

**Climate Change Innovation  
Programme**

---

**Training Module for using  
a Value Chain Analysis  
Approach to support  
Climate Resilient Cropping  
Patterns**

**Adapting to Climate Change in Agriculture:  
Climate Resilient Agriculture Practices**





**Climate Change Innovation  
Programme**

**Training Module for using  
a Value Chain Analysis  
Approach to support  
Climate Resilient Cropping  
Patterns**

**Adapting to Climate Change in Agriculture:  
Climate Resilient Agriculture Practices**

The views expressed in this report do not necessarily reflect the UK government's official policies.

# Table of Contents

**01** Agriculture Value Chain Analysis - Tools & Methodology  
**Page 1**

**02** Value Chain Mapping  
**Page 5**

**03** Analysing Financial Aspects of Value Chain  
**Page 11**

**04** Analysing technology, knowledge and Management Aspects of Value Chain  
**Page 15**

**05** Analysing Post-Harvest, Value Addition and Marketing Aspects of Value Chain  
**Page 19**

**06** Climate change & Agri value chain  
**Page 23**

## List of Tables

Table 1: Core process mapping matrix	10
Table 2: Product flow Matrix	10
Table 3: Service Matrix	11
Table 4: Format for mapping constraints and possible solutions	12
Table 5: Cost Benefit Analysis matrix (crop)	13
Table 6: Value chain finance matrix	14
Table 7: Technology Mapping (Farmer)	15
Table 8: Technology Mapping (Processor)	16
Table 9: Access to information and knowledge	17
Table 10: Post-harvest situation analysis	18
Table 11: Market analysis (Farmer)	19
Table 12: Market analysis (Trader)	19
Table 13: Adoption of climate resilient practices by farmers	21
Table 14: Assessing climate risk, impact & responses by the value chain players at pre-production & Production stages	21
Table 15: Assessing climate risk, impact & responses by the value chain players at storage, processing and marketing stages	22

## List of Figures

Figure 1: Agri-Value Chain	5
Figure 2: Key questions for decision making	6
Figure 3: Agri value chain actors	8
Figure 4: Core Processes in Cotton Value Chain	9
Figure 5: Process and Actors in Honey Value Chain	10
Figure 6: Commodity flow	11
Figure 7: Example of Price built up across supply chain	14

# 01

## Agriculture Value Chain Analysis - Tools & Methodology



### Session Objective

- To know what a value chain is and how to analyse a value chain
- To get an acquaintance with different research tools for conducting value chain analysis
- To know the steps in conducting value chain analysis



### Learning Outcome

- Participants will be able to describe different research tools used for value chain analysis
- Participants will be able to describe the steps used in conducting value chain analysis



**Duration:**  
105 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

### Session Plan

Time Slot	Key Points	Method
15 min	Value chain, aspects and approach	Lecture with Power point presentation
15 min	Tools used in value chain analysis	Lecture with Power point presentation
15 min	Steps to follow in value chain analysis	Lecture with Power point presentation
15 min	Activity analysis and value analysis in a value chain	Lecture with Power point presentation
15 min	Evaluation and planning in a value chain	Lecture with Power point presentation
30 min	Group interaction	Interactive & participatory

The handout shall cover the details of Agriculture value chain analysis, tools & methodology as mentioned below:

### 1.1 Value chain and its aspects

A 'value chain' in agriculture describes the range of activities and set of actors that bring agricultural product from production in the field to final consumption, where in at each stage, value is added to the product. The production stages entail a combination of physical transformation and the participation of various producers and services up to product's disposal after use.

Figure 1: Agri-Value Chain



Successful agricultural value chains are both productive and sustainable; it is important to conserve the environment & natural resource base; adapt to climate change, price fluctuations & consumer needs and to improve people's lives and livelihoods and provide sustainable pathways to sufficient, nutritious & affordable food to meet the challenge of our growing population.

The Value chain analysis is built on a market system (in particular a supply chain), detailing both structural and dynamic factors that affect the contributions of each actor to the chain.

End markets, business enabling environment, supporting market, vertical and horizontal linkages are the structural factors that affect the value chain. Dynamic factors are value chain governance, inter firm relationship and upgrading.

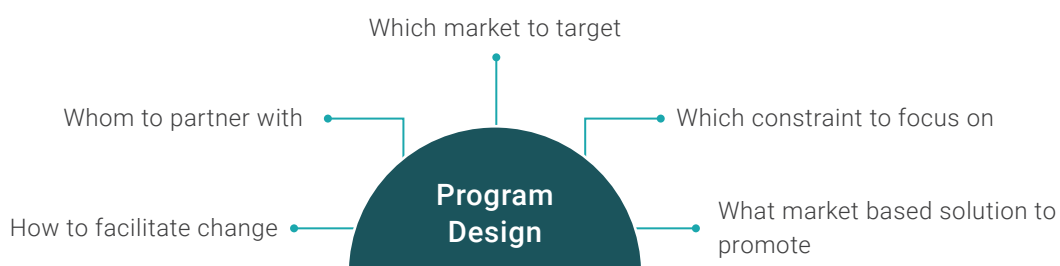
The concept of value chain encompasses the issues of organization and coordination; the strategies and the power relationship (including gender concerns) of the different actors in the chain. The value chain concept helps in tracing product flows and shows value additions at different stages, identifying key actors and their relationships in the chain, identifying enterprises that contribute to production, services and required institutional support, identifying bottlenecks preventing progress, provides a framework for sector-specific action, identifying strategies to help local enterprises to compete and to improve earning opportunities, identifying relevant stakeholders for program planning.

## 1.2 Value chain approach

A value chain approach supports integrated climate risk management through better connection of producers to markets and increased economic returns to small farmers. It also supports in recognising the interdependency of actors involved in all stages of a value chain and guards against climate change risks that threaten any part of this chain and in responding to the impacts of climate change, it is impossible to provide effective support unless the whole value chain is considered.

It is an approach that analyses a production unit or process in a market chain - from input suppliers to final buyers, and the relationships among them. It analyses the factors influencing performance, including access to and the requirements of end market; the legal, regulatory and policy environment; coordination between firms in the industry; and the level and quality of support services.

Figure 2: Key questions for decision making





## 1.3 Value chain assessment

A thorough assessment of dynamics amongst the actors in a value chain, factors keeping these actors together, information sharing and relationship evolving amongst actors are required to conduct a value chain analysis. The analysis can then be used to identify opportunities for intervention, such as providing access to finance, markets or technology; or improving institutional or policy frameworks or the business environment. Ultimately these interventions aim to enhance the income generation of those across the value chain.

## 1.4 Value chain tools and steps

Following are some of the tools to analyse the value chain

- **Participant observation:** It is a qualitative tool wherein an intensive involvement with people over an extended period of time is done with an aim to gain a close and intimate familiarity with a given group of individuals.
- **Semi structured Interview:** It is a qualitative method of inquiry that combines a pre-determined set of open questions with the opportunity for the interviewer to explore a particular theme. It is open in nature focus on interviewee.
- **Focus group discussion:** It is a qualitative method of research wherein group of 8 to 10 people discuss a particular theme. Moderator plays an important role in facilitating the discussion.
- **Structured Questionnaire:** It is a quantitative method of research. Here each interview is structured in a particular manner.
- **Market Mapping:** In market mapping, market is being studied in terms of price trend of various commodity, influence and relationship among market players. It is done to identify issues in functioning of market and opportunity.

### Steps used in value chain analysis

1. Activity Analysis
2. Value Analysis
3. Evaluation and Planning

#### Activity Analysis

- The activities of a value chain and sub component of each activity can be analysed.

