.69

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
22	Supplying of MS reinforcement including labour charges for bending, binding and placing in position all reinforcement as per drawing including cost of binding wire and all leads and lifts using. Tor or ribbed bars(IS :1786-1985)		0.00	5274.69	33763.38	39038.07
23	Cement concrete (1:3:6)M-10 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.			214.68	635.92	850.60
24	Cement concrete (1:2:4) M-15 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.		2126.88	966.78	245.68	3339.34
25	Cement concrete (1:1.5:3) M-20 well mixed and laid in position complete including all leads of all construction materials including curing and finishing having well graded crusher broken stone aggregate of maximum size upto 20 mm.			205.35	1000.38	1205.73
26	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement in foundation, rafts, beams, columns bases, stilling basin ,buckets,aprons,etc (non suspended horizontally laid mass concrete)			99.44	268.01	367.45
27	Extra charges for using mobile transit mixture.		6176.02	456.45	2153.18	8785.65
28	Extra charges for using suitable admixtures..		6176.0155	0.00		6176.02
29	Extra charges for complete weigh batching and mixing plant.		6176.0155	456.45	2153.18	8785.65
30	Flush or ruled pointing on stone masonry including racking of joings and curing etc. complete including all leads of all constuction materials in mortar ratio in cements & mortar 1:3				601.88	601.88
31	Supplying and fixing of sluice /regulator gates using MS plates, channels, tees, angles, girders ,gears etc. of given size and design having suitable brass/gun metal lining,rubber seals etc,and desired rod length clamps,keys, wire ropes, ladders, supports,etc complete (excluding civil work)			6500.00	8550.00	15050.00

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
	including painting with red oxide paint and delivery at site (Size up to 1 sqm)					
32	Providing laying & fixing in position RCC spun or hume pipe (IS 458-2003) with collars in required size packed in gasket for hume or spun yarn & neatly finished with rich grout of cement mortar (1:3) perfectly air tight including testing of joints class NP-3					
A	900 mm dia				112.50	112.50
B	600 mm dia				125.00	125.00
C	225 mm dia			97.50	225	322.50
D	150 mm dia				250	250.00
33	Providing bitumen joint filter sheet confirming to IS: 1838-1983, 20mm thick			16.80	67.2	84.00
34	Providing and erecting direction and place identification for semi reflective sign board as per IRC:67 made of 2 mm thick M.S. Sheet dully stove enameled paint in white colour in front and gray colour on back with red reflective border of 70 mm width in required message letter,figures with reflective Engineering grade tape as per MORD specification of required shade and colour ,supported and welded on 47 mm x 47 mm of 12 SWG square tube of 3050 mm height dully strengthened by 25 mm x 5 mm M.S. flate iron on edge on back firmly fixed to the ground by mean of properly designed foundation with M-15 grade cement concrete 450 mm x 450 mm x 600 mm , 600 mm below ground level as per approved drawing and technical specification clause 1701 semi reflective traffic sign.			14.04		14.04
35	Reinforced Cement Concrete M 15 grade kilometre stone /local stone of standard design as per IRC:8 fixing in position including painting and printing etc as per drawing and technical specification clause 1703 (i) Ordinary Kilometer stone (Precast)			26.00		26.00
36	Making standard type cement gauge including engraving letter and painting including scaffolding etc.			15.23		15.23
37	Preparation and dressing of sub grade including removal of irregularities up to 7.5 cm in soil, Morrum mixed with pebbles, small boulders and highly weathered rock for Bed		28453.25			28453.25
38	Dismantling of masonary with care inclusive of dewatering wherever required.					

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
(a)	Dry stone masonary or pitching			5.0	13.37803776	18.39
39	Venturi flumes (Measuring device): Supply and fixing of glass reinforced plastic (FRP) moulded cut throat flume without any joint, accurate in dimensions and having accuracy of +/- 1mm smooth & uniform surface with 0.13 as value of rougosity of flowing capacity with as below with bell mouth entry minimum 45cm and 55cm with engraved gauge marking in cm and litre per second on both side of flow directions at u/s and d/s end. Capacity marking and chart showing calculation discharge variation at every 0.50 cm and flow measured at submerged condition etc. complete in all respect. The flumes shall be light in weight and easy in handling including stiffeners hold fast, sand treatment on the back side of flume.					
(b)	Discharge in cusec upto 3 cusec			6.0		6.00
(c)	Discharge in cusec upto 4 cusec			3.0		3.00
(d)	Discharge in cusec upto 6 cusec			2		2.00
(f)	Discharge in cusec upto 10 cusec			2.00		2.00
40	Extra labour charges for obstruction in laying & placing the reinforced cement concrete due to reinforcement I Colums slabs, Cntiliver Projections, Staircases, lintels, beems, chachaas, retaining walls, Piers, abutments, galleries, arch covers, Bed plates, sluice capastan bases etc.		0.00	106.47	842.844	949.31
41	Supply of Qyarry rubbish not more than 10 vm in site including all lead and lift			40095.60		40095.60
42	Spreading & Consolidation/ compaction of quarry ribbish /spall to required grade & camber by plain roller by manually watering			133652.00		133652.00
43	Providing and laying cast in situ concrete sleeper 15 cm x7.5 cm in cement concrere (1:3:6) with maximum size of crushed stone aggregare up to 20 mm well graded including all lead of all construction materials including curing,finishing and form work etc. complete as per specification (in bed)		2454.00			2454.00
44	Providing and laying canal lining with PCC blocks 50mm thick made of cement concrete (1:2:4) grade M-15 with aggregate size upto 20mm crusher broken including manufacturing of PCC block mechanically vibrated at site in size of 300 x 300 x 50 mm including all leads and lifts of material,		75292.06			75292.06

GENERAL ABSTRACT OF QUANTITY						
Name of Work :-Rehabilitation & modernization works of direct off taking Minors of Palayatha sub Branch Km. 12.30 to Km 25.75.						
#	**Item**	**Lining of PSB Minors**		**Construction of new structures**	**Renovation of Existing Structures**	**Total Quantity**
		Sub Branch	**Minors**	**Minors**	**Minors**	
	transportation of blocks from manufacturing site to lining site, laid over 6mm thick 1:3 cement mortar filling and smooth finishing of joints laid over 15.5mm thick sandwich plaster in cement sand 1:3 laid over 12mm thick base plaster in cement 1:6, including curing and machinery charges with mixture vibration etc., complete as per technical specifications.(IN SIDE SLOPE)					
45	Providing and laying CNS (Cohen-sive nonswelling) layer below PCC block /c.c lining in required thickness comprising of clay silt and gravel mixed in desired ratio including excavation in borrow area / quarry, transportation to work site with all lead and lifts of all ingredients, mixing homogeneously by suitable method, laying in layers of 15-20 cm watering and compaction by mechanical vibro compractor to achieve a density of 98% of standard proctor's denisty including dewatering wherever necessary and complete as per Technical specification.Ingrediants of CNS layer are (i) Clay 20 % (ii) Silt 35 % (iii) Sand 40 % (iv) gravel 5 %		24859.27			24859.27
46	Filling of construction joints with sealing compound, including painting the concrete sleepers below lining and sides of lining panel as per specification provided in IS: 3384-1986 and all leads of all construction materials including cost of sealing compound, complete in all respect.		368.10			368.10
47	Providing and laying 75mm thick sand layer in bed (over clays sub grade) dully stablized with cement slurry (1:20) including all leads and lift of material.		2683.48			2683.48

Annexure 6.3 Cost and Benefit Ratio

Estimated cost of the project 1240
CCA (ha) 2892.00
Cost of land development @ Rs.0 per ha 0.00

Rs. In Lacs

Items	Before Irrigation / Pre Project	After Irrigation / Post Project
A. Gross Receipts		
1. Gross value of farm produce	1456.72	1822.93
2.Dung receipts (at 30% of fodder expenditure)	65.55	54.69
3. Total (A) Gross receipts (1 & 2)	1522.27	1877.62
B. Expenses		
1. Expenditure on seeds	162.47	197.17
2.Expenditure on manure etc.	52.00	58.90
3.Expenditure on hire labour (human & Bullock)	86.33	100.78
4.Fodder expenses (Assume 15% of A1 before and 10%of A1 after the project)	218.51	182.29
5.Depreciation on implements (Assume 2.7% of A1 before and after the project)	39.33	49.22
6.Share and Cash rent (Assume 5% of A1 before and 3%of A1 after the project)	72.84	54.69
7.Land Revenue (Assume 2% of A1 before and after the project)	29.13	36.46
Total B Expenses(1 to 7)	660.61	679.51
C. Net value of Produce		
1.Total Gross receipts	1522.27	1877.61
2.Minus total expenses	660.61	679.51
3.Net value of produce	861.66	1198.1

Items	Values
D. Annual Agricultural Benefits	
1.Net value after Irrigation	1198.11
2.Net value before Irrigation	681.66
3.Net annual Benefits	336.45
E. Other Benefits	
F. Total net Annual Benefits	336.45

Items	Values
G. Annual Cost	
1. Interest on capital @10%	124.00
2.Depriciation of the project @2% of cost of project	24.80
3. Annual Operation & Maintenance charges @ Rs 1175/ ha of CCA or annual irrigation (11380 ha)	33.98
4.Maintenance of Headworks @ 1% of it's cost	12.40
5. Annual maintenance cost of settling basin (As per actual tender cost)	0.00
5.Depriciation of the pumping system @8.33% of the estimated cost of the pumping system	0.00
6.Depriciation of the raising main @ 3.33% of the estimated cost of the raising main	0.00
7. Power charges considered @ Rs. 5250.70 per ha	0.00
8. Total (G) Annual Cost (1 to 7)	195.18
Benefit Cost Ratio : Annual Benefit / Annual Cost	1.72

Table 60: Calculation of the Post project benefits for Palaitha Irrigation Project

Name of the Crop	Area under the crop	Receipts						Expenditure on										Total	Total	Benefit/ha	Total
		Yield/ha	Total produce	Rate	Gross produce value Rs Lakh	Dung Receipts	Gross Receipts	Seeds Rs/ha	Cost of Seed (Rs. In Lakh)	manure etc	Cost of manure (Rs. In Lakh)	Hired labour human bullocks	Labour Cost Rs. In Lakh)	Fodder Expenses	Depreciation on implements	share &cash rent	Land Revenue	Expenses	Expenses/ha		Benefit for Crop
Wheat	202.44	33.65	6812.11	1500.00	102.18	3.07	105.25	3000.00	6.07	3119.60	6.32	3000.00	6.07	10.22	2.76	3.07	2.04	36.55	0.18	68.70	33936.42
Gram	809.76	8.15	6599.54	8000.00	527.96	15.84	543.80	10500.00	85.02	2494.40	20.20	5300.00	42.92	52.80	14.26	15.84	10.56	241.59	0.30	302.21	37321.29
Coriander	347.04	5.40	1874.02	8200.00	153.67	4.61	158.28	2400.00	8.33	3262.00	11.32	3000.00	10.41	15.37	4.15	4.61	3.07	57.26	0.00	101.02	0.00
Mustard	462.72	14.21	6575.25	3950.00	259.72	7.79	267.51	500.00	2.31	2838.00	13.13	5300.00	24.52	25.97	7.01	7.79	5.19	85.93	0.19	181.58	39242.57
Garlic	318.12	70.00	22268.40	3500.00	779.39	23.38	802.78	30000.00	95.44	2494.00	7.93	5300.00	16.86	77.94	21.04	23.38	15.59	258.18	0.00	544.59	0.00
Total	**2140.08**		**44129.32**		**1822.93**	**54.69**	**1877.62**		**197.17**		**58.90**		**100.78**	**182.29**	**49.22**	**54.69**	**36.46**	**679.51**			

