



Improving water use for dry season agriculture by marginal and tenant farmers
in the Eastern Gangetic Plains

Assessing value chain opportunities for smallholder vegetable growers in Eastern Gangetic Plains

Working Paper

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1. Introduction

1.1 Key constraints and gaps in intervention areas

The Eastern Gangetic Plains is one of the most densely populated, poverty stricken belts in South Asia, with deeply entrenched social structures of class and caste, and a high incidence of inequitable landlord-tenant relations. This is combined with poor access to irrigation water in the dry season, limited irrigation capacity and low agricultural innovation. Since late 2014, USQ, IWMI along with partners initiated project interventions in selected areas of EGPs with the aim to improve the livelihoods of woman, marginal and tenant farmers, through improved water use and increased dry season agricultural production. These landless, untenured farmers get together as a group, approach a landlord who doesn't use land in the dry season, rent it together and have access over the dry season using groundwater and sharing labour. With the use of improved technology and efficient water management the interventions centers on facilitating production of fresh vegetables as well as cereal crops.

Farmers in intervention areas generating marketable surplus – mainly of vegetable crops. However, one of the issue is 'Do they know market price and demand situation?' The production – market linkages is important for economic feasibility of the interventions and realization of livelihood improvement through increased income. Lack of infrastructures (such as collection centre), low influence of producers (in price fixation), low strength to penetrate at distant markets, high market margins seemed to be the key constraints in relation to value chain of the fresh vegetables. Major gap existed in terms of market demand and price information, as well as market connectivity.

In this context this study aimed to address key questions: How farmers can maximize their share from the market chain?; Are there market infrastructure and traders in (or near) the production areas?; and How to manage the marketing of the produce and fetch better price?

1.2 Background on value chain concept

Michael Porter used the term 'value chain' in a book published in 1985 in which he used the term to illustrate how companies could achieve what he called "competitive advantage" by adding value within their organization (Porter, 1998). It evaluates which value each particular activity adds to the products or services. Value should be added at each link of the chain. Value does not necessarily include monetary value only. There could be value in information exchange, building networks and learning new processes (AFC, 2004). The value coalition model recognizes that value is often created by the simultaneous interaction of several stakeholders (Reddy, 2013). Porter argues that the ability to perform particular activities and to manage the linkages between these activities is a source of competitive advantage.

Value chain includes all the vertically linked, interdependent processes that generate value for the consumer, as well as horizontal linkages to other value chains that provide intermediate goods and services. Value chain focuses on value creation—typically via innovation in products or processes, as well as marketing—and also on the allocation of the incremental value. By contrast, the term

supply chain is used internationally to encompass every logistical and procedural activity involved in producing and delivering a final product or service, from the supplier's supplier to the customer's customer (Feller et al., 2006). Since the primary focus of supply chain is efficiency, the main objectives are usually to reduce friction (for example, delays, blockages, or imbalances), reduce outages or over-stocks, lower transaction costs, and improve fulfillment and customer satisfaction. In fact, Feller et al. (2006) argue precisely for the need to stop thinking of supply chain and value chain as different entities, but rather, for integration of the two.

There is a temptation to use "value chain" and "supply chain" interchangeably, but there is a difference in the concepts and that is significant. The supply chain model, which came first, focuses on activities that get raw materials and subassemblies into a manufacturing operation smoothly and economically. The value-chain notion has a different focus and a larger scope. A supply chain is simply a transfer of a commodity from one stakeholder to another in a chained manner. The value chain is the value addition at different stages of transfer. In different stages of value chain, different stakeholders add value to the product to increase the end-product value. In other words, a value-chain analysis looks at every step from raw materials to the eventual end-user – right down to disposing of the packaging after use. The goal is to deliver maximum value to the end user for the least possible total cost. That makes supply-chain management a subset of the value-chain analysis (Reddy, 2013).