#### Value Analysis

- Value that changes across the chain is analysed to achieve required standard of quality and reliability. It also analyses factors affecting the cost, and ways and means to minimize the same.

#### Evaluation and Planning

- The effectiveness, future prospect, issues and constraints of the existing value chain are measured.
- The impact, sustainability of the value chain and the degree of coordination and synergy among the actors and processes are assessed.
- Short and long-term solutions for guiding decision-making process for sustainable value chain development are formulated.

#### Activities: Pre-production

This contains activities which are necessary for better production. In this, the factors of production like land, labour and material are analysed.

*Example:* Land preparation, labour and material requirement and arrangement.

### Activities: Production

This includes all activities of the farmers that lead to effective cultivation of crops to yield different commodities/products.

*Example:* Planting the sapling or sowing the seed, irrigation, nutrient management, pest, disease management and harvesting.

### Activities: Processing and Value addition

This includes practices which modifies raw product to semi-finished one and also increases the shelf life of the products, increases its marketability

*Example:* Cleaning, drying, sorting, grading, primary & secondary processing

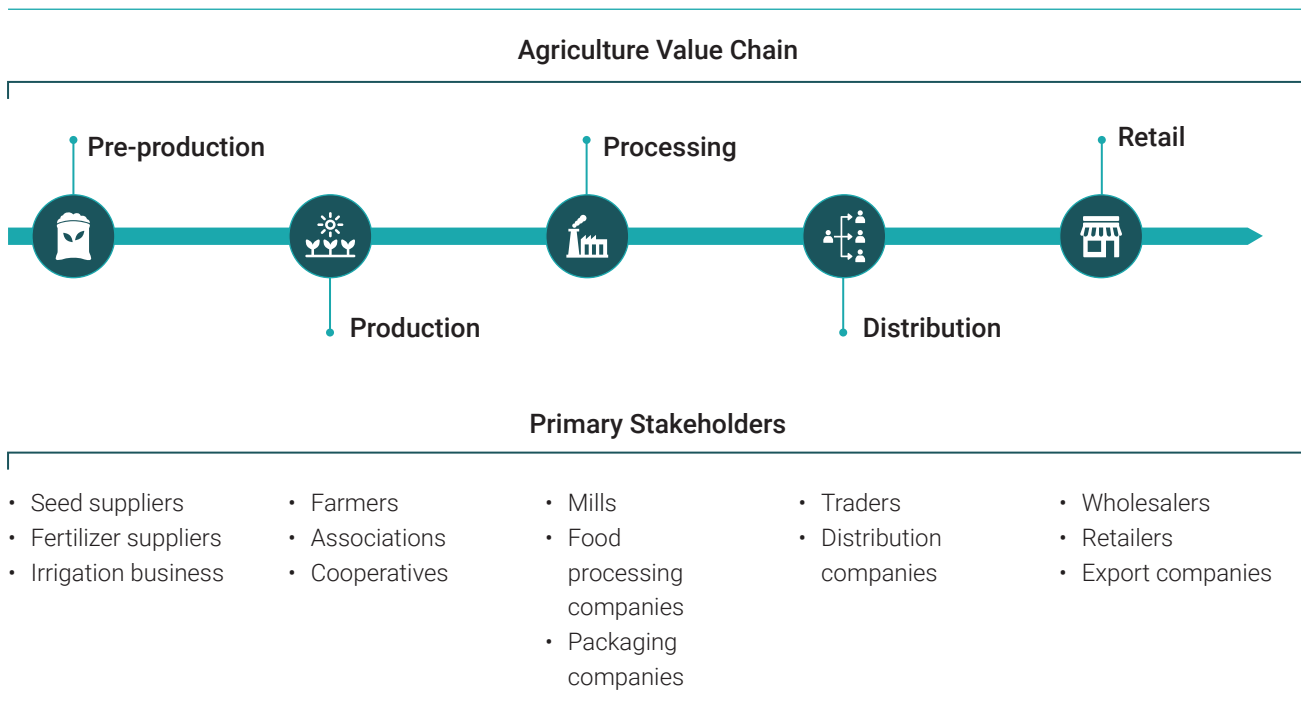
### Activities: Transportation

It aims at availing certain produces at certain location through some arrangement and equipment and vehicles.

### Activities: Marketing

It is a function which results in creating options for the consumer to buy a product at optimum price and of better quality. The product moves from farm to consumer. Different interconnected activities are involved in achieving this, such as production planning, grading, packing, transport, storage, agro and food processing, distribution, advertising and sale.

Figure 3: Agri value chain actors



# 02

## Value Chain Mapping



### Session Objective

- To have a basic overview of the processes in value chain
- To identify constraints and possible solutions at different processes in the value chain
- To understand the product, information and knowledge flow in a value chain



### Learning Outcome

- Participants will be able to assess the products, services, processes and players involved in a value chain
- Participants will be able to identify the constraints and possible solutions at each process in a value chain



**Duration:**  
90 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

### Session Plan

Time	Key Points	Method
15 min	Mapping core processes and players in a value chain	Lecture with Power point presentation.
15 min	Mapping product, information, knowledge flow and geographic flow of product in a value chain	Lecture with Power point presentation.
15 min	Mapping services in a value chain	Lecture with Power point presentation.
15 min	Mapping constraints and solutions at different processes of a value chain	Lecture with Power point presentation.
30 min	Group interaction	Interactive & participatory

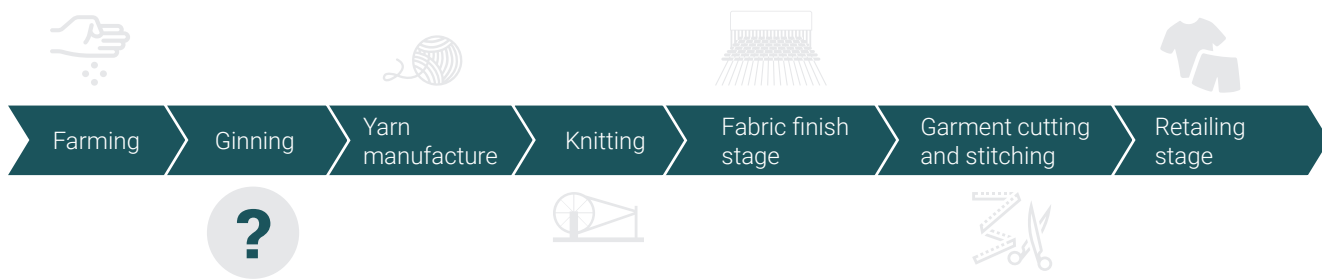
The handout shall cover the details of mapping the core processes, main players involved in these processes, product, information and knowledge mapping, geographical flow of the product, mapping the constraints and potential solutions of the value chain as mentioned on following page;

## 2.1 Mapping the core processes in the value chain

A value chain constitutes some core processes. The core processes start with production and ends with consumption. The core processes in a value chain can be identified and detail activities in each core process can be listed down and analysed.

An example of core processes in cotton value chain is shown below.