Table 61: Calculation of the Pre project benefits for Palaitha Irrigation Project

Sr. No	Receipts								Expenditure on											Total Expenses/ ha	Benefit	Benefit /ha in Rs
	Name of the Crop	Area in Ha	Yield/ ha	Total produce	Rate	Gross produce value	Dung Receipts	Gross Receipts	Seeds Cost Per ha	Cost of Seed (Rs. In Lakh)	manure etc Cost Per ha	Cost of manure (Rs. In Lakh)	Labour charges Cost Per ha	Labour Cost Rs. In Lakh)	Fodder Expenses	Depreciation on implements	share &cash rent	Land Revenue	Total Expenses			
1	Wheat	231.36	33.65	7785.26	1500.00	116.78	5.26	122.03	3000.00	6.94	3119.60	7.22	3000.00	6.94	17.52	3.15	5.84	2.34	49.94	0.22	72.09	31159.06
2	Gram	809.76	8.15	6599.54	8000.00	527.96	23.76	551.72	10500.00	85.02	2494.40	20.20	5300.00	42.92	79.19	14.26	26.40	10.56	278.55	0.34	273.17	33735.29
3	Coriander	347.04	5.40	1874.02	8200.00	153.67	6.92	160.58	2400.00	8.33	3262.00	11.32	3000.00	10.41	23.05	4.15	7.68	3.07	68.02	0.00	92.57	0.00
4	Mustard	289.20	14.21	4109.53	3950.00	162.33	7.30	169.63	500.00	1.45	2838.00	8.21	5300.00	15.33	24.35	4.38	8.12	3.25	65.08	0.23	104.55	36150.26
5	Garlic	202.44	70.00	14170.80	3500.00	495.98	22.32	518.30	30000.00	60.73	2494.00	5.05	5300.00	10.73	74.40	13.39	24.80	9.92	199.02	0.98	319.28	157716.09
	Total	**1879.80**		**34539.16**		**1456.72**	**65.55**	**1522.27**		**162.47**		**52.00**		**86.33**	**218.51**	**39.33**	**72.84**	**29.13**	**660.61**			**258760.70**

Table 62: Cost of Inputs, Crop Yields and other Parameters

S. No.	Crop	Seed Rate [kg/ha]	Rate of Seed [Rs./kg]		Cost of Seed [Rs./ha]		Fertilizer Cost [Rs./ha]	Yield (with-rehabilitation) [q/ha]	Irrigation Charges [Rs./ha]
			Local	Improved	Local	Improved			
	RABI	100	20	30	2000	3000	3119.6	33.65	149
1	Wheat	75	100	140	7500	10500	2494.4	8.15	110
2	Gram	100	20	25	2000	2500	3119.6	29.5	114
3	Coriander	5	80	100	400	500	2838	14.21	139.25
4	Mustard	600	30	50	18000	30000	2494	70	110
5	Garlic	100	20	30	2000	3000	3119.6	33.65	149

Table 63: Present Average Cropping Area

No.	Crop	Present Average Cropping Area	
		Irrigated by canal	
		% CCA	Area [ha]
	Rabi		
1	Wheat	8%	**231**
2	Gram	28%	**810**
3	Coriander	12%	**347**
4	Mustard	10%	**289**
5	Garlic	7%	**202**
	Total Rabi	**65%**	**1880**

Table 64: Proposed Average Cropping Area

No.	Crop	Proposed Average Cropping Area	
		Irrigated by canal	
		% CCA	Area [ha]
	Rabi		
1	Wheat	7%	202
2	Gram	28%	810
3	Coriander	12%	347
4	Mustard	16%	463
5	Garlic	11%	318
	Total Rabi	**74%**	**2140**

Annexure 6.3.1 & 6.3.2: The Pre & Post Irrigation Planning

The Annexures have been attached as MS Excel file separately.

Annexure 7.1: Social Management Plan under RACP (Implementation strategy of Palayatha cluster)

1. Stakeholder Consultations

To avoid/minimize risks, avoid exacerbation of social and economic disparities between and among social groups, ensure equitable spread of project investments and benefits, and contribute to long-term social and institutional sustainability of the RACP, stakeholder consultations in form of Focused Group Discussion were carried out in entire villages of 4 gram panchayats of Palayatha Surface Water Cluster. Major issues in the Palayatha cluster that emerged from the farmer and group consultations during field visit are summarized below.

a. Equal distribution of technologies and investment should be ensured under RACP through reframing the beneficiary contribution. As though the farmer is having big farm land but financially not able to contribute the beneficiary share and similarly small and marginalized farmer doesn't having amount to share the beneficiary contribution.

b. Women folk believe that though they do most of the work in agriculture except for ploughing and selling, they have no role in decision making regarding purchase of inputs or selling of produce.

c. Nallah & canal should be covered through solar panels for power generation so that during windy seasons, nallah / canals doesn't get filled with sand.

d. Goat rearing women, widow, divorce, disabled and schedule cast farmer not able to take benefit of Drip, Mini sprinkler due to lack of beneficiary / farmer contribution.

e. Farmers are not getting affected with land acquisition as there is no displacement through canal rehabilitation works.

f. Women are not recognized as farmers in their own right.

g. Problem of access to credit by small and marginal farmers.

h. Lack of timely supply of agriculture inputs including seed and fertilizers.

i. Marginalization of small and marginal farmers in technologies and investments, training and capacity building.

j. Lack of breed improvement and livestock health care services.

k. Outreach of extension services very low in villages.

l. The villagers identified that the new infrastructure would be created for water management (Canal System, naadis and harvesting structures etc.) which would provide sufficient water for agriculture production.

m. In Palayatha cluster, Agriculture and animal husbandry are the main source of livelihood for majority of population residing in the Project Area. Most of the villages are located in Cluster Area and the connected market Baran city Near By Project area like ,Jhalawar, Kota etc and boarder area in located .

1.1 Field Consultant held - Key social issue of cluster

Major issues in the cluster that identified after consultation from the Sarpanch, PRIS and other groups like Women group, SC groups, field NGOs, representative of PRIs etc. during field visit with, are summarized below

S. N.	Date	Village	Gram Pnachyat	Place
1	09.01.2017	Palaytha	Palaytha	Animal hospital
2	11.01.2017	Amalsara	Amalsara	ASK
3	12.01.2017	Gopalpura	Amalsara	Temple of mataji
4	13.01.2017	Gulabpura	Amalsara	Ganpat ji farm
5	16.01.2017	Thikariya	Thiakriya	ASK
6	17.01.2017	Dugari	Thiakriya	Nagar House
7	19.01.2017	Nagda	Thiakriya	Temple chock
8	28.06.2017	Dhakad kheri	Bamuliya mataji	Chock
9	23.01.2017	Bhojyakheri	Bhojyakheri	Hanuman Tempal
10	24.01.2017	Raipuriya	Bhojyakheri	Chock
11	25.01.2017	Ladwara	Bhojyakheri	Main Road
12	27.01.2017	Bishankhedi	Bhojyakheri	Chock
13	28.01.2017	Balakhera	Balakhera	ASK
14	21.06.2017	Alipura	Balakhera	Main Choraha
15	24.06.2017	Baldara	Baldara	ASK
16	02.02.2017	Rooppura	Baldara	Mandir Chock
17	03.02.2017	Sindpuri	Baldara	Sindpuri main road
18	04.02.2017	Ganeshpura	Baldara	Mandir Chock
19	06.02.2017	Patunda	Patunda	ASK
20	08.02.2017	Thikhod	Baldara	School Ground
21	09.02.2017	Udapuriya	Udapuriya	ASK
22	13.02.2017	Pipalda	Udapuriya	Main Road
23	14.02.2017	Papdli	Udapuriya	AWC
24	16.02.2017	Sonwa	Udapuriya	AWC
25	27.06.2017	Godawari	Udapuriya	Main Road
26	21.02.2017	Siswali	Siswali	Kalupura
27	22.02.2017	Bamori Anta	Anta	Animal Hospital

Agriculture:-

Mini sprinkler are the most important and useful work in Surface water Cluster Palayatha, as farmer can use to secure their crops with irrigation.

1. For every farmer, those who get benefitted with solar pumps and mini sprinkler should be must.
2. Sprinkler is very successful in cluster area as most of the area comes under Black soil.
3. Regular farmer training and exposure tour activities should be conducted so that they can adopt new technology and innovation idea in Agriculture field.
4. Farm land fencing could be done to save crops from wild animals.
5. Those farmers who are very poor / BPL should be facilitated with more project share to construct Mini sprinkler in their respective fields.

Water resources:-

1. Time to time Canal repairing should be ensured.
2. Pataree (canal side road) should also be constructed
3. Sometimes canals get breakdown so along with construction, there should be a

provision of Repairing also time to time.

As far as crops are concerned, there is a scope to reduce the area of high water requiring crops and increase the area of those crops, which need less water requirement to mature and relative water use efficiency is more. For instance, the area of Mustard may be reducing because crop water requirement this crop is more. At the same time less crop water requiring crops like Barley & Gram can be promoted and area under these crops is advised to be increased in Rabi season. Soybean & Maize crops in Kharif have importance for value addition so the same may be selected for value chain.

Animals Husbandry:-

1. Though the Animals husbandry is also one of the major livelihood activity along with Agriculture, so pasture development activities on Government land has to be increased.
2. There is felt need of community based dairy farm, so project should also assist in such Endeavors.
3. To encourage the milk production in the cluster area, breed improvement of cows should also be taken care.
4. There should be a provision of cattle shed to cattle rarer.

Market Linkages:-

1. Though the cluster village is populated outside from road and lack of transportation among the farmers, there is a felt need of Market development / linkages.
2. Kota and Baran is the only market nearer to cluster area.
3. Due to lack of investment money with farmers, they generally borrows cash from Mandi wholesalers / businessman during the sowing time and therefore they have to sell their crop production to them only. Which results high rate of interest and suffering the farmers.
4. Though farmers are having Kisan Credit cards, but once they get defaulter, banks doesn't allow to give them loan and therefore the farmers has to rely to Mandi wholesalers / businessman

Value Chain :-

1. Soybean, Mustard, Wheat, and Garlic are the major crops in the cluster area.
2. Soybean, Wheat and Garlic Crop is the large scale Production in the cluster area so under value chain activities Soybean, Wheat and Garlic should be develop as value chain crop.