The term value chain was adopted for agricultural development purposes (Kaplinsky and Morris, 2001) and has been used by majority of the development agencies to guide their development interventions. At the heart of the agricultural value chain concept is the idea of actors connected along a chain producing and delivering goods to consumers through a sequence of activities (Henriksen et al., 2010). The application of value chain analysis is being interpreted differently by different organizations (Riisgaard and Ponte, 2011; Lundy et al., 2007; Springer-Heinz, 2007; Vermeulen et al. 2008, and Herr and Muzira, 2009). However, the key conceptual and methodological elements of value chain analysis and development are still evolving. Value chain analysis has been used to assess and upgrade the performance of individual firms, devise interventions to achieve competitive advantage, and also to examine constraints in the enabling environment in which the chains operate. Value chains have also been used as a tool for SME development, with new methods of linking SME suppliers and service providers to the value chains of lead processors or marketers (WB, 2010).

Value chain allows businesses to respond to the marketplace by linking production, processing and marketing activities to market demands. In typical value chain, different actors are connected from one end of the primary production process (e.g., farmer's field), through processing, and possibly into the final marketing stages where consumers purchase a finished product. At each stage the products' value increases. In other instances, such as a collection of agricultural producers consolidating supply, no value added to the product. For successful value chain development: creating the right environment for agriculture and investing in rural public goods is essential. Governments have a responsibility to provide essential goods and services, infrastructure, such as rural roads, and agricultural research and extension. A strong private sector is essential to make an agriculture profitable. Many measures to improve value chains require collaboration between a wide range of different agencies (Wiggins, 2014; Pye-Smith, 2013).

1.3 Why a value chain is necessary

There are three general triggers for developing a value chain, namely, improving quality, improve systems efficiency and produce diverse products (AFC, 2004). Since the competition is becoming increasingly fierce, there is an opportunity to produce quality product and food when producers, processors and retailers track products through the food chain. Premiums also exist for a consistently high quality produced and processed food product. Likewise, opportunities exist to lower costs and increase efficiencies in the market by producers, processors and marketers working together.

Further, differentiation is the ability to provide unique and superior value to the buyer in terms of product quality, special features or after sales service. Consumers are demanding new products that require supply chain actors to share information and systems or provide unique inputs (e.g., special variety, trademarked process, and unique genetics). These products often require consistently high quality, proof of adherence to protocols and legislated standards throughout the production, processing and marketing channels. Bringing existing businesses together provides opportunities to share the risk and costs of developing market channels and end markets. While maintaining competitiveness in commodity production is becoming more difficult, there are opportunities for specialized products that consumers are demanding. Some of these technological products require coordinated systems from producer to market. Once established, a real advantage to these systems is that they are difficult for competitors to duplicate. Everyone in the chain to work together, share information and problem solve as a unit provides a uniqueness that is difficult for others to duplicate. Using a value chain approach enables each chain member to implement specific production practices, share information and solve problems at each stage of the production process.

2. Value chain analysis

Value chain analysis rests on a segmentation of the different activities and mapping of interactions that may generate costs or value in the production and sale of a product or service. Although it is also concerned with structure, conduct, and performance, it differs from traditional commodity system or industry analyses in some important ways (Kaplinsky and Morris, 2001).

- It recognizes that linkages between productive activities and actors vary according to the specific product type and target market, even if the main actors are the same.
- It recognizes that economic activity is very dynamic, necessitating adjustments in strategy and tactics constantly as circumstances change.
- It recognizes that there are different kinds of value chains (buyer-dominated, supplier-dominated, balanced, or directed) depending on which actors or activities have the most leverage, information, and power.
- It looks not just at physical flows, but also informational flows.
- It focuses on net value added instead of just overall revenue and gross physical output.
- It seeks to better understand the constraints and opportunities within each segment, as well as the context in which the chain operates.

There are many ways to analyze or evaluate a value chain. Analysis can stem from research of secondary information, such as government or industry data, to interviews with value chain actors involved. In general, an in-depth value chain analysis considers the following questions:

- What are the target markets that the value chain of interest serves?
- What/where are the main competing value chains?
- What are the product types, forms, and presentation that each target market seeks?
- What are the pathways from source to each end-market?
- What are the value chain's comparative advantages?
- How do financial (and economic) costs rise as the product moves along the value chain?
- How does market value rise as the product moves along?
- Where is there the most potential for growth in sales or profitability?
- Who are the most important actors within the value chain and how do they behave?
- To what extent is trust and cooperation evident at each step in the chain?
- What is the share of volume and value associated with different types or cohorts of actors?
- Where are the apparent choke points or bottlenecks in the value chain?
- What is the overall size of the value chain of interest?
- How does this value chain connect to others, and what possible synergies exist?
- How has the value chain been evolving over time?
- How is the value chain governed, and who holds power or influence?
- In what ways is the value chain regulated from outside, or self-regulated?
- What is the institutional framework of value chain (such as, producer or trade associations)?
- What factors in the enabling environment hinder or support chain growth and prosperity?
- What is the potential for improving or upgrading any of the above?