**Figure 4: Core Processes in Cotton Value Chain**



**Table 1: Core process mapping matrix**

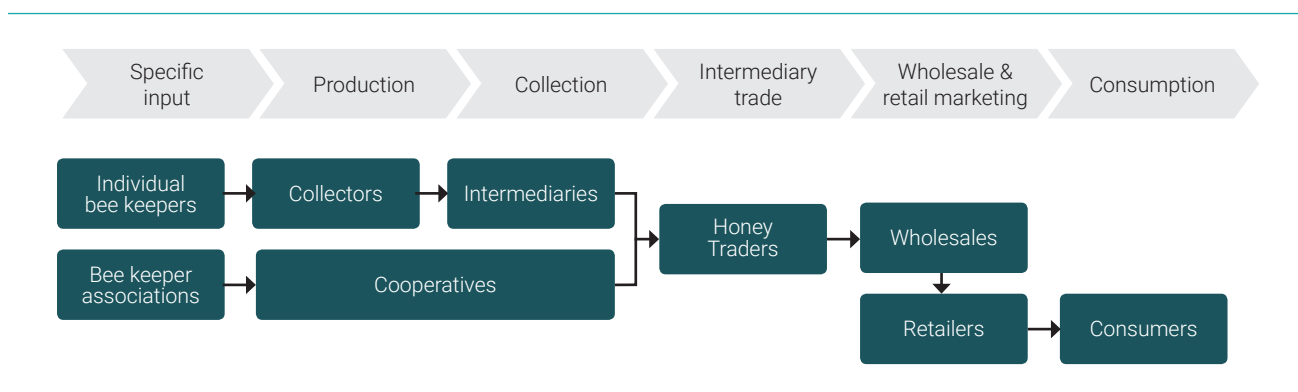
Commodity	Core Processes	Detail activity in the core process
Cotton*	Farming*	Land preparation, sowing of seeds, application of plant nutrients, irrigation, plant protection activities, intercultural operations, etc.*
Green gram*	Post-harvest value addition and primary processing*	Cleaning, drying, sorting, grading, splitting/crushing for dal making, packaging, etc.*

\* Some examples to aid clarity

## 2.2 Mapping the main players involved in these processes

After mapping the core processes, the next step is to identify the actors involved and their role in these processes. The objective of doing this is to analyse the role of each actor and to evaluate the impact of each actor on the overall performance of the value chain. Breaking down the processes into specific detailed activities can help in analysing the costs, revenues and margins. The actors involved in the honey value chain are illustrated below.

**Figure 5: Process and Actors in Honey Value Chain**





## 2.3 Mapping product, information and knowledge

In this step the analyst needs to identify the products at each stage of process (as they are transformed from inputs to raw materials to intermediate material and to final products). Mapping creates a clear picture of what portfolio of products are being handled. Along with the product, information and knowledge flow within a value chain need to be identified. The volume of product can be mapped.

## 2.4 Mapping the geographical flow of the product

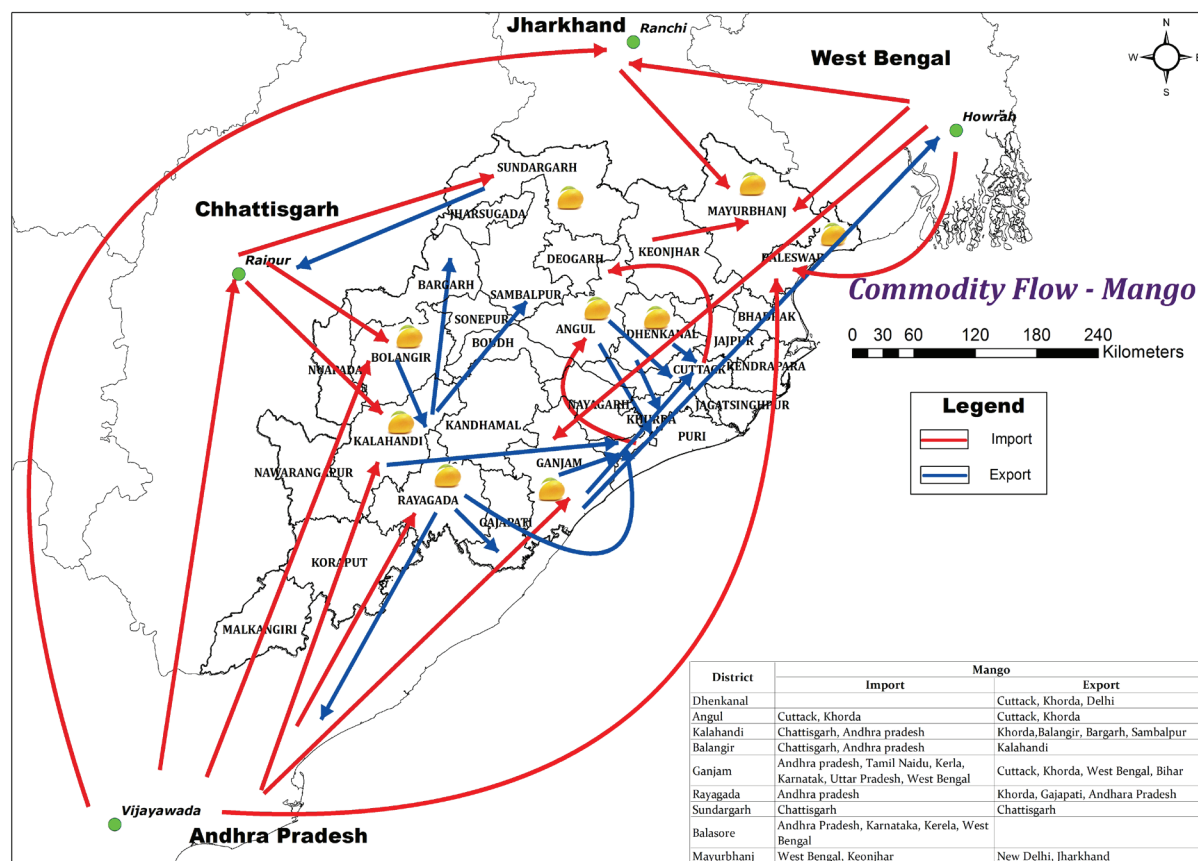
For mapping the geographical flow of the products, the pathway of travel of the product/commodity from its place of origin or production to the final consumer through intermediary traders, wholesalers and retailers need to be mapped. The physical flow of the product/commodity can be indicated on the map of the district/state/region/country (e.g. figure 6).

**Table 2: Product Flow Matrix**

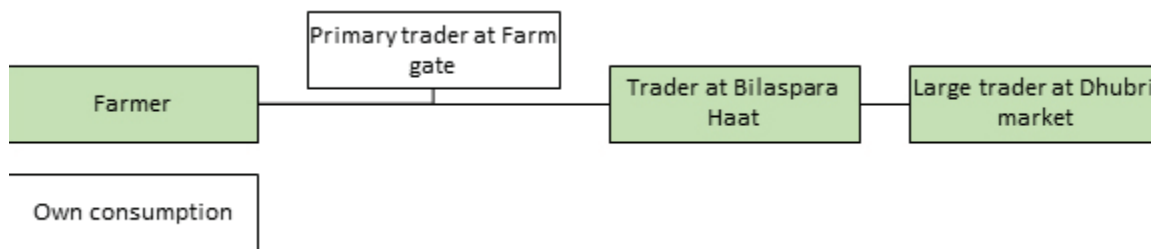
Commodity	Place of Origin/Production	Place of Sale	Volume/ Quantity (MT)
Mango*	Dhenkanal*	Cuttack*	50 MT (2016-17)*
Ginger*	Koraput*	Bhubaneswar*	120 MT (2015-16)*