Farmer Discussion in Cluster Area Enclosed The farmer list

Palayatha Field Consultation:-

Sr. No.	Name Of Farmer	Father Name	Village	Gram Panchayat	Kasra No.	Mobile No.	Date
1	Shyam bihari	Ram karan	Palaytha	Palaytha	1507	9414765460	09-02-17
2	Prabhu lal	Jagannath	Palaytha	Palaytha	1744,53	7891239684	09-02-17
3	Ram bhrosh	Bheru lal	Palaytha	Palaytha	1554	9571938445	09-02-17
4	Dulichand	Nanad lal	Palaytha	Palaytha	1545	9782034118	09-02-17
5	Ram charan	Shri lal	Palaytha	Palaytha	1401	9413469237	09-02-17

Amalsara Field Consultation

Sr. No.	Name Of Farmer	Father Name	Village	Gram Panchayat	Mobile No.	Date
1	Bheru lal	Lalya	Amalsara	Amalasara	9691371812	11.01.2017
2	Revdi lal	Kishan lal	Amalsara	Amalsara		11.01.2017

3	Rakesh	Ramkalyan	Amalsara	Amalsara	9166315677	11.01.2017
4	Bhagchand	Keshri lal	Amalsara	Amalsara	9928327018	11.01.2017
5	Ramkishan	Sanwaliy	Amalsara	Amalsara	7725951275	11.01.2017

Gopalpura Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Parwati	Hemraj	Gopalrpura	Amalsara	9782057202	12.01.2017
2	Geeta	Omprakash	Gopalrpura	Amalsara	9166555696	12.01.2017
3	Bhagchand	Kesri lal	Gopalrpura	Amalsara	9928327012	12.01.2017
4	Badri lal	Bhagchand	Gopalrpura	Amalsara	9829129778	12.01.2017
5	Mahaveer	Bhagchand	Gopalrpura	Amalsara	9116006820	12.01.2017

Gulabpura **Field Consultation**

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Mukesh kumar	Nandlal Dakad	Gulabpura	Amalsara	7742473472	13.01.2017
2	Shri Lal Nagar	Ram lal	Gulabpura	Amalsara	9950885655	13.01.2017
3	Surendra kumar	Ramkalyan	Gulabpura	Amalsara	9785185394	13.01.2017
4	Jodhraj jat	Kesri lal	Gulabpura	Amalsara	9784196386	13.01.2017
5	Geeta bai	Omparkash	Gulabpura	Amalsara	9166555696	13.01.2017

Thikariya **Field Consultation**

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Janrel Singh	Teja Singh	Thikariya	Thikariya	8696971592	16.01.2017
2	Hemraj Gurjar	Bhimraj	Thikariya	Thikariya	9660630376	16.01.2017
3	Dharmraj Suman	Lator Lal	Thikariya	Thikariya	8562092714	16.01.2017
4	Chotulal Suman	Shukhdev	Thikariya	Thikariya	9928882822	16.01.2017
5	Hajari Lal	Panchu Lal	Thikariya	Thikariya	8890299678	16.01.2017

Dugari Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Ganesh Ram	Mathura Lal	Dugari	Thikariya	8107850923	17.01.2017
2	Gourav	Mangilal	Dugari	Thikariya	9660752990	17.01.2017
3	Omprakash	Dhanalal	Dugari	Thikariya	9680334432	17.01.2017
4	Mahaveer	Girdhari	Dugari	Thikariya	9680995552	17.01.2017
5	Prabhu Lal	Mathuralal	Dugari	Thikariya	9001186927	17.01.2017

Nagda Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Ramesh	Chaturbhuj	Nagda	Thikariya	8696971592	19.01.2017
2	Babulal	Madholal	Nagda	Thikariya	7740879543	19.01.2017
3	Gyarsiram	Dhanalal	Nagda	Thikariya	9784916643	19.01.2017
4	Mahaveer	Bhanwarlal	Nagda	Thikariya	8890514954	19.01.2017
5	Premshankar	Ramdev	Nagda	Thikariya	9269132669	19.01.2017

Dhakadkheri **Field Consultation**

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Chetan	Chandra Prakash	Dhakad Kheri	Bamuliya Mataji	9660472667	28.06.2017
2	Murli Manohar	Kunj Bihari	Dhakad Kheri	Bamuliya Mataji	9950867885	28.06.2017
3	Hemraj	Gobrilal	Dhakad Kheri	Bamuliya Mataji	9636825260	28.06.2017
4	Bherulal	Ramcharan	Dhakad Kheri	Bamuliya Mataji	9602205236	28.06.2017
5	Kamlesh	Mohanlal	Dhakad Kheri	Bamuliya Mataji	9680882227	28.06.2017

Bhojyakhedi **Field Consultation**

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Barjmohan	Hira lal	Bhojyakhedi	Bhojyakhedi	8875254494	23-01-17
2	Girdhari lal	Chotmal	Bhojyakhedi	Bhojyakhedi	9569961055	23-01-17
3	Rampratap	Chitar lal	Bhojyakhedi	Bhojyakhedi	8890830007	23-01-17
4	Bajrang lal	Surajmal	Bhojyakhedi	Bhojyakhedi	9649813498	23-01-17
5	Dhanna lal	Ramkalyan	Bhojyakhedi	Bhojyakhedi	9829914161	23-01-17

Raipuriya Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Haridwar	Jagannath	Raipuriya	Bhojyakhedi	9636976078	24-01-17
2	Panchulal	Ramnath	Raipuriya	Bhojyakhedi	9772852113	24-01-17
3	Harilal	Suraj mal	Raipuriya	Bhojyakhedi	9982598870	24-01-17
4	Harnarayan	Ramgopal	Raipuriya	Bhojyakhedi	9829382892	24-01-17
5	Madan Mohan	Bhawani Shankar	Raipuriya	Bhojyakhedi	8239846032	24-01-17

Ladwara Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Dwarki Lala	Ramkaran	**Ladwara**	**Bhojyakhedi**	9460176344	25-01-17
2	Manohar lal	Gapallal	**Ladwara**	**Bhojyakhedi**	9772814513	25-01-17
3	Kelash Bai	Suraj Mal	**Ladwara**	**Bhojyakhedi**	8290859307	25-01-17

Bishankhedi Field Consultation

Sr. No.	Name Of Farmer	Father/Hus. Name	Village	Gram Panchayat	Mobile No.	Date
1	Nandkawri	Ramkalyan	Bisankheri	Bhojyakheri	9799186224	27.01.2017
2	Mor Bai	Ram singh	Bisankheri	Bhojyakheri	9587299053	27.01.2017
3	Chandra Mohan	Dwarka lal	Bisankheri	Bhojyakheri	9460679035	27.01.2017
4	Ram Lal	Dhannalal	Bisankheri	Bhojyakheri	7426908504	27.01.2017
5	Mahaveer	Parmanand	Bisankheri	Bhojyakheri	9929388483	27.01.2017

1.2 Findings of PRA in cluster area

As of field consultation during field visits, Participatory Rural Appraisal (PRA) activities viz. Resource mapping, Transit walk etc. were also carried out in the cluster area. The main findings during PRA exercise in Palayatha cluster are summarized as under:

Findings of PRA in cluster area

1. There is high need/requirement from farmers Any demonstration or input provided to farmers from line departments shall also include proper training and follow up for effective learning, adoption and impact on ground Farmers which is not arable Poor/BPL farmers require more financial assistance from government for construction or installation of Mini Sprinkler/ Drip The

cluster is under canal irrigation Dhorra. the farmer gets irrigation water which his 2-3 beegha land is irrigated by flood irrigation.

2. There is lack of education and health services in the area as compared to rest of the state average of schools or PHC per GP.
3. The connecting canals are open and get filled up with sand. This is Command Area So All Farmer used cropped area by floods irrigation systems.
4. Dairy development activities for establishment of milk route and improved animal husbandry practices should be promoted in the project area Breed improvement is highly necessary in the project area Land levelling as well as pastureland development is highly in demand in the project area.
5. There is requirement of solar water pump in the project area. Crop insurance is in High demand in project area.

Social mobilization strategy

The consultations with participant are followed by / carried out through Information, Education and Communication (IEC) activities like display board, pamphlet distribution and awareness campaign with school children on activities and benefits for preparing of CACP under RACP. The detail of IEC activities are given as bellow in table.

S.N.	Name of Activities	Target	Achieve
1	Display Board at GP/Village Level	10	10
2	Kala Jattha and Puppet shows at the Chack Level	16	16
3	Pamphlet Distribution	11600	11600
4	RACP Awareness Rallies of School Children	08	08
5	Flex Stand	8	8
6	Slogan Writing	58	58

2. Socioeconomic Profile (based on CACP baseline data)

Project Area covers an area of 8003 hectare (ha)comprising Ten (10) Gram Panchayats and Twenty saven (27) villages.& One Nagar Palika Area. The Cluster village has a population of 47718 of which 24750 are males while 22968 are females as per field survey by NGOs. In the cluster scheduled caste 10544 and scheduled tribe 3102. Cluster had household of 5292 of which are large farmer's amount to 792 Marginal Farmers 1902 & Small Farmers 2114 & All Farmar is landless.

The populations of cluster are counted through baseline survey conducted by field NGOs which are counted different to census data due to variation of village boundary. Some villages population are not counted of hole village population because of some area of village are not consider in cluster boundary hence the population of census data is variable to baseline survey.

Socioeconomically disaggregated baseline: The Baseline data are documented the existing status of farmers and estimate the resource dependency of the village common lands. CACP is included a summary of socioeconomic baseline, consultations held with various socioeconomic groups and their key concerns and a social strategy.

Population Details (according baseline survey)

Male	Female	Total	SC	ST
14266	13298	27564	6049	2259

51.76%	**48.24%**	**100.00%**	**21.95%**	**8.20%**

Household Details (according baseline survey)

BPL household	Land Less	Small Farmer	Marginal Farmer	Large Farmer	Total household	SC household	ST household
1828	484	2114	1902	792	5292	1162	434
34.54%	**9.15%**	**39.95%**	**35.94%**	**14.97%**	**100.00%**	**21.96%**	**8.20%**

Category wise Cultivated Area in Palayatha Cluster

Participatory Rural Appraisal (PRA) has been done to assess the irrigated and rainfed area. The total cultivated area of the cluster is 8,003 ha and the total households in the cluster are 5292 The category wise cultivated area in the Palayatha cluster is being presented in Annexure 2.3

The table presented clearly indicates that large farmers are 14.97% whereas small and marginal farmers are 39.95% and 35.94% respectively. The total cultivated area of the cluster i.e. 8,003 ha comes under irrigation. Out of the total area, 54.60% belongs to OBC category, 36.87% to general class whereas 5.01% and 3.51% belongs to SC and ST respectively.