Diagnosing a value chain in a particular region and in a particular consumer/producer segment require systematic understanding of different activities of stakeholders at present and future planning to minimize transaction costs and for recognizing each partners' competitive advantage. It also requires demand and supply estimates with and without value chain intervention. We have to examine how participation of smallholder farmers can be increased and up-graded to enhance their incomes within the value chain keeping their resource constraints. We also need to identify intervention points within the value chain based on priorities set out through SWOT analysis. It will also be helpful in financial plans for each partner engaged in the value chain up-gradation and for attracting investments in the value chain. Table 1 depicts steps involved in value chain diagnosis.

Table 1. Steps involved in value chain diagnosis

Step	What to do?	Why?
Phase 1: Diagnosis		
Step 1	Preparation	To define the destination, type of potential target group, and assessment of team/partners
Step 2	Map the big picture: enterprises and other actors in the agricultural sector, links between them, demand and supply data, and the pertinent context	To organize a chaotic reality, understand the overall system
Step 3	Map what the poor do and why they do not participate	To avoid erroneous assumptions about poor actors. To take account of the less visible suppliers
Step 4	Conduct fieldwork interviews in each node of the chain, with input suppliers and traders and processors, including current/potential poor participants	To provide data and insights for Steps 5 to 8
Step 5	Track revenue flows and pro-poor income. Estimate how revenues flow through the chain and how much accrues to the poor. Consider their returns and factors that enable or inhibit earnings	To follow the costs/revenue through the chain down to the poor, and assess how returns can be increased
Phase 2: Scope, priorities and opportunities		
Step 6	Identify where in the agricultural value chain to seek change: which node or nodes?	To select areas ripe for change, drawing on Steps 1 to 5. To ensure Steps 6 to 8 are focused on priority areas
Step 7	Analyze blockages, options and partners in the nodes selected, to generate a long list of possible interventions	To think laterally and rationally in generating the range of possible interventions
Step 8	Prioritize interventions on the basis of their impact and feasibility	To generate an intervention shortlist, comprising interventions most likely to deliver impact
Phase 3: Feasibility and planning		
Step 9	Intervention feasibility and planning	Package selected interventions for funding and implementation
<p>Note: These steps are iterative and cannot be entirely sequential, eg, some initial thinking from Step 6 (where to focus) will help in focusing resources within Step 5.</p>		

Source: Reddy, 2013

Further, Table 2 shows the process by which producers can be linked to the final consumers in actual conditions.

Table 2. Analyzing how farmers are connected to final markets

Issues in buying	Method of data collection	Data required
Identification of key buyers	Analysis of key market segments; ask suppliers for names of major buyers	Concentration ratios in market segments: names of key buying firms/individuals
Dynamics of the buying function	Analysis of key market segment; discussions with key buyers	Changing distribution of sales through different marketing channels
Low cost approaches to reach different buyers	Interviews with key respondents	Time trend of competitiveness of suppliers
Strategic judgments on sources of supply	Interviews with key respondents	Judgments of which supply sources are likely to be winners and why this might be the case.
Supply chain management policies	Interviews with key respondents, both amongst buyers and suppliers (to triangulate results)	Specific steps taken to upgrade (or prevent upgrading) by suppliers; size and budget of supply chain management function in buyers; frequency and nature of visits to and by suppliers, and who makes visits.

Note: Useful forms of concentration-ratio calculations are the proportion of purchases coming from the three largest, the five largest and the 10 largest suppliers (three-firm, five-firm and 10-firm concentration ratios). Another analytical technique is Pareto-analysis, detailing the percentage of sales accounted for by the deciles of suppliers, which can then be charted on a graph. Open-book costing refers to a relationship whereby the suppliers open their costing procedures to buyers so that they can jointly act to reduce costs in the belief that the buyers will not use this information to squeeze profits out of production. Where this works, open-book costing requires high levels of trust and long-term relationships and frequently also involves some minor equity-holding.