\* Some examples to aid clarity

**Figure 6: Commodity flow example**

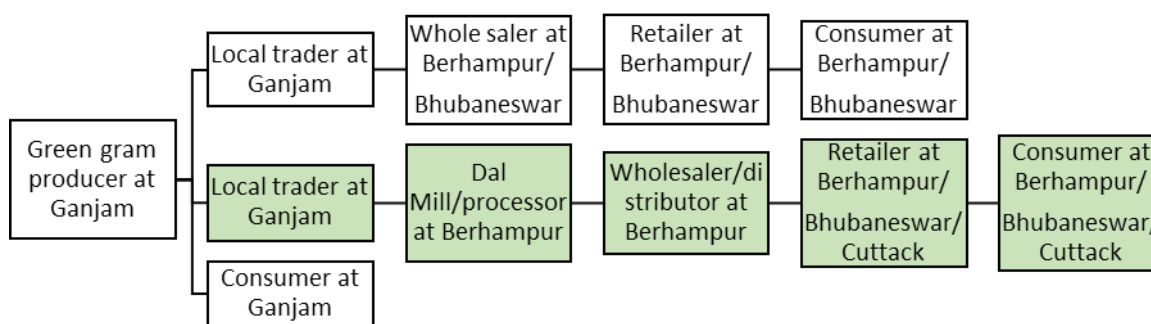


**Figure 7: Example of major market channels in villages from Bilaspara subdivision in Dhubri district (Major market channel actors are highlighted in shaded box)**



**Figure 8: Example of major market channels in villages from Chatrapur sub division in Ganjam district (Odisha)**

(Major market channel actors are highlighted in shaded box)



## 2.5 Mapping services that feed into the value chain

A potential risk with value chain analysis is that the world surrounding the value chain is not considered. Crucial information might be found in the rules and regulations that are governing (parts of) the value chain or in services that are feeding into the chain. Mapping these services will give an overview of the potential for interventions outside the value chain itself. In this step, the analyser will identify the rules and regulations (export and import information) that have an impact on export scenario and performance of value chain due to lack of crucial extension services (training on cultivation).

**Table 3: Service Matrix**

Process/ Stage	Services/ Schemes/Policy
Input Provision*	Biofertilisers and Biopesticides production Unit facility @25% of total financial outlay subject to the maximum of Rs 40 lakh per unit, whichever is less for Individuals, group of farmers/ growers, proprietary, and partnership firms, Co-operatives, Fertilizer industry, Companies, Corporations, NGOs under National Project on Organic Farming*
Cultivation*	For protected cultivation in green house with fan & pad structures, the maximum permissible cost per m <sup>2</sup> for calculation of subsidy will vary from Rs.1420/- to Rs.1650/- out of which 70% of the cost will be provided as subsidy. The beneficiary will contribute the balance cost as beneficiary's share. Maximum area per beneficiary is 2500 m <sup>2</sup> *
Collection/ Aggregation*	Aggregation & pack house facility with credit linked back-ended subsidy @ 35% of the cost of project in general areas and 50% of cost in case Hilly & Scheduled areas for individual entrepreneurs under MIDH*
Post-harvest value addition, processing*	Establishment of mini dal mills by farmers, farmer groups or registered FPOs (@Rs. 10.00 lakhs, or 30% of the total cost, whichever is lower, as one-time support) under NFSM (Pulse)*

Process/ Stage	Services/ Schemes/Policy
Export/ Import*	The authorized laboratories shall issue certificate of analysis to the exporter/processing unit as per the prescribed format within 96 hrs from drawl of sample. The laboratory shall declare that the sampling has been done in the APEDA registered Pea nut (ground nut) processing unit, integrated peanut processing unit, peanut shelling unit, peanut grading unit, peanut shelling-cum-grading unit, peanuts go downs/storage*

\* Some examples to aid clarity

## 2.6 Mapping constraints and potential solution

Constraints exist at almost all process levels of any value chain. For example, these could be constraints to greater efficiency, constraints to upgrading or constraints to greater involvement of the poor and marginalised. Initial identification of these constraints as well as potential solutions should be made at all process levels.

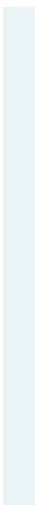
**Table 4: Format for mapping constraints and possible solutions**

	Pre-production	Production	Procurement	Processing	Marketing
Activities	Arrangement of inputs, land preparation, etc.*				
Actors	Seed/ fertilizer/ pesticide suppliers, service providers, etc.*				
Constraints	Non-availability/ late availability of required variety of seeds & fertilizers*				
Possible Solutions	Crop planning in advance, contingency planning, alternate arrangement from different possible sources, etc.*				

\* Some examples to aid clarity

Blank cells are left for the trainees to practice

Reference: <http://valuechains4poor.pbworks.com>





# 03

## Analysing Financial Aspects of Value Chain



### Session Objective

- To analyse the cost benefit aspects of the agri value chain
- To know the existing supply chains of a commodity and price build up at different stages in the supply chain and value chain finance



### Learning Outcome

- Participants will be able to do cost benefit analysis of process and actors in the Agri value chain
- Participants will be able to analyze price build up at different stages in the supply chain and value chain finance



**Duration:**  
90 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

Time Slot	Key Points	Method
30 min	Cost benefit analysis	Lecture with Power point presentation.
30 min	Price build up across supply chain, value chain finance	Lecture with Power point presentation.
30 min	Group interaction	Interactive & participatory

The handout shall cover the details of financial aspects of agri value chain as mentioned below;

### 3.1 Cost Benefit Analysis

Cost Benefit Analysis of a crop can be calculated by dividing total cost of cultivation to total revenue. Below format can be used to calculate cost benefit ratio of a crop. The net profit earned by a farmer can be calculated by summing up net profits of individual crops grown by the farmer in a year.

**Table 5: Cost Benefit Analysis matrix (crop)**

Cost Benefit Analysis					
Cost particulars	Amount (Rs)	Cost particulars	Amount (Rs)	Cost particulars	Amount (Rs)
1. Land Preparation	700*	4. Plant Protection	250*	7. Harvesting & Packaging	450*
2. Seed/planting material	300*	5. Irrigation	150*	8. Other costs (specify)	50*
3. Fertilizers/ Nutrients	400*	6. Intercultural Operations	200*	9. Total Cost	2500*
10. Total Revenue (Total Quantity in Kg X cost per Kg)	4500* (300kgX15)	Net profit (Total Revenue- Total cost)	2000* (4500-2500)	Cost Benefit Ratio (Total Revenue/ Total cost)	1.8* (4500/2500)

\* Some examples to aid clarity

The cost benefit ratio can be calculated for each actor in a value chain to know the profit of each actor in the value chain. For a processor, it can be calculated by dividing total cost of production of the processed product to the total revenue earned from selling the product. Cost benefit analysis of other actors in the value chain can be done in the same process. For a trader, this can be calculated by dividing total cost of trading (procurement cost + value addition & packaging cost + transportation & logistic cost + marketing cost) to the total revenue earned from selling the product.

## 3.2 Value chain finance

Investment or finance is the most important factor at each stage of a commodity value chain. Value chain finance is vital as it makes the value chain more effective and resilient. Access to finance is important for each player to expand and perform better. Below mentioned format can be used to ascertain the degree of access of different players to credit.

**Table 6: Value chain finance matrix**

(A) Access to credit:	1. Commercial Bank	2. Coop. Bank	3. Gramya Bank	4. Pvt. Bank
	5. Money lender	6. Other (specify)		7. No
(B) Purpose of credit:	1. Cultivation	2. Farm mechanization	3. Processing unit	4. Storage godown
	5. Cold storage/ cool chain	6. Pack house	7. Sales outlet/vending cart	8. Other (specify)
(C) Rate of interest:		(D) Repayment period (in years)	1	

√: Some examples to aid clarity

## 3.3 Price build up across supply chain

This is to analyse the type and number of players involved in the value chain from production till consumption of an agricultural commodity and price build up by different players across the supply chain for the commodity. This will help in determining the percentage of consumer price realized by each player in the supply chain.