Type of Farmer	Total Households (Nos)	Area (in ha)			Area (in ha) Category wise			
		Commanded	Non Commanded if any	Total	General	SC	ST	OBC
(i) Large farmer	792	3108	0	3108	1146	156	108	1697
(ii) Small farmer	2114	4053	0	4053	1494	203	143	2213
(iii) Marginal farmer	1902	842	0	842	311	42	30	460
(iv) Landless person	484		0					
(V)No. of BPL households	1828		0					
Total (1 to 4)	**5292**	**8003**	**0**	**8003**	**2951**	**401**	**281**	**4370**
Category wise Cultivated Area in Palayatha (Command) Cluster in %								
Large farmer	14.97%	38.84%	0.00%	38.84%	14.32%	1.95 %	1.35 %	21.20 %
Small farmer	39.95%	50.64%	0.00%	50.64%	18.67%	2.54 %	1.79 %	27.65 %
Marginal farmer	35.94%	10.52%	0.00%	10.52%	3.89%	0.52 %	0.37 %	5.75%
Landless person	9.15%	0.00%	0.00%	0.00%	0.00%	0.00 %	0.00 %	0.00%
No. of BPL households	34.54%	0.00%	0.00%	0.00%	0.00%	0.00 %	0.00 %	0.00%
Total (1to 4)	100.00%	100.00 %	0.00%	100.00 %	36.87%	5.01 %	3.51 %	54.60 %

3. Beneficiary Targeting and Social Inclusion

Ensuring Targeting, Inclusion, Participation and Access of small and marginal farmers, tribal farmers, SC and women farmers to agricultural inputs (seeds, fertilisers, credit, training, information, etc.), extension services and markets; are the basic need for the project to reach out and involve these groups at all stages. Through social mobilization including IEC activities and field consultation / PRA exercise, equitable access of small and marginal farmers, women farmers, tribal farmers and scheduled caste farmers in CACP preparation, farmer mobilization, and farmers' organisations is ensured.

4. Social Inclusion in Selection of Individual beneficiaries

RACP is offering a range of assets and resources to individual beneficiaries on a cost-sharing basis. Since most of these will not be on a saturation basis, the targeting and beneficiary selection criteria for all the categories of private assets will prioritise selection of small and marginal farmers, from scheduled caste, scheduled tribe, women headed and other vulnerable households highlighted in the social assessment of the CACP.

5. Beneficiary Targeting and Social Inclusion

Though most of the activities planned under CACP in Palayatha cluster is belongs to individual farmer / beneficiary, few activities viz. Rehabilitation & Modernization of Canal System (Main Canal, Distributaries, Minors & its structures etc.), Adjustable Proportional Module (APM) type outlet etc. has to be done on existing canal which is Water Resources Department land. Therefore there is no need to do Participatory Planning for Interventions on Panchayat Lands and Village Commons in Palayatha cluster.

6. Gender and Women's Empowerment

During and before CACP planning, FGDs were conducted among different women groups where the anticipated benefits of the project were shared among them. It was also ensured that women from every group (caste/religion) should participate in such meetings with support of Female outreach workers viz. Anganwari Worker, Asha Sahyogini, ANM etc.

i) In CACP planning:-To promote goat raring among the women, information and eligibility criteria for distribution of goats and bucks among women (widow, physically challenged/divorced) is discussed so that they could adopt such livestock raring as a livelihood support. Under RACP, there is a provision of distribution of Goat and bucks, chaff cutter etc. and the same is being ensured by the TL & CMS with due support of livestock assistant and community organizers.

ii) As beneficiaries of individually targeted assets: -The selection of beneficiary is also being done in group meetings with women and tried to get benefitted to those women MTG members, who are needier. Women from SC/ST and BPL families are given priority.

iii) As members of MTGs, WUAs, and FPOs: - Apart from beneficiary selection, it is also taken care that women could participate as a member of MTGs, WUAs and FPOs. Though the small ruminant MTGs is having all the members are women mandatory but it is also ensured that at-least 30% members would be women in MTGs for agriculture and horticulture. It would also be taken care that in WUAs and FPO, there would be active participation of women members in meetings, capacity building and decision making. It is envisaged that for any decision regarding the WUAs / FPO, 60% women members' participation is mandatory.

iv) as participants in training program:-Though it is being ensured that women member's participation in group formation, meetings, planning and decision making but also it would be encouraged that women members could participate in capacity building programs / trainings. For every group / WUA, it would be mandatory that at-least 30% participants would be women members.

v) specially targeted women's activities:-Under RACP, recognition of women as farmers across the project structures are benefiting under project activities like goat rearing, chaff cutter, water troughs, cattle shed vegetable production etc. for generating her income. Women are aware through training, capacity building and consultation for preparation of CACP under activities and benefit in RACP. Apart from Goat Rearing, vegetable production etc. specially targeted women's activities, Lady Link workers were also being selected in the cluster under the Animal husbandry Department. Time to time their capacity building and trainings were also being carried out.

7. Tribal Development

The tribal population is 6.66% in Palayatha cluster Social Impact Mitigation (for activities involving land, structures, crops, livelihoods and access)

S. N	Major Activity	Sub Activity	GP/common / private/other land	Social Impact	Mitigation
1	Water Resource	Renovation & Modernization of Canal System (Main Canal, Distributaries, Minors & its structures etc.)	Water resource department land	The risk of encroachment on canal as a farmer hut, cattle house etc. Inequity in the use and distribution of water The risk of conflicts among water users resulting from collective efforts at establishing more efficient water usage norms. The risk of child labor during rehabilitation work on existing canal.	Ensure that the encroachment on canal as farmer hut and cattle not house is not permissible. Exposure visits of farmers to water scarce areas use of water to more managed and equitable resource-sharing arrangement. Close monitoring of water use and distribution arrangements by CBOs, CRPs and F-NGO. RACP would not encourage child labor. Social safeguard screening will be carried out for selected infrastructure
		Lining of Direct off taking Minors of Palayatha sub Branch Km.12.30 to 25.75			
		Renovation of Existing Structures on direct off taking Minor of Palayatha sub Branch Km. 12.30 to 25.75 Km.			
		Construction of New Structures on direct off taking Minors of Palayatha sub Branch Km.to 25.7 Km.			
		Repairing work of office			

S. N	Major Activity	Sub Activity	GP/common / private/other land	Social Impact	Mitigation
		Building for WUAs			
		Construction of office Building for WUA's	Proposed in WRD land		
2	Agriculture	Integrated demonstration for Drip Irrigation System with Automation and fertigation based techniques for field crops	Own land	The risk of exclude in farmer selection specially women and SC for benefit distribution Risk of resource-farmers being further indebted to moneylenders. Increased perishability, and challenges in marketability of produce	Ensuring for benefit for SC and Women on basis of cluster population parentage. Facilitate for market oriented agriculture comprising high-value and high-risk crops. Promote establishment of grain banks with exclusive membership of farmers.
		Integrated demonstration for Mini Sprinkler based techniques for field crops	Own land		
		Drip Irrigation System	Own land		
		Mini/ Micro Sprinkler Irrigation System	Own land		
		Sprinkler Irrigation System	Own land		
		Pipeline for piped conveyance of irrigation water	Own land		
		Demonstrations on farm mechanization and PHM technologies	Own		
		KSK strengthening as model in project area-to serve as level I platform for ICT	To be finalized		
		Agriculture Research Institute	To be finalized		

S. N	Major Activity	Sub Activity	GP/common / private/other land	Social Impact	Mitigation
		strengthening to serve as level II/ III platform for ICT			
3	Horticultur e	Wide spacing crops with inter cropping	Own land	The risk of exclusion of women and SC farmers from project investments and other benefits. Risk of livelihood security due to Increasing marketability produce.	Farmer selection process through MTG discussion Identification of women household headed, and SC farmers, and their prioritized inclusion in all project benefits
		Assistance on production technologies for vegetable Cultivation			
		Solar Pump Program	Own land		
		Post-Harvest Management	Own land		
		Drip system (Fruit &Veg.)			
		Horticulture Mechanization	Own land		
		Green house	Own land		
4	Animal Husbandry	Buck Distribution	Not applicable	The risk of exclude poorest women of SC, widow, disabled for getting the benefit of activities The risk of women being excluded from training and related activities. The risk of migrant households particularly sheep herds getting excluded from receiving the benefit. Affect access to the land for grazing/ stalling livestock	Identification of women household headed, and SC farmers, and their prioritized inclusion in all project benefits. Develop a cadre of women CRPs and LLW in different thematic areas, including animal husbandry Allow medical supplies (deworming and routine vaccination) for migrant herds to be given in bulk for the duration away from the village. Formation of common land user associations/ resource institutions for development and
		Goat Distribution	Not applicable		
		Azolla Demonstration	Own Land		
		Chaff Cutter Distribution	Not applicable		
		Feed Supplement	Not applicable		
		Rural Technology Centers (RTCs)	To be finalized		
		Feeding & Water Trough	Not applicable		
		Goat House	Own land		
		Weighing Scale	Not applicable		
		Travis Installation In Project Villages	Gram Panchayat land		
		Integrated Livestock Center			

S. N	Major Activity	Sub Activity	GP/common / private/other land	Social Impact	Mitigation
					management of the resource.
5	Market & value chain	FPC	Proposed Gram panchayat land	It is expected that sufficient land would be available with the Gram Panchayat for establishment and/or construction of common use facilities proposed under the project. Loss of control of women over farm production with commercialization -on and formalization of markets – further disempowerment of women in the household economy	Land-based interventions would be located only in those areas where such land is readily available and voluntarily offered by the Gram Panchayat. The procedure for obtaining a "no objection certificate" from the Gram Panchayat. Social safeguard screening will be carried out for selected infrastructure Form and strengthen exclusive women farmers' groups for collective enterprise development.
		FCSC	Proposed Gram panchayat land		
6	Farmers' organizatio n and capacity building	Formation of MTGs	Not applicable	Risk of exclude of women/SC/BPL farmer in MTGs	Priority of memberships & leadership of women/SC/BPL farmer in MTGs/WUAs/FP C All household data collection of cluster area. Equitable distribution of project benefits between women and men of categories wise percentage
		Formation of WUAs	Not applicable	Risk of exclude of Women/SC/BPL farmer in WUAs	
		Formation of FPC	Not applicable	Risk of exclude of Women/SC/BPL farmer in MTGs	
		Socio economic Data collection	Not applicable	Risk of exclude of Women/SC/BPL farmer in MTGs	
		Identification of Beneficiary	Not applicable	Risk of exclude of women, SC/BPL from beneficiary selection for Project activities	
		Capacity building & Training	Not applicable	Risk of exclusion of women from training for technological interventions	

8. Grievance Redress

The Grievance Redress Mechanism (GRM) are developing at three tier level (first, second and third level). The first, second and third level recognized as followed village, district and PMU level. The grievance redressal registers are maintained at all three tier level for received grievance under project activities.

First tier-Grievance mechanism operating and grievance register maintain by community organizer at village level with participation of MTGs leader.

Second tier-Grievance received through web application, hand on and toll free number and redress by Grievance Redressal Cell (GRC) which headed by cluster representative of PRIs/ZilaParisad with DPMU coordination.

Third tier– GRM monitor through web application, toll free number, forward by DPMU by state level GRC which headed by project director.

9. Key Social Indicators

The key social indicators are given below in table:-

Major activity	Sub activity	Social indicators
Water resource	The project will carry out rehabilitation and modernization of canal works	Focus will be on improved management of rehabilitated canal networks through WUAs/CBOs About 22% of SC, 8% of ST of MTGs, WUA, FPCs members and leaders from SC, and women farmers About 22% of SC, 8% of ST of trainees from SC and women farmers
Agriculture	MIS, Diggies, Soil testing, Demonstrations ,PHM technologies, Seed Production	Increase in farm production and productivity as a result of improved seed management and cultivation practices. About 22% of SC, 8% of ST and women farmers as beneficiaries of individually targeted assets/services and demo activities. About 22% of SC, 8% of ST of MTGs, WUA, FPCs members and leaders from SC, and women farmers About 22% of SC, 8% of ST of trainees from SC and women farmers
Horticulture	Greenhouse, shade net house cultivation, Solar pump set including fencing, Post-Harvest Management, Horticulture Mechanization	Greater access of farmers to markets and financial institutions and higher incomes. About 22% of SC, 8% of ST of SC and women farmers as beneficiaries of individually targeted assets/services and demo activities. About 22% of SC, 8% of ST of MTGs, WUA, FPCs members and leaders from SC,ST and women farmers About 22% of SC, 8% of ST of trainees from SC and women farmers
Animal Husbandry	Buck Distribution ,Goat distribution to Widows and/or especially abled women, Health and Awareness camps, Fodder Demonstrations on private lands, Azolla	All farmers with goats will stand to benefit from project interventions under the livestock component. The overall impact of these interventions will be a rise in income from goat rearing. About 22% of SC, 8% of ST and women farmers as beneficiaries of individually

Major activity	Sub activity	Social indicators
	Demonstration, Lady Link Worker cum Marketing Facilitator and Chaff Cutter Distribution	targeted assets/services and demo activities. About 22% of SC, 8% of ST of MTGs, WUA, FPCs members and leaders from SC, and women farmers About 22% of SC, 8% of ST of trainees from SC,ST and women farmers
Markets and value chains	Agri-Business Promotion Facility (ABPF) Pre-Investment Advisory Support Market Infrastructure and Agribusiness Support	Higher income from market-oriented agriculture and market advisory services is the expected outcome of this component. Formation of producers' companies will lead to an increase in farmers' bargaining capacity and help in collective procurement of quality agriculture inputs. About 22% of SC, 8% of ST of trainees from SC, ST and women farmers
Farmers' organization and capacity building	Capacity building Socio economic Data collection Identification of Targeting and Beneficiary MTGs (Multi Task Groups) MTA (Multi Task Association) FPC (Farmer Producer Company) Training on Social management Plan	Community will aware about RACP Project. Ensuring community participation. Project goal be achieved. Analyses the findings by different socio-economic groups. Cluster's all community will be benefited About 22% of SC, 8% of ST of MTGs, WUA, FPCs members and leaders from SC,ST and women farmers About 22% of SC, 8% of ST of trainees from SC,ST and women farmers

The project does not envisage acquisition of any private land for purposes of storage, processing or any other activity. There will be no adverse impacts related to land acquisition. Therefore abbreviated resettlement plan does not require at cluster level.

Annexure 7.2 Environment Management Plan (EMP)

The key interventions under RACP can be grouped as under:-

- Crop intensification
- Water Management
- Livestock Management
- Value chain development activities

Environment Management Plan for Crop Intensification

The key objective of interventions in crop production is to increase crop productivity so that farmer income is also enhanced. The dominant and "business-as-usual" approach to achieving this is to intensify crop production by introducing hybrid seed varieties that respond well to chemical fertilizers and apply chemical pesticides to control pests and diseases that attack the crop. However, use of such intense chemical based crop production technologies results in the long-run in decreased yield. Increased use of chemical pesticides leads to destruction of pest predators and increase in pest and diseases. Most, hybrid seeds are designed to respond to higher doses of chemical fertilizers and do not perform well if they are not provided.

Thus, if a "business-as-usual" approach is taken to increasing crop productivity under RACP, there is a high likelihood of use of agri-chemicals increasing substantially leading to deterioration of soil quality which would reduce crop productivity and thereby agricultural competitiveness in the long run. Further, these agri-chemicals would pollute the village ecosystem and affect the health of the farming families in the village and their livestock as well.

The RACP proposes to adopt "green" agricultural practices that would promote Integrated Nutrient Management (INM) and Integrated Pest Management (IPM) and therefore, the possibility of excessive use of agri-chemicals is largely mitigated.

It is defined as producing more from the same area of land while reducing negative environmental impacts and increasing contributions to natural capital and the flow of environmental services. Sustainable Crop Production Intensification (SCPI) views farming as an ecosystem which uses inputs, such as land, water, seed and fertilizer, to complement the natural processes that support plant growth, including pollination, natural predation for pest control, and the action of soil biota that allows plants to access nutrients.

The Line Department /NGO will abide by the Environmental measures listed in the Environment Management Plan (EMP) given below. The Line Department shall include the EMP requirements in the Programme of RACP Works. The requirements stated in the EMP should therefore be studied properly and implemented accordingly.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Impact on Environment**	**Possible Environmental Impacts**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
Demonstration packing of practices for higher production of selected crops	Crop Selection	Low	Selected crop may lead to consumption of more water	The sustainable availability of water and crop water requirement of each crop that is suited to the agro-climatic conditions of the cluster and choosing only those crops that can be grown within the available water. This assessment has to be conducted at the sub-watershed level for rained areas, at the aquifer level for groundwater conditions.	Design of package of practices	% of farmers got aware that crops have been selected based on water availability. % of crops that are water efficient (50%)	% of farmers following crops recommended based on water availability
			Selected cropping pattern may lead to nutrient depletion	Cropping pattern should be chosen such that the same crop is not being grown in the same patch of land season after season, year after year. Crops should be rotated to ensure that crops with different root zones, different demands on nutrients and different pests and diseases are grown. This would help in better soil, nutrient and pest management.		% of farmers got aware that identified cropping pattern based on crop rotation.	% of farmers following recommended cropping pattern
	Seed Selection		Variety may not be suited to the area or preferred by the farmers	Well adapted, high-yielding varieties with resistance to biotic and a -biotic stresses and improved nutritional quality should be chosen to mitigate risks of crop.	Design of Package of Practices & at the time of purchase of seeds for distribution.	% of farmers got awareness on the varieties that are suitable to the local conditions.	% of Farmers using the varieties suitable for the region
			Seed selected may be pest or disease infected	Use of seeds of good quality that are pests & disease free determines crop performance to a		% of farmers has access to certified seed.	

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Impact on Environment**	**Possible Environmental Impacts**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
			leading to pest attack and crop loss or increased use of chemical pesticides	large extent. Therefore, Seeds when purchased should be only from certified sources and should be used well within the expiry date.			
			Genetically modified seeds may be used that are not approved for use in Rajasthan	In case of selection of Genetic Modified varieties guidance should be sought from the Department of Agriculture on whether it is an approved variety in the state or not.			
	Soil Health & Nutrient Management		Degradation of soil physical characteristics due to intensive cropping	Nutrient management is based on Integrated Nutrient Management Plan (INM). Package of practices considering the soil nutrient status of the cluster	Design of Package of Practices & at the time of purchase of fertilizers including biofertilizers for distribution.	% of farmers got aware on Integrated Nutrient Management practices. % of farmers who have been issued Soil Health Cards % of farmers who have received Soil Test results before taking up cropping	% of farmers who are applying fertilizers as per dosage recommended by the Soil Test result % reduction in use of chemical fertilizers over baseline in kg/Ha.
			Deterioration of nutrient content of soil due to intensive cropping				
			Increased and imbalanced use of chemical fertilizers				
	Pest & Disease Management		Increased chemical pesticide use	Restricting the use of banned pesticides (as per WHO, list) and promoting the Integrated Pest management Plan (IPM).	Design of Package of Practices & at the time of purchase of pesticides including	% of farmers who have attended training/demonstration on IPM	% of farmers who have adopted all components of IPM. % reduction in use of chemical pesticides over
			Increased incidence of pests if the same crop is				

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Impact on Environment**	**Possible Environmental Impacts**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
			promoted repeatedly Safety issues in storing and using chemical pesticides		biopesticides / bio-control agents /pheromone traps for distribution.		baseline in l/Ha.
	Demand-side Water Management		Introduction of micro irrigation devices may lead to expansion of cropped area leading to no net reduction in water used in agriculture sector Cropping pattern may be leading to unsustainable use of available water	The key practices to be adopted at the design stage itself are: ➢ Compulsory use of micro irrigation to irrigate crops in all water regimes so as to reduce absolute quantity of water applied and also increase water use efficiency ➢ Simple low pressure, gravity fed drip systems could be used in such situations to reduce the capital cost to the beneficiary. ➢ Mulching is an important operation to be carried out for weed control as well as improve water use.	At the time of design of cropping plan in CACP As a process during implementation of water management plan	% of farmer who have attended training on water conservation.	% of farmer who have adopted micro irrigation and drip system. % of farmer who have carried out mulching practices.
	Storage & Handling of Agri-inputs		Poor storage, handling can lead to spills and leaks of fertilizers and pesticides leading to contamination of soil and water	The following precautionary principles shall be followed an existing storage facility: ➢ Bagged fertilizer must be handled in a manner to prevent fertilizer from escaping to the environment.	Design of Package of Practices & at the time of purchase of seeds, fertilizer, pesticides for distribution.	% of farmers who have attended training on precautions mentioned in measures to be taken/Implemented for storage and Handling of agri-inputs.	% of farmers followed code of practices for storage and handling agri-inputs.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Impact on Environment**	**Possible Environmental Impacts**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				➢ Spills should be cleaned up immediately to avoid the potential for soil and groundwater contamination.			
			Poor storage may lead to pest and disease infestation of seeds	Seeds should be stored in air tight containers and away from sunlight, heat and moisture. Before storage, the moisture level of the seeds should be bought down to an appropriate level by drying it in sunlight followed by drying in shade. Seeds of different should be stored in separate containers and clearly labeled.			