Figure 9 depicts the price build up by different players across the supply chains and percentage of the total quantity covered by different supply chains.







# 04

## Analysing technology, knowledge and Management Aspects of Value Chain



### Session Objective

- To analyse the technology use in all stages of agri value chain
- To analyse the knowledge and capacity of the players across the value chain
- To assess the capacity need of the players



### Learning Outcome

- Participants will be able to analyse the technology use in all stages of agri value chain
- Participants will be able to analyse the knowledge and capacity of the players across the value chain
- Participants will be able to assess the capacity need of the players in the value chain



**Duration:**  
90 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

### Session Plan

Time Slot	Key Points	Method
30 min	Analysis of technology use in different stages of agri value chain	Lecture with Power point presentation
30 min	Capacity need assessment, analysis of Knowledge and capacity of the value chain players	Lecture with Power point presentation
30 min	Group interaction	Interactive & participatory

The handout shall cover the details of technology mapping, knowledge and capacity mapping and capacity need assessment of the players in agri value chain as mentioned below;

### 4.1 Technology Mapping

It is important to analyse the current technology, knowledge and management practices adopted by the players in a value chain. This is required to ascertain the gap in the technology use and intervention areas to upgrade technology in the value chain.

The matrix presented in Table 7 can be used to capture the information regarding use of technology by the farmer.

**Table 7: Technology Mapping (Farmer)**

Seed variety/ Planting Material used:	1. Local	2. HYV ✓	3. Hybrid	4. Graft	5. Others (specify)	
Source of seed/planting material:	1. Govt	2. Pvt ✓	3. OUAT	4. Others (specify)		
Type of implement/ Equipment used:	1. Manual/hand operated	2. Power operated				
Source of irrigation:	1. Canal	2. LI point	3. Well/Tube well ✓	4. Tank	5. Others (specify)	
Type of irrigation:	1. Surface irrigation	2. Drip irrigation	3. Sprinkler irrigation	5. Others (specify)		
Hours of irrigation per acre:	2					
No. of irrigation per month:	4					
Integrated Nutrient Management:	A. Organic:	1. Farm Yard Manure ✓	2. Vermicompost	3. Green Manure	4. Other (specify)	
	B. Inorganic:	1. Urea	2. Super	3. Potash	4. Others (specify) IFFCO	
	C. Micronutrient:	D. Bio fertilizer:				
	D. Soil test:	1. Yes	2. No	D. Adoption of soil test recommendations:		1. Yes ✓
E. Application method:	1. Broadcasting	2. Behind plough	3. At root zone ✓	4. Fertigation	5. Other (specify)	
Integrated Pest management:	1. Chemical pesticide	2. Organic pesticide ✓	3. Beneficial organism	4. Mechanical control	5. Cultural practice	
Primary value addition:	1. Cleaning/ washing ✓	2. Drying ✓	3. Sorting ✓	4. Grading	5. No	
Processing:	1. Dal	2. Raw mango products ✓	3. Ripe mango products	4. Other (specify)	5. No	
Packaging:	1. Gunny bag ✓	2. Polythene bag	3. wooden box	4. Paper cartoon	5. Plastic crates	6. Bamboo basket ✓
	7. Other (specify)	8. No				
Storage	1. Indoor ✓	2. Outdoor	3. Warehouse	4. Cold storage	5. Other (specify)	6. No

✓: Some examples to aid clarity

The matrix presented in Table 8 can be used to capture the information regarding use of technology by the processor.

**Table 8: Technology Mapping (Processor)**

Type of processing	1. Manual	2. Machine based ✓
Type of machine	1. Traditional	2. Automated ✓
Use of energy	1. Solar	2. Conventional ✓
Packaging	1. Manual ✓	2. Machine based

✓: Some examples to aid clarity

## 4.2 Knowledge and Capacity Mapping

To adopt sustainable agricultural practices; it is vital to have access to information, knowledge and services by the players in a value chain. Farmers need to have access to information on scientific and sustainable cultivation practices, market, weather, insurance and on-going government schemes. For identifying the current status in term of access to knowledge, information and services, the data can be captured as per the format shown in table 9. This will help in analysing the gap and scope for improvement.

**Table 9: Access to information and knowledge**

Access to information/ service:	1. Crop-weather	2. Market/ MSP	3. Extension Services	4. Govt. Programs & Schemes	5. Mobile Advisory
	6. Electronic/ Print media✓	7. IEC Material	8. Insurance	9. Other (specify)	
Access to capacity building program	1. Govt. ✓	2. OUAT/KVK	3. NGO		
	4. Private/ company/ industry	5. Other (specify)	6. No		
Capacity building program attended	1. Training ✓	2. Demonstration	3. Exposure visit		
Aspects of the capacity building program	1. Pre-production	2. Production ✓	3. Post-harvest management & value addition		
	4. Processing	5. Marketing	6. Other (specify)		

✓: Some examples to aid clarity

## 4.3 Capacity Need Assessment

Capacity need assessment is a process of evaluating existing gaps within farmer groups in terms of knowledge, skills, strengths, weaknesses, opportunities, threats, assets and other elements required for them to achieve the pre-specified objectives. Capacity is interrelated in three levels: Individual, organizational and enabling environment.

Three steps are involved in the capacity need assessment. The first step involves identifying the existing capacity amongst farmer groups. At this stage, existing assets, existing knowledge and skills and existing policy environment are identified. The second step involves identification of the desired levels of capacity. This is the capacity level necessary for the farmer groups' objectives to be achieved. Finally, the gap between the two steps is identified which is the difference between the desired and the existing levels of capacity. A structured and participatory approach is required for assessing capacity needs. Capacity need assessment shall help in planning suitable capacity building programs to strengthen knowledge, skills, processes and systems to achieve goals and meet objectives.





# 05

## Analysing Post-Harvest, Value Addition and Marketing Aspects of Value Chain



### Session Objective

- To ascertain the status of post-harvesting practices, processing and marketing aspects of a value chain
- To analyse the gap and scope for improvement



### Learning Outcome

- Participants will be able to analyse post-harvest scenario of a value chain
- Participants will be able to analyse market situation of a value chain



**Duration:**  
105 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

### Session Plan

Time Slot	Key Points	Method
30 min	Post-harvest system analysis	Lecture with Power point presentation
30 min	Market analysis	Lecture with Power point presentation
30 min	Group interaction	Interactive & participatory

The handout shall cover the details of analysis of post-harvest scenario and market in agri value chain as mentioned below;

### 5.1 Analysis of Post-harvest scenario

A post-harvest system is the set of operations and functions between production and consumption of agricultural commodities which are fulfilled by different players in the value chain. This includes primary value addition, processing, storage, packaging and marketing. The analysis of the operations and players involved in the post-harvest system shall help in identifying the gaps and scope for improvement.

For analysing the current status of post-harvest scenario, the data can be captured as per the format displayed in table 10.

**Table 10: Post-harvest situation analysis**

Primary value addition practices adopted:	1.Cleaning/ Washing	2. Drying	3. Sorting	4. Grading	5. No
Availability of aggregation and pack house facilities	1.Govt.	2.Private	3.NGO	4.Other (specify)	5. No ✓
Availability of storage godown facilities	1.Govt. ✓	2.Private	3.NGO	4.Other (specify)	5. No
Availability of cold storage/cool chain facilities	1.Govt.	2.Private	3.NGO	4.Other (specify)	5. No ✓
Availability of processing facilities	1.Govt.	2.Private	3.NGO	4.Other (specify)	5. No

✓: Some examples to aid clarity

## 5.2 Market Analysis

Analysis of the current market scenario, market infrastructure, prevailing marketing strategy and marketing mechanism are vital for identifying the gap and scope for improvement, for effective marketing of the primary and processed agricultural commodity.