Environment Management Plan for Water Management

Rehabilitation of distributaries has no major adverse environment impact since this related to only rehabilitation and not construction of new structures. Activities in rehabilitation are bring the canal components to their originally designed parameters i.e. restoring them to original section and the canal capacities etc. including remodeling /re-sectioning, re-aligning of canal.

Overall, activities under this subcomponent are expected to reduce absolute quantity of water use in agriculture while increasing water-use efficiency. Therefore, environmental impacts are expected to be positive.

The Line Department /NGO will abide by the Environmental measures listed in the Environment Management Plan (EMP) given below. The Line Department shall include the EMP requirements in the Programme of RACP Works. The requirements stated in the EMP should therefore be studied properly and implemented accordingly.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
Water Supply Augmentation	Restoring original section and the canal capacities etc. including remodeling /resectioning, re-aligning of canal, Some gates of regulators require minor repairing, oiling, greasing, alignment, nut & bolt, rods etc. Digging of Diggies	Top soil removal	Medium	Soil removed during the process of digging water harvesting storage structures should be used to build bunds and top soil should be spread over the rest of the farm.	At the time of CACP. At the time of sanction of individual structure for implementation	% of trees actually planted as compared to number of trees to be taken up under compensatory planting.	% survival of trees planted under compensatory planting.
		Cutting of trees		As far as possible, these structures should be sited where there are no trees. If tree cutting is unavoidable, then compensatory planting in the ratio of 1:10 should be carried out and the beneficiary group made responsible for maintaining it with at least 90% survival till 3 years.			
		With distributaries rehabilitated and diggies dug farmers would expand cropped area and also prefer water intensive crops.		Compulsory uses of micro irrigation to irrigate crops in all water regimes so as to reduce absolute quantity of water applied and also increase water use efficiency.		% diggies with vegetative cover to prevent erosion and siltation. % diggies with safety provisions	% of diggies designed and constructed on the basis of water demand and followed safety measures.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
		Siltation of canal and diggies.		Water should be passed through a silt filter to prevent frequent silting up to these storage structures. Reduction in the seepage rate may be achieved by mixing swelling clay material such as bentonite with soil. Bunds should be covered with vegetative cover to ensure longevity with lower maintenance costs. Grasses such as Lasiurus sindicus, Cenchrus ciliaris, Cenchrus setigerus, Stylosanthes scabra,Panicum antidotale, Chloris gayana. Desmodium trifolium, Macroptelium atroperpureum,Vetiveria zizaniodes , Saccbarum munja etc. could be grown to help bind the soil together and thereby stabilize the bund.			
		Environment pollution may be generated During construction activities.		The sewage system for the labour/ camp is designed, built and operated in such a manner that no health hazard occurs and no pollution to the air, ground water or adjacent water sources takes place. • Waste water generated from the sanitary facilities of			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				labour camp is disposed in a septic tank/soak pits. • Solid waste generated at the construction site, camp site, will be collected in covered wasted bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag etc.). Polyethylene/plastic wastes will be stored in empty cement bags and should be sent for recycling. Biodegradable (food waste, paper etc.) solid waste will be disposed in a compost pit. The contractor will take every precaution to reduce the level of dust and gaseous pollution from the work site/s. Measures to reduce the level of dust (PM 2.5 and PM 10) will be taken and the Contractor will make arrangements to minimize dust pollution through provision of wind screens/barriers, water sprinkling/mist fine spray arrangement and encapsulation of dust source (as required) shall be made. Only acoustic enclosures fitted DG set will be allowed at the construction and camp sites. All measures required for ensuring safety and health of the			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				workers shall be taken up by the Contractor. This includes provision and enforcement of appropriate personal protective equipment; first aid facilities at camp, plant site and work zones; emergency response arrangements; proper storage of hazardous/ toxic and/or polluting materials; measures for ensuring electrical, fire and mechanical safety arrangements.			

Environment Management Plan for Livestock Management activities

RACP has recognized the importance of livestock in ensuring nutrient recycling in cropping systems. Accordingly, it has included a component that focuses on improving livestock management, especially for goats. The key environmental impact of this activity would be shortage of fodder and increased grazing pressure on existing pastures.
Further, the project proposes to provide health care through organizing Animal Health Camps and also by providing permanent services through a Rural Technology Centre-cum-Animal Health Centre. The likely impacts of these are issues related to safe disposal of syringes, needles and vaccines used in treating the animals.

Therefore, there is a need to develop pasture (tree & grasses) lands on common and private land, bring in improved feed practices such as using chaff cutters to ensure that there is no rejection of fodder by the animals, use of mineral supplements to increase productivity, inclusion of fodder crops in the cropping pattern to ensure year-round feed and fodder availability etc. Of these, for small ruminants, development of pastures is the most important intervention since they need both tree leaves as well as grasses. Further, since small ruminants are almost entirely free grazed, availability of well-developed pastures is very essential.

The Line Department /NGO will abide by the Environmental measures listed in the Environment Management Plan (EMP) given below. The Line Department shall include the EMP requirements in the Programme of RACP Works. The requirements stated in the EMP should therefore be studied properly and implemented accordingly.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
Livestock Development & Management	Breed improvement of goats through introduction of bucks	Breed may not be suited to the area	Low	• Good quality bucks of the chosen breed (ensure that the breed being promoted complies with The Rajasthan Livestock Improvement Act No.45 of 1958) born in twins and triplets should be selected as breeding bucks. A buck is generally sufficient to serve about 30-40 females. • Bucks kept with a goat rearer group should be exchanged with other similar groups after 10-12 months to avoid inbreeding.	At the time of CACP. At the time of preparation of the Livestock Management Plan	Ratio of elite bucks of chosen breed to no. of females in a herd/goat rearers group. % of nondescript and mixed breed kids castrated to total kid population.	% of herd showing full characteristics of chosen breed.
		Fodder may not be sufficient to support the herd		• Development of community pasture land goes hand in hand with herd improvement. Planting tree species such as Gliricidia, Prosopis cineraria, Acacia, etc. on field bunds, backyards and on bunds of pasture lands would help in meeting the fodder			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				requirements of goats. • Kids should also be given very succulent green fodder such as maize, Lucerne, etc. If adult goats are completely stall fed they should be given a daily feed of • Green fodder – 3to 4 kg • Dry fodder - 1 to 2 kg • Readymade concentrate – 200-250 g • If they are partly stall fed and partly free grazed they may be given half these rations.			
	Animal Health Inputs	Disposal of Used and expired vaccines and Biomedical waste		Biomedical wastes including needles, syringes, vaccines, medicines etc. generated from conducting animals health camps should be disposed of after treating 10% Sodium Hypochlorite solution then before burying	At the time of CACP. At the time of preparation of the Livestock Management Plan	% of staff who have attended training on Biomedical Waste Management for animal health camps	% of animal health camps that have adopted safe disposal of medical wastes % Animal Health Camp sites that have a safe disposal pit

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				them in deep pits which are at least 500 m away from water bodies, grazing land and other human habitations. These pits should be covered with soil immediately after disposal of the wastes.			
		Use of banned veterinary medicines		Diclofenac and its formulations (for animal use) are prohibited for manufacture and sale through GSR NO. 499(E) Dated 04.07.2008 under section 26 A of Drugs & Cosmetics Act 1940 by The Ministry of Health and Family Welfare, India			
	Goat shade and Manure Management	If improperly managed, manure and shad can be a source of water pollution, odor, flies, parasites, and other nuisances. It can contaminate drinking water		Livestock owners must take responsibility for the manure generated by their animals in order to prevent water pollution. Composting is a controlled and managed aerobic ("with air") decomposition process for manure	At the time of CACP. At the time of preparation of the Livestock Management Plan	% of goat herd owner has aware shade and manure management.	% of goat herd owner adopted shade and manure management

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
		and harm goat.		and other organic materials waste.			

Environment Management Plan for value chain activities

Storage and processing of produce are activities expected to be taken up under value chain development component of the RACP.
The operations include input supply to its members, output marketing and processing support to its members, providing warehousing facility, etc. These activities when carried out in a "business-as-usual" manner would affect the environment in one way or the other. For example, if the Farmer Producer Organization **(**FPC) were to promote agri chemicals indiscriminately, as a pesticides dealer would, it would result in increased use of such chemicals in the project area. Therefore, there is a need for the FPC to operate as a responsible business entity.
All of food processing units consume huge amount of water for processing food. A considerable part of these waters are potential wastewaters to be treated for safe disposal to the environment. Wastewater and solid waste are the primary waste streams for the food processing units.

The Line Department /NGO/ Design consultants/engineers hired for designing and executing the structures will abide by the Environmental measures listed in the Environment Management Plan (EMP) given below. The Line Department shall include the EMP requirements in the Programme of RACP Works. The requirements stated in the EMP should therefore be studied properly and implemented accordingly.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
Value Chain Development	Farmer Producer Organization (FPO)	FPO activities may promote increased use of agri chemicals	Medium	Unlike a general agri-input merchant, the FPO shall not stock, sell and promote agri-chemicals. pesticides banned/restricted as per WHO classification. indiscriminately. It shall make strong efforts to ensure that its members follow IPM and INM and accordingly shall stock and sell inputs relevant to implementing INM and IPM.	At the time of preparation of the business plan of the FPC.	% FPCs trained on Code of Practices for value chain	% FPCs with a CoP developed and adopted by the BoD.
	Establishing Food Processing Units	Water pollution ,air pollution , noise pollution and Solid waste may be generated through food processing Units		• Water used in conveying materials, facility cleanup, or other non-ingredient uses will be reduced, which in turn will reduce the wastewater volume from food-processing facilities. • Sanitizers or anti-microbials in wash water and other processing water may be useful in reducing pathogens on the surface of produce and/or reducing pathogen build-up in water. Chlorine is a commonly used anti-microbial. • Typically, pathogens, suspended solids, dissolved solids, nitrogen, and phosphorus are removed in advanced wastewater treatment. • The following is a listing of some technologies being used in advanced wastewater treatment. A .Membrane applications		% of workers of food processing Units are aware waste water and solid waste management practices.	% of food processing units are adopted waste water treatment and solid waste management practices.