For analysing the current status of market for raw and value-added products, the data can be captured as per the format mentioned in table 11 & 12.

**Table 11: Market analysis (Farmer)**

(I) Place of sale:	A. Immediate sale			B. Store & sale		
	Selling price (Rs/Kg)	% of produce sold	Time gap in price realization (days)	Selling price (Rs/Kg)	% of produce sold	Time gap in price realization (days)
1.Farm Gate/Door step	10*	30*	5*			
2.Village Hat/ Mandi	15*	30*	1*			
3.Whole sale Market				20*	40*	7*
4.Contract/Tied sale						
5.Nearby Town/ City Market						
6.Outside District						
7.Outside State						
8.Other (specify)						
(II) Availability of mandi/market/ Krushak bazar	(i) <2 Kms	(ii) 2-5 Kms ✓	(iii) 5-10 kms	(iv) >10 Kms		

(III) Availability of market infrastructure facilities	(i) Covered platforms	(ii) Road	(iii) Electricity	(iv) Drinking water	(v) Toilet
	(vi) Drying, cleaning, grading, packing facilities	(vii) Storage godown facility	(viii) Cold storage facility	(ix) Other (specify)	(x) Not available ✓

*\*Some examples to aid clarity*

**Table 12: Market analysis (Trader)**

(A) Source of procurement	1. Farmer	2. Agents ✓	3. Wholesaler	4. Retailer
	5. Mandi/Market	6. Other (specify)		
(B) Place of procurement	1. Within district ✓	2. Outside district	3. Outside state	4. Other (specify)
(C) Place of sale	1. Within district ✓	2. Outside district	3. Outside state	4. Other (specify)
(D) Buyer	1. Consumer ✓	2. Retailer ✓	3. Wholesaler	4. Corporate retail store
	5. Institutional buyer	6. Other (specify)		
(E) Transaction details	During harvest	1-3 month after harvest	4-6 month after harvest	
(E1) Average Volume of transaction (Qtl)	50*	20*	10*	
(E2) Average Procurement cost (Rs/Qtl)	1000*	1200*	1500*	
(E3) Average Selling price (Rs/Qtl)	1200*	1500*	1900*	
(E4) Wastage (%)	2*	3*	5*	

*\*Some examples to aid clarity*



# 06

## Climate change & Agri value chain



### Session Objective

- To map the impact of climate change and responses in agri value chain
- To map adaption of the climate resilient practices



### Learning Outcome

- Participants will be able to analyze the climate risks, climate change impacts and responses of the value chain players at different stages of agri value chain



**Duration:**  
105 minutes



### Material, Tools, Equipment

Computer/Laptop & screen, projector and microphone



### Teaching Aid

Hand out, Power Point Presentation, Notepad, White board and Marker

### Session Plan

Time Slot	Key Points	Method
20 min	Value chain approach to climate resiliency	Lecture with Power point presentation.
20 min	Analysis of climate change impact and responses at pre-production and production stages in agri-value chain	Lecture with Power point presentation.
20 min	Analysis of climate change impact and responses at post-harvest stages in agri- value chain	Lecture with Power point presentation.
30 min	Group interaction	Interactive & participatory

The handout shall cover value chain approach to climate resiliency and analysis of climate change impacts and responses of the value chain players at different stages of agri value chain as mentioned below;

### 6.1 “Value chain approach” to climate resiliency

The potential effects of climate change need to be considered in value chain development. The value chains need to be responsive to these and other changes – climate smart and climate proof. It is important to consider the impact of climate change from the selection of a value chain to the design of upgrading and development of strategies, and to plan proper adaptation measures. It's important to look at value chain functions and then integrate these into upgrading, as the expected return on investment largely depends on the chain's vulnerability to water, energy, soil

nutrients, weather, and knowledge. Climate smart factors need to be integrated during the value chain development process to ensure the value chain is sustainable and climate resilient<sup>2</sup>.

The analysis of climate impacts and responses along the value chain can be done through qualitative and participatory approach to elucidate perception of value chain actors on climate impacts and responses, and to promote climate adaptation. Climate hazards such as droughts, floods and changing rainfall patterns negatively affect all actors of a value chain, but in different ways and to different extents. Most players are making some effort to minimize the negative impacts of climate hazards on their activities, but not all responses are sustainable. Furthermore, a lack of communication and trust between and among the players along the value chain particularly hampers climate adaptation.

## 6.2 Analysis of effects of climate change and responses on the pre-production and production stages of agri-value chain

Agriculture is one of the most climate-sensitive sectors. Pre-production and production components of the agri-value chain are mostly affected by climate change. Increasing global temperature and uneven rainfall pattern in recent years have put pressure on production of various agri commodity. Increasing attention is now being given to the wide range of crop production practices that can be considered as climate smart or climate resilient either from an adaptation perspective, or for their mitigation potential. Adaption of climate resilient agricultural practices across the value chain can reduce the negative affect of climate change.

For analyzing the current status of adoption of climate resilient practices in the field, the information/data can be captured as per the format mentioned in table 13.

**Table 13: Adoption of climate resilient practices by farmers**

<b>Climate resilient practices adopted:</b>	1. Use of organic fertilizer/manure ✓	2. In-situ incorporation of crop residue	3. Mulching
	4. Use of tolerant/resistant variety	5. Change/adjustment of sowing/planting time	6. Intercropping ✓
	7. Use of organic pesticides ✓	8. Rain water harvesting	9. Water conservation
	10. Soil conservation	11. Custom hiring	12. Other(specify)

✓: Some examples to aid clarity

For assessing climate risk, impact & responses by the value chain players at pre-production & production stages, data/information can be captured in the format as shown in table 14.

**Table 14: Assessing climate risk, impact & responses by the value chain players at pre-production & Production stages**

Stage	Climate Risk	Impact	Coping mechanism/Responses
Pre-production	Dry spell	Vegetative growth of saplings affected, moisture stress condition, temporary wilting*	Watering at frequent intervals*
	Wet spell		
	Heat wave		
	Hail storm	Leaf damage, sapling damage and mortality*	Gap filling*
	Late monsoon		
	Draught		
	Flood		
	Cyclone		

<sup>2</sup> Reference: <http://lib.icimod.org>-Looking at value chains from a climate change perspective



Stage	Climate Risk	Impact	Coping mechanism/Responses
Production	Dry spell		
	Wet spell		
	Heat wave		
	Hail storm	Damage of leaves, flowers and pods*	Removal of broken twigs/ branches and damaged pods and leaves*
	Late monsoon		
	Draught		
	Flood	Submergence/ water logging*	Draining of excess water from root zone, earthing up at base of the plant after water recedes*
	Cyclone		

\*Some examples to aid clarity

Blank cells are left for the trainees to practice

## 6.3 Analysis of effects of climate change and responses on the post-harvest stages of agri-value chain

Much of the research on global climate change and its impact on food systems focus on the effects of climate change on agricultural production and post-harvest value chain issues such as storage, processing and packaging. The effect of climate change on postharvest value chains cannot be ignored. For example, higher temperatures will reduce shelf-life of stored products while lower temperatures will do the opposite. This will have serious post-harvest implication on all crops, especially perishable foods which easily spoil with increases in temperature. Furthermore, the proliferation of pests and crop disease can increase due to temperature increases and pose a great threat to effective storage. There is a need to address the effects of climate change on storage, processing and packaging of agricultural products. This will enable to further push research in the area of post-harvest management, especially in regard to issues of storage, preservation, processing and packaging. It will also educate stakeholders on the impact of climate on regional post-harvest value chains so that better opportunity and challenges can be identified to ensure food security<sup>3</sup>.

For assessing climate risk, impact & responses by the value chain players at storage, processing and marketing stages, data/information can be captured in the format as shown in table 15.

<sup>3</sup> Reference: [www.agrilinks.org](http://www.agrilinks.org)-assessing effect climate change postharvest value chains

**Table 15: Assessing climate risk, impact & responses by the value chain players at storage, processing and marketing stages**

Stage	Climate Risk	Impact	Coping mechanism/Responses
Storage	Dry spell		
	Wet spell	Pest and fungal infestation*	Preventing rain water to enter storage room/ container, arranging proper ventilation, putting the grain bags above the ground surface on racks*
	Heat wave		
	Hail storm		
	Late monsoon		
	Draught		
	Flood		
	Cyclone		
Processing	Dry spell		
	Wet spell	Raw material supply and product delivery affected, quality deterioration of grain*	Preventing the raw materials and grain stock from getting wet*
	Heat wave		
	Hail storm		
	Late monsoon		
	Draught		
	Flood		
	Cyclone		
Marketing	Dry spell		
	Wet spell		
	Heat wave		
	Hail storm		
	Late monsoon		
	Draught		
	Flood	Water logging, poor drainage, wastage of products, effect on power supply, effect on transportation, product supply and transaction*	Draining of excess water from market yard, stores and counters, restoration of power supply through alternate arrangements, shifting of products to safer place*
	Cyclone		

*\*Some examples to aid clarity*

Blank cells are left for the trainees to practice

# Annexure:

## Sample Formats for Stakeholder Interaction

The handouts will also include the sample formats for interaction with different stakeholders like farmer, trader/wholesaler/retailer, processor, input suppliers, mandi/market, etc. The trainees will use these formats in practice. The soft copy of the handouts and sample formats will be provided to the trainees for reference and future use. They can use the sample formats with necessary customization as and when required for value chain analysis.

The sample formats are given below;

### A Stakeholder Interaction Format: Farmer

#### Crop: ARHAR /MANGO

1	District:				2	Block:			
3	GP:				4	Village:			
5	Respondent's Name:				6	Father/Husband's Name:			
7	Gender:	1. Male	2.Female	8	Farmer Category:	1. Marginal	2. Small	3. Medium	
		2.Female				4.Big			
9	Social Category:	1. SC	2. ST	3. OBC	4. General	5. Other (specify)			
10	Education:	1. Illiterate	2. Primary /UP	3.High School/ Inter	4.Graduate & above	5.Technical/ Trade			
11	Land Holding: (in Ac.)	1. Irrigated	2. Non-irrigated		3. Total				
12	Crop production:	Area (Ac)		Production (Qtl)		Type of cropping system*	Farming type (1. Organic/2. Inorganic/3. Mixed farming)		
		Irrigated	Non-irrigated	Irrigated	Non-irrigated				
		* 1. Sole cropping, 2. Inter cropping, 3. Mixed cropping, 4. Bund/periphery plantation, 5. Others							
13	Seed variety/ Planting Material used:	1. Local	2.HYV	3. Hybrid	4. Graft	5. Others (specify)			

14	Source of seed/planting material:	1. Govt	2. Pvt	3. OUAT	4. Others (specify)			
15	Source of irrigation:	1. Canal	2. LI point	3. Well/Tube well	4. Tank	5. Others (specify)		
16	Type of irrigation:	1. Surface irrigation	2. Drip irrigation	3. Sprinkler irrigation	5. Others (specify)			
17	Hours of irrigation per acre:							
18	No. of irrigation per month:							
19	Integrated Nutrient Management:	A. Organic:	1. Farm Yard Manure	2. Vermicompost	3. Green Manure	4. Other (specify)		
		B. Inorganic:	1. Urea	2. Super	3. Potash	4. Others (specify)		
		C. Micronutrient:	D. Bio fertilizer:					
		D. Soil test:	1. Yes	2. No	E. Adoption of soil test recommendations:	1. Yes	2. No.	
		F. Application method:	1. Broadcasting	2. Behind plough	3. At root zone	4. Fertigation	5. Other (specify)	
20	Integrated Pest management:	1. Chemical pesticide	2. Organic pesticide	3. Beneficial organism	4. Mechanical control	5. Cultural practice		
21	Occurrences of pest & disease:	1. Kharif		2. Rabi	3. Zaid/Summer			
	Insect/ pest:							
	Disease:							
22	Type of implement/ equipment:	1. Manual/hand operated			2. Power operated			
23	Primary value addition:	1. Cleaning/ washing	2. Drying	3. Sorting	4. Grading	5. No		
24	Processing:	1. Dal	2. Raw mango products	3. Ripe mango products	4. Other (specify)	5. No		
25	Packaging:	1. Gunny bag	2. Polythene bag	3. wooden box	4. Paper cartoon	5. Plastic crates		
		7. Other (specify)	8. No	6. Bamboo basket				
26	Storage	1. Indoor	2. Outdoor	3. Warehouse	4. Cold storage	5. Other (specify)		
27	Application of chemical for early/ late ripening	1. Pre-harvest			2. Post-harvest/ storage			
		A. For early ripening		A. For late ripening		A. For early ripening		A. For late ripening
		a. Yes	b. No	a. Yes	b. No	a. Yes	b. No	a. Yes

28	Wastage at different Stages:	1. During Harvest	2. During post-harvest operation	3. During storage	4. During transportation	Total	
Wastage (%):							
29	Access to credit:	1. Commercial Bank	2. Coop.Bank	3. Gramya Bank	4. Pvt. Bank	5. Money lender	6. Other (specify)
7.No							
30	Access to information/ service:	1. Crop-weather	2. Market/ MSP	3. Extension Services	4. Govt. Programs	5. Mobile Advisory	6. Electronic/ Print media
7. IEC Material							
8. Insurance							
9. Other (specify)							
31	Infrastructure facility:	Availability	Place	Distance (Km)	Accessibility	Remarks/ comments	
32							
33							
34							
35							

## B Stakeholder Interaction Format: Trader/Wholesaler/Retailer

**Commodity: MANGO/ARHAR**

1	Name						
2	Address						
3	District			4	State		
5	Contact number			6	Email		
7	Type of business	1. Wholesaler	2. Retailer	3. Commission Agent	4. Other (specify)		
8	No. of years in this business	9		Business engagement	1. Seasonal	2. Throughout the year	
10	In case of seasonal business, what is his engagement in lean/off season						
11	Source of procurement	1. Farmer	2. Agents	3. Wholesaler			
		4. Retailer	5. Mandi/Market	6. Other (specify)			
12	Place of procurement	1. Within district	2. Outside district	3. Outside state	4. Other (specify)		
13	Terms & condition for procurement						
14	Service provided to the seller	1. Credit facility	2. Collection from farm gate	3. Transport arrangement			
		4. supply of inputs	5. Other	6. No			
15	Major buyers/customers	1. Consumer	2. Wholesaler	3. Retailer	4. Processor	5. Other	
16	Place of sale	1. Within district	2. Outside district	3. Outside state	4. Other (specify)		