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				B. Charge separation etc. • Food processing units will continue to look at ways to reduce solid waste generation, use less or reusable packaging, and use biodegradable packing products. • Solid waste pollution can be reduce through management alternatives as following: A. Using the food by-product as an animal feed. B. Composting or land spreading the food by-product. • Noise protective equipment should be provided to the operator of machines. Silencer should be attached to the equipment to reduce noise from the equipment to surrounding areas. • Use energy efficient equipment for processing (such as steam boilers/solar energy /LED light).			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
	Construction of Warehouse/ Food processing Unit	Cutting trees		As far possible, RACP would promote options wherein trees would not be cut to carry out an activity. However, where it is not feasible it would support compensatory planting in the ratio of 10 trees for every tree cut. The onus on planting will lie with the beneficiary who is cutting the trees.	At the time of CACP At the time of design and approval of building plans.	% of trees actually planted as compared to no. of trees to be taken up under compensatory planting. % of construction workers who have detailed mitigation measures for building construction.	% survival of trees planted under compensatory planting. % of construction workers adopted EMP for building construction.
		Top soil removal		Top soil removed during the process should be used to build bunds and excess soil should be spread over the rest of the farm.			
		Improper construction leading to damage of stored material		In addition to the above general guidance on building constructions, the RACP shall adhere to Code of Practice for Construction of Food grains Storage Structures as defined under the Warehouse Manual published by the Department of Food & Public Distribution, Ministry of Food & Consumer Affairs, GoI under operationalization of the Warehousing (Development & Regulation) Act, 2007.			
		Environment pollution may be generated During		• The sewage system for the labour/ camp is designed, built and operated in such a manner that no health hazard occurs and no pollution to the air,			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
		construction activities.		ground water or adjacent water sources takes place. • Waste water generated from the sanitary facilities of labour camp is disposed in a septic tank/soak pits. • Solid waste generated at the construction site, plant/camp site, will be collected in covered wasted bins and segregated as biodegradable (food waste, paper, etc) and non-biodegradable (plastic, polyethylene bag etc.). Polyethylene/plastic wastes will be stored in empty cement bags and should be sent for recycling. Biodegradable (food waste, paper etc.) solid waste will be disposed in a compost pit. • The contractor will take every precaution to reduce the level of dust and gaseous pollution from the work site/s. Measures to reduce the level of dust (PM 2.5 and PM 10) will be taken and the Contractor will make arrangements to minimize dust pollution through provision of wind screens/barriers, water sprinkling/mist fine spray arrangement and encapsulation of dust source (as required) shall be made.			

Multiple Sectors						Monitoring Indicators	
Intervention	**Activity**	**Possible Environmental Impacts**	**Impact on Environment**	**Measures to be Taken/Implemented by the Line Department**	**Stage of Application**	**Process**	**Outcome**
				• Construction debris should be put to alternate uses such as land filling. If not utilized it should be disposed off in nearby safe places. • Only acoustic enclosures fitted DG set will be allowed at the construction and plant/camp sites. • All measures required for ensuring safety and health of the workers shall be taken up by the Contractor. This includes provision and enforcement of appropriate personal protective equipment; first aid facilities at camp, plant site and work zones; emergency response arrangements; proper storage of hazardous/ toxic and/or polluting materials; measures for ensuring electrical, fire and mechanical safety arrangements. • Energy conservation measure should be followed in constructed building like installation of solar energy, LED lighting etc as energy efficient building.			

Clearance requirement

Agriculture and allied activities per se have not been incorporated under the ambit of the Environment Impact Assessment (EIA) notification 1994 so the project per se will not require any clearance under this act. The clearance requirements for individual subprojects have been specified in the table below.

Relevant Acts/Rules	Relevance to RACP Project	Provision
Air (Prevention and Control of Pollution) Act 1981	Applicable to, processing activities (dal mills, rice mills fish/ poultry feed manufacture etc.	Setting air quality standards, procedures for consent to operate enterprises, penalties etc. Consent should be taken to establish and operate.
The Water (Prevention and Control of Pollution) Act Amended: 1988	Applicable to any activities that release wastes into water bodies (eg: processing units etc.) The project will address the issue of Water contamination due to chemicals by adopting an IPM strategy.	Laying down the permissible limits/ standards of pollutants likely to be emitted, collection of samples of effluent and analysis and provisions for penalties.
The Biological Diversity Act, 2002 G.S.R.261 (E), [15/04/2004] - Biological Diversity Rules, 2004	The project envisages maintaining the biodiversity. At the same time the project will enhance crop productivity through sustainable natural resource management.	Regulation of access to biological diversity, empower National Biodiversity Authority and State Biodiversity Board to restrict certain activities that affect biodiversity adversely. Provision of appropriate legislation for declaration of Biodiversity Heritage sites at local level.
Scheduled Tribes and other Traditional Forest Dwellers (Recognition Forest Rights) Act, 2006	The Act determines the use rights for the collection Non Timber Forest Product (NTFP), agricultural operation, animal rearing and construction of common facilities.	Recognition of rights and responsibilities and authority for sustainable use, maintenance of ecological balance and strengthening the conservation regimen of forest while ensuring livelihood and food security.
Forest (Conservation) Act, 1980 (With Amendments made in 1988) Forest (Conservation) Rules, 2003 (With Amendments made in 2004)	Applicable to the project where agriculture or Any construction of common facilities are promoted near forest in tribal areas.	Reserved forest or any portion thereof, shall cease to be reserved. Forest land or any portion thereof may be used for any non-forest purpose. Necessary Clearance should be obtained from Forest Dept or Revenue Department for trees cutting and plantation..

Relevant Acts/Rules	Relevance to RACP Project	Provision
The Wild Life (Protection) Act, 1972	Applicable to the activities like livestock Development where grazing is involved in forest areas, collection of NTFP and construction of common facilities near forest areas.	Destruction, exploitation or removal of any wild life including forest produce from a sanctuary of the destruction or diversification of habitat of any wild animal, or the diversion, stoppage or enhancement of the flow of water into or outside the sanctuary is prohibited without a permit granted by the Chief Wildlife Warden.
The Insecticides Act. 1968 Amendment: Insecticides (Amendment) Act, 1977	Applicable to agricultural activities. Mitigation measures taken care in Pest Management Plan	Regulate the import, manufacture, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animals, and for matters connected therewith.
The Fertilizer (Control) Order, 1985	Applicable to POs in cases where stocking and sale of fertilisers may happen	Registration is required for selling fertilizer at any place as wholesale dealer or retail dealer.
The Seeds Act 1966, The Seeds Rules 1968	Relevant to the project. The project does not envisage seed production yet, but will take cognizance of the act if promoted.	Regulation of sale of seeds of notified kinds or varieties. Determine the responsibilities for making and labelling. Certification agency and grant/ revoke of certificate, provision of penalties.
Bio-Medical Waste(Management & Handling) Rules, 1998	Rules will help in managing the waste generated by the veterinary health centres that may have adverse environment affects.	It shall be the duty of the every occupier of an institution generating bio medical waste which includes Veterinary institution and animal house to ensure-that such waste is handled without any adverse effect to the human health and the Environment.
Rajasthan Soil and Water Conservation Acts, 1964	Applicable to water harvesting & storage structures on arable and non-arable land	provide for the conservation and improvement of soil and water resources at cluster
Policies		
National Environment Policy 2006 Rajasthan State Environment Policy, 2010	The project promotes conservation and sustainable use of land, water and biomass which is one of the major challenges in agriculture sector. The project addresses the issue of awareness generation and mitigation measures	To protect and conserve critical ecological system and resources and to ensure equitable access to these resources for communities which are dependent on these resources for their livelihood.

Relevant Acts/Rules	Relevance to RACP Project	Provision
State Water Policy 2010 The Rajasthan Regulation and Control of The development and Management of Ground Water Bill, 2006	Optimization of water resources exploitation and raising the level of reliability of supplies through conjunctive use of surface and ground water.	Necessary permission should be obtained from ground water board or water resources department for extraction of water from ground water through for bore wall or canal for irrigation.
National Policy for Farmers 2007	The project envisages improvement of the land productivity and income of farmers in a sustainable manner.	To improve economic viability of farming by substantial increase in net income of the farmers, to conserve and regenerate land, water and genetic resources for sustainable improvement in productivity, profitability and stability of major farming system. To develop support services including provisions of timely input supply and agriculture credit at affordable interest rates to the farmers. Provide suitable risk management measures for adequate and timely compensation to the farmers.
State Policy for promotion of agro-Processing and Agri-business, 2010	The project envisages promotion of agro-processing industries and agri-business, thus, seeks to address the entire value chain in agro-processing and marketing, including development of the supply chain, market development and diversification.	To promote and encourage value addition and loss reduction in agriculture, including horticulture; introduce new post harvesting technologies; promote export of agriculture products produced and encourage the development of agro processing infrastructure and human resources.

Training Plan for Implementation of Environment Management Plan (EMP)

Apart from the training plan being presented here, every training provided under RACP should include where relevant a module on Environment Management Framework (EMF) and its application.

Objectives of training plan

The key objectives of the training plan are:

- To create awareness about RACP project activities and their environmental impacts.
- To create awareness about the Environmental Guidance that provides information on how to mitigate or avoid those impacts.
- To create awareness about the concept, approach and processes of EMF including selection of project activity, application of the specific Environment Guidelines (EGs), preparation of EMPs, monitoring performance of EMF and reporting.
- To teach how to apply the EMF and prepare EMPs for specific activities.

Training Type, Target Groups & Frequency

A 4-tier strategy for imparting training on the EMP is proposed and is presented **Error! Reference source not found.** :

Type of Training	Target Groups	Number of training	Frequency	Modes of training
Sensitization	• PMU • PIU • DPMU	One	Launch of the Project	Lectures, Presentation
State Level Training (Training workshops for trainers)	• Environment Specialist (ES, PMU) • Line Department (Team Leader) • Field NGO (Team Leader)	Two (Planned)	1st year at the beginning of the project 2nd Year a refresher course after preparation of Audit Report	On-field demonstrations, Case Studies, Group Exercises.
State Level Training of Trainers (Demand Driven)		Three (if Required)	3rd year onwards on assessment of requirement through the environment audit	
District Level training Workshops	• DPMU /DLIC • NGO (entire team) • Representatives of Cluster level /GP level / Village level Community Institutions • Representative of FPC including CEO	One in each of the districts every year in district where there are interventions	1st year before interventions are initiated and thereafter each year after completion of audit.	Field Demonstrations, lectures, group discussions, case studies
Community Level Training Workshops	• All Community Institutions Leaders • FPC Board Members	One in each of the districts every year in district where there are interventions	1st year before interventions are initiated and thereafter each year after completion of audit.	Field demonstration, group exercises, lectures

Tier-wise Suggested Training Content

Provides a brief outline of training content and duration for the 4 tiers of trainings envisaged. The actual content, pedagogy and duration should be developed as part of the general training being planned under RACP.

Type of Training	Content	Duration
Sensitization	Sensitization on RACP activities, environmental impacts Brief concept of EMP, Institutional arrangement for implementing EMP	2 hrs as a part of larger induction training at the launch of RACP
State Level Training (Training workshops for trainers)	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. institutional arrangements for implementing EMP	3 days including 1 day of field visit to apply in EMP for sample project interventions
State Level ToT (Demand Driven)	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMP process, institutional arrangements for implementing EMP	As per need
District Level training workshops	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMP process, institutional arrangements for implementing EMP	5 days including 3 days for field visit to understand environmental issues and apply in EMP to understand IPM and INM in action. etc.
Community level training workshop	Project activities and environmental impacts EG to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMF process, institutional arrangements for implementing EMF	5 days including 3 days for field visit to understand environmental issues and apply in EMP to understand Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) in action etc.