17	Consumers' preferences				
18	Transaction details	During harvest	1-3 month after harvest	4-6 month after harvest	
	Av. Volume of transaction (Qtl)				
	Av. Procurement cost (Rs/Qtl)				
	Av. Selling price (Rs/Qtl)				
	Wastage (%)				
19	Reason for fluctuation of price & volume				
20	Factors of Demand	1.Price of the product	2. Taste & preference of buyer	3. Price of related products	4. other
21	Price build up at different level of supply chain:	Existing Supply Chain		% of produce	Place (a- with in dist/b- outside dist/c- outside state)
		1. Farmer Consumer			
		2. Farmer Wholesaler Retailer Consumer			
		3.Farmer Trader Wholesaler Retailer Consumer			
		4.Farmer Processor Wholesaler Retailer Consumer			
		5.Farmer Local aggregator Trader Wholesaler Retailer Consumer			
22	Climate Risk, Impact & Coping mechanism/ contingency plan:				
	Climate Risk	Impact	Coping mechanism/contingency plan		
	Dry spell				
	Wet spell				
	Heat wave				
	Hail storm				
	Late monsoon				
	Draught				
	Flood				
	Cyclone				
23	Issues & constraints				
24	Opportunities				
25	Suggestions	High impact priority		Low impact priority	
	Short term				
	Long term				

## C. Stakeholder Interaction Format: Processing Unit

### Commodity: MANGO/ARHAR

1	Name of the Unit					
2	Name of proprietor/ Respondent					
3	Address					
4	District			5	State	
6	Contact number			7	Email	
8	Production capacity of the unit per day (Qtl)			9	No. of days the unit functions per year	
10	Type of processing	1. Manual	2. Machine based	11	Type of machine	1. Traditional      2. Automated
12	Use of solar energy	1. Yes	2. No			
		a. Light		b. Power		
13	Type of product					
	Mango	1.Mango drink	2. Jam	3.Pickle	4. mango bar	
		5.Dried mango	6.Dry mango powder (amchur)	7.Other		
	Arhar	1. Dal		2. Flour	3.Other	
14	Source of procurement	1. Farmer	2. Agents	3. Wholesaler		
		4. Retailer	5. Mandi/Market	6. Other (specify)		
15	Place of procurement	1.With in district	2. Outside district	3. Outside state	4. Other (specify)	
16	Service provided to the seller	1. Credit facility	2. Collection from farm gate	3. Transport arrangement		
		4. supply of inputs	5. Other	6. No		
17	Major buyers/ customers	1.Consumer	2. Wholesaler	3. Retailer		
		4. Mall	5.other (specify)			
18	Supply to high end processor/processing industry	1.Yes	2.No			
		Semi processed product	Name of high end processing unit/ industry	Place		
19	Place of sale (%)	1.Within district	2. Outside district	3. Outside state	4. Outside country	
20	Consumers' preferences					



21	Factors of Demand	1.Price of the product	2. Taste & preference of buyer	3. Price of related products	4. other(specify)
22	Production economics	Product 1-	Product 2-	Product 3-	Product 2- Product 3-
	Procurement cost (Rs/Kg)				
	Processing cost (Rs/Kg)				
	Selling price (Rs/Kg)				
	Wastage (%)				
	Av. Volume of production (Qtl)				
23	Participation of women in food processing				
24	Role of women SHG in food processing				
25	Climate Risk, Impact & Coping mechanism/ contingency plan:				
	Climate Risk	Impact	Coping mechanism/ contingency plan		
	Dry spell				
	Wet spell				
	Heat wave				
	Hail storm				
	Late monsoon				
	Draught				
	Flood				
	Cyclone				
26	Issues & constraints				
27	Opportunities				
28	Suggestions	High impact priority			Low impact priority
	Short term				
	Long term				

## D Stakeholder Interaction Format: Input Dealer

### Commodity: MANGO/ARHAR

1	Input category:	1.Seed/ Planting material	2.Plant nutrients	3.Plant protection material	4. Farm implement/ equipment	5. Other
2	Name of the enterprise:					
3	Ownership	1. Govt.	2.Private	3. Cooperative	4. Other	
4	Name of Dealer/ Respondent:					
5	Address					
6	District:		7	State		
8	Contact number:		9	Email		
10	Commonly used varieties:					
10.1	Seed/Planting material	1.Local				
		2.HYV				
		3.Hybrid				
		4.Graft				
10.2	Plant nutrients	1.Inorganic				
		2.Organic				
10.3	Plant protection material	1.Inorganic				
		2.Organic				
10.4	Farm implement/ equipment	1.Manual operated				
		2.Power driven				
11	Services provided	1.Only sale		2. Advise on use/ application	3.After sale service	4.Other (specify)
12	Whether supply is adequate to meet the requirement of the farmers in the locality	1.Yes	2.No  (Please mention reason)			
13	Whether required input is supplied in time of need of the farmer	1.Yes	2.No  (Please mention reason)			
14	Climate Risk, Impact & Coping mechanism/ contingency plan:					

Climate Risk	Impact	Coping mechanism/ contingency plan
Dry spell		
Wet spell		
Heat wave		
Hail storm		
Late monsoon		
Draught		
Flood		
Cyclone		
15	Issues & constraints	
16	Opportunities	
17	Suggestions	High impact priority      Low impact priority
Short term		
Long term		

## E Stakeholder Interaction Format: Mandi/Market

**Commodity: MANGO/ARHAR**

1 Name of the Mandi/ Market													
2 Location/Place					3 Block/NAC/ City								
4 District					5 State								
6 Name of the Respondent													
7 Designation													
8 Address													
9 Contact number						10 Email							
11 Transaction details (2016)													
11.1	Total Supply(Qtl)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec

11.2 Total Sale(Qtl)


11.3 Avg. Market Price (Rs/Qtl)


12 Reason of fluctuation in supply/sale/price in diff season:

12.1 Reason of fluctuation in supply:

12.2 Reason of fluctuation in sale:

12.3 Reason of fluctuation in price:

13 Source of supply (Place)      1.With in district      2. Outside district      3. Outside state      4. Other

Place	%	Place	%	Place	%	Place	%
-------	---	-------	---	-------	---	-------	---


14 Major Suppliers (%)      1. Farmer      2. Traders/ Agents      3. Wholesaler      4. Other(specify)

15 Major buyers/ customers (%)      1.With in district      2. Outside district      3. Outside state      4. Outside country

--

16 Avg. Procurement cost (Rs/Qtl)      16a Avg. Selling price (Rs/Qtl)      16b Wastage%

17 Procurement norm

18 Facilities available

19	Market Determinant factors	1. Factors of Demand	Ranking	2. Factors of Supply	Ranking
		1.1 Price of the product		2.1 Demand of the product	
		1.2 Taste & preference of buyer		2.2 Price of the product	
		1.3 Price of related products		2.3 Cost of production	
		1.4 supply /availability of the product		2.4 No. of producers/ volume of production	
20	Impact of climate change				
	On demand	1. Increase	2. Decrease	3. No change	4.
	On supply	1. Increase	2. Decrease	3. No change	4.
	On quality	1. Increase	2. Decrease	3. No change	4.
	On price	1. Increase	2. Decrease	3. No change	4.
	On weight	1. Increase	2. Decrease	3. No change	4.
	On business transaction	1. Increase	2. Decrease	3. No change	4.
21	Issues & constraints				
22	Opportunities				
23	Suggestions	High impact priority		Low impact priority	
	Short term				
	Long term				



**Action on Climate Today (ACT)**

**For more information,**

Email: [info@actiononclimate.today](mailto:info@actiononclimate.today)  
[www.actiononclimate.today](http://www.actiononclimate.today)



Department of  
Agriculture and  
Farmers' Empowerment,  
Government of Odisha