Training Plan for Implementation of Environment Management Plan (EMP)

Apart from the training plan being presented here, every training provided under RACP should include where relevant a module on Environment Management Framework (EMF) and its application.

Objectives of training plan

The key objectives of the training plan are:

- To create awareness about RACP project activities and their environmental impacts.
- To create awareness about the Environmental Guidance that provides information on how to mitigate or avoid those impacts.
- To create awareness about the concept, approach and processes of EMF including selection of project activity, application of the specific Environment Guidelines (EGs), preparation of EMPs, monitoring performance of EMF and reporting.
- To teach how to apply the EMF and prepare EMPs for specific activities.

Training Type, Target Groups & Frequency

A 4-tier strategy for imparting training on the EMP is proposed and is presented **Error! Reference source not found.** :

Type of Training	Target Groups	Number of training	Frequency	Modes of training
Sensitization	• PMU • PIU • DPMU	One	Launch of the Project	Lectures, Presentation
State Level Training (Training workshops for trainers)	• Environment Specialist (ES, PMU) • Line Department (Team Leader) • Field NGO (Team Leader)	Two (Planned)	1st year at the beginning of the project	On-field demonstrations, Case Studies, Group Exercises.
			2nd Year a refresher course after preparation of Audit Report	
State Level Training of Trainers (Demand Driven)		Three (if Required)	3rd year onwards on assessment of requirement through the environment audit	
District Level training Workshops	• DPMU /DLIC • NGO (entire team) • Representatives of Cluster level /GP level / Village level Community Institutions • Representative of FPC including CEO	One in each of the districts every year in district where there are interventions	1st year before interventions are initiated and thereafter each year after completion of audit.	Field Demonstrations, lectures, group discussions, case studies
Community Level Training Workshops	• All Community Institutions Leaders • FPC Board Members	One in each of the districts every year in district where there are interventions	1st year before interventions are initiated and thereafter each year after completion of audit.	Field demonstration, group exercises, lectures

Tier-wise Suggested Training Content

Provides a brief outline of training content and duration for the 4 tiers of trainings envisaged. The actual content, pedagogy and duration should be developed as part of the general training being planned under RACP.

Type of Training	Content	Duration
Sensitization	Sensitization on RACP activities, environmental impacts Brief concept of EMP, Institutional arrangement for implementing EMP	1 day as a part of larger induction training at the launch of RACP

Type of Training	Content	Duration
State Level Training (Training workshops for trainers)	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. institutional arrangements for implementing EMP	2 days including 1 day of field visit to apply in EMP for sample project interventions
State Level ToT (Demand Driven)	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMP process, institutional arrangements for implementing EMP	As per need
District Level training workshops	Project activities and environmental impacts EMP to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMP process, institutional arrangements for implementing EMP	2 days including 1 day for field visit to understand environmental issues and apply in EMP to understand IPM and INM in action. etc.
Community level training orkshop	Project activities and environmental impacts EG to be presented thematically as Agriculture, Water Management, Livestock, Input Storage, etc. EMF process, institutional arrangements for implementing EMF	2 days including 1 day for field visit to understand environmental issues and apply in EMP to understand Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) in action etc.

Training required on activities wise for implantation of Environment Management Plan (EMP) as per Environment Management Safeguard (EMSF) guidelines under RACP as follows:-

Intervention	Activity	Reference of Environment guideline(EG) as per EMSF
Demonstration packing of practices for higher production of selected crops	Crop Selection	EG Agri 1
	Seed Selection	EG Agri 2
	Soil Health & Nutrient Management	EG Agri 3
	Pest & Disease Management	EG Agri 4
	Water use Management	EG Agri 6
	Storage & Handling of Agri-inputs	EG Agri 5
Water Supply Augmentation	Water harvesting structures	EG water 7.1
Value Chain	Farmer Producer Company (FPCs)	EG producer organisation 2.1
	Establishing Food Processing Units	-
	Construction of Warehouse/ Food processing Unit	EG common 10-1

Time Schedule on yearly basis for conducting training on Implementation of Environment management Plan:-

Type of Training	Jan.	Feb.	March	April	May	June	July	August	September	October	November	December
Sensitization												
State Level Training (Training workshops for trainers)												
District Level training Workshops												
Community Level Training Workshops												

Tentative Budget for training (As per yearly basis) as follows:-

SN	Items	Nos.	No. of Days	Qty.	Rate (Rs.)	Unit	Amount (Rs.)
One Sensitization (One day Training)							
1	Training Kit - pen, note book, folder, Course material, inputs, other utility based required materials, reference literature, Registration etc.	50	1	50	300	Each	15000
2	Mobility support	1	1	1	2000	Day	2000
3	Miscellaneous						
	Total	One sensitization training will be carried out in a year					17,000
Two State, Three District and Three Cluster Level training (Two days training).							
1	Training Kit - pen, note book, folder, Course material, inputs, other utility based required materials, reference literature, Registration etc.	40	2	40	300	each	12000
2	Lodging and Boarding of participants	40	2	40	1000	each	40000
3	Mobility support	1	1	1	7000	day	7000
4	Rent for other training facilities (Class-room, LCD, etc.)	1	1	1	15000	day	15000
5	Travel for participants	40	1	40	300	Person	12000
6	Miscellaneous						
	Total	Eight numbers of two days training including one day field visit will be carried out in a year.					86,000*8=6,88,000/-
	Grand Total						7,05,000/-

Information, Education and Communication (IEC) & capacity building Strategy and it tentative budget for implementation of Environment Management Plan (EMP) at cluster

Introduction:-

Information, Education and Communication (IEC) is a process of working with individuals, communities, societies and policy & decision makers to develop communication strategies to promote positive behaviours which are appropriate to their Culture& Social/Community behaviours. IEC combine all suitable strategies, approaches and methods that enable individuals, families, groups, organizations and communities to play active role in achieving, protecting and sustaining the desired behavioural change.

IEC plays a pivotal role in creating awareness, mobilizing people, and making development process participatory through advocacy and by sharing knowledge, skills and techniques with the people. It is also critical for bringing about transparency in implementation of programmes at the field level and for promoting the concept of accountability and social audit. There are various techniques of communication, which include mass communication as well as inter personal communication. There are no any fixed formulae and the techniques mobilize and ensuring participatory development .It varies from place to place, according to their specific problems, cultures and social setup.

Strategy for the IEC, Public awareness & Capacity Development.

Principles of strategy for IEC and Public awareness are based on the downward dissemination theory and Convergence theory for the message dissemination, Behaviour change and capacity development on environment management Plan (EMP) of activities under RACP.

Followings strategies shall be adopted at the Implementations level.

- IEC strategy has been prepared; to generate awareness amongst the stakeholders for achieving the objectives of the Rajasthan Agricultural Competitiveness Project (RACP). It is essential to use all type of communication mediums such as Inter Personnel Communication (IPC), Print media, electronic media, outdoor media and folk media. Extensive publicity and designing and printing of IEC material will be undertaken to disseminate the designated communication issues.

- IEC activities taken up in the action plan are telecast and broadcast of issues through electronic media, publication of public appeals in print and extensive use of social media, In addition to this orientation workshops, trainings, designing and printing of IEC material like posters, banners, flex, booklets, leaflets, flip chart and other material, etc will be undertaken.

- The major focus has been given to the grass root level interpersonal activities. The interpersonal communication will help in clearing the doubts of audience and take instant action. The advantage of this medium is that the messages can be communicated to the target audience who are not adequately educated.

- Greater emphasis has been given to grass root level activities whereas some activities have been taken for environment building and positioning the programme in proper perspective across all stakeholders.

The details are follows:-

i. New media
    - Bulk SMS
    - U –tube and face book

- What's up messages

ii. Reminder Media
- Wall Paintings
- Slogans
- Hoardings

iii. Inter Personal Communication (IPC)
- Workshop
- Exhibition
- Community rally
- Youth Rally
- Women Rally
- Rally by School Students
- Door to door visits
- Nukkad Natak
- Essay and drawing competitions
- Quiz competitions
- PRA
- SHG, Water User Association, MTG, FPCs

iv. Print media
- Printing of IEC materials (Poster, banners, flex, Signboards on the buses, folders at bus stands, Mandi, street etc.

Template for IEC activities

IEC required on activities wise for implantation of Environment Management Plan (EMP) as per Environment Management Safeguard (EMSF) guidelines under RACP as follows:-

Stakeholders	Content of Information as per activity wise under RACP	Reference of Environment guideline(EG) as per EMSF	Methods to convey the Information (Methodology)	Responsibility
House holds	Crop Selection, Seed Selection, Soil Health & Nutrient Management, Pest & Disease Management, Water use Management, Storage & Handling of Agri-inputs, Water Harvesting Recharge & Storage Structures Farmer Producer company(FPCs), Establishing Food Processing Units and Construction of Warehouse/ Food processing Unit	EG Agri 1,2,3,4,5,6 EG water 7-1 EG common 11-2 EG producer organisation 12-1 EG common 10-1	IPC with Poster, Leaflet, Brochure	Line Departments and NGOs
Community			Hoarding and workshops of Town leader and IPC at Community level with town leaders and NGOs as community participation. Lecture Series Exhibitions, Panel Discussion and Group meeting.	
Mass level			Print Media, Electronics Media, Poster, Hoardings, Use of Public Transport and Workshop at village level of Govt. officers and public Representation.	

Tentative Cost Estimation for the IEC & Capacity development activities at Cluster and village level on yearly basis.

SN	Detail of activity	Unit	Unit cost	Estimation Cost	Remarks
1	Workshop at clusters and village level	5	10,000	50,000	One day workshop in village having population more than 500
2	Installation of Hording	10	1000	10,000	Hording Size 8 ft*5ft
3	Community Rally	5	2000	10,000	rally in village having population more than 500
4	Youth rally	5	2000	10,000	Rally in village having population more than 500
5	Women rally	5	2000	10,000	Rally in village having population more than 500
6	Rally by school student	5	2000	10,000	Rally in village having population more than 500 with the participation of all school.
7	Essay and drawing competition	10	1500	15,000	Sensitization of school children
8	Nukkad natak	5	1500	7500	One Nukkad natak at public place
9	Poster	100	500	50,000	Poster size 1.6ft×2ft
10	Leaflet	200	100	20,000	Size A4
11	Brochure	100	200	20,000	Half fold
Total for Cluster				2,12,500/-	

The above expenditures of IEC activities for capacity building on implementation of Environment Management Plan (EMP) are included in budget of sub-component activities of agriculture. This activity will be implemented through DPM with the support of Environment Specialist and NGO. The expenditure of training will be incurred through Project Management Unit. The provision of the training related to EMP has not been included in cluster plan