(Adapted from Kaplinsky and Morris 2001).

3. Approach and Methods

3.1 Conceptual framework

This study used the concept of ‘value chain’, which was developed and popularized in 1985 by Michael Porter. He defined value as the amount buyers are willing to pay for what a firm provides, and conceived that value chain as the combination of generic value-added activities operating within a firm – activities that work together to provide value to customers. In recent days, the value-creating process has commonly called as the value chain and a Google search on the term value chain produces nearly 4 million hits (Feller et al., 2006). It is clear that the interest in value chain is not a new phenomenon. Hunka et al. (2011) indicated that a value chain analysis is that in which a product gains value as it passes through a stream of production within the chain in an enterprise.

Value chain is conceptualized as full range of activities required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers and disposal

after use (Kaplinsky and Morris, 2000). Value chain is a shift in way of thinking from producer-focused approach to consumer-targeted approach (Collins, 2009; Fearn, 2009). Efficient value chain management of vegetables and fruits contributes to add value to the products during bringing it into the market (Reddy et al., 2010). Value does not necessarily include dollar value only. There could be value in information exchange, in building networks and in learning new processes (AFC, 2004). The value coalition model recognizes that value is often created by the simultaneous interaction of several stakeholders (Reddy, 2013). In rapidly shifting tastes, preferences, and demand of consumers, the supply chain and value chain must synchronize the flows of supply with the flows of value from customers to meet emerging demand of customers (Feller et al., 2006). It is necessary to identify potential enterprises and supply to consumers by creating perceived value.

In most cases, both value chain and supply chain have been used interchangeably. At the beginning, the focus was on management of a chain of supply. Supply chain consists of the parties involved, directly or indirectly, in fulfilling a customer request. It includes several actors: manufacturer and suppliers, transporters, warehouses, retailers, and customers (Chopra and Meindl, 2013). Beamon (1998) defined supply chain as a set of relationships among suppliers, manufacturers, distributors, and retailers that facilitates transformation of raw materials into final products. Although supply chain is comprised of a number of business components, the chain itself could be viewed as a single entity. To generate more profit in dynamic environment, supply and value chain must be synchronized for the flows of supply with the flows of value from customers (Feller et al., 2006; Hunka et al., 2011). Supply chain is an emerging term that emphasizes interactions among marketing, logistics, and production (Ballou et al., 2000). The supply chains link value chains (Hunka et al., 2011).

The agri-food supply chain is different than other supply chain due to its perishability and seasonality nature (Van der Vorst, 2000). Mittal (2007) reported high cost of production, low productivity and large post-harvest losses has made the fruits and vegetables supply chain more inefficient in India. Various supply chain and value chain studies were conducted for fresh vegetables and fruits in the context of developing countries (Bhattarai et al., 2013; Dastagiri and Immanuelraj, 2012; Chapagain et al., 2011; Chen et al., 2011; Halder et al., 2011; Sharma and Singh., 2011; Amos Gyan et al., 2011; Sidhu et al., 2010; Mangala and Chengappa, 2008; Mittal, 2007; Zhang et al., 2006). In the past development efforts in Nepal, value-based outlook was lacking which have resulted in lack of response to market needs or oversupply problem. Different past studies (E.g. Timsina et al., 2012a; Timsina et al., 2012b; Shrestha et al., 2012; Chapagain et al., 2011; FBC, 2008) related to value chain and supply chain analysis for different vegetables, fruits and cash crops in Nepal has ignored the consumers' perspective in the analysis. Similar scenarios were found in some cases of India (NCAP, 2010).

Traditionally, practitioners and researchers have limited their analyses and scope to individual stages within the larger chain, but have recently identified a need for a more integrated approach. Therefore, such an integrated approach has been used for this study. Value chains generally include following actors: input suppliers, producers, processors, distributors, brokers, wholesalers, retailers and consumers. In addition, it could also include research and development organizations including government agencies. In fresh vegetables value chain of Nepal all these actors may not be applicable. However, initially we try to look for these actors and then subsequently identify existing

value chain and its actors. In this study, we try to use more comprehensive methodology that has taken into account an entire spectrum of associated activities and inputs. A conceptual framework has been proposed to organize the analysis (Figure 1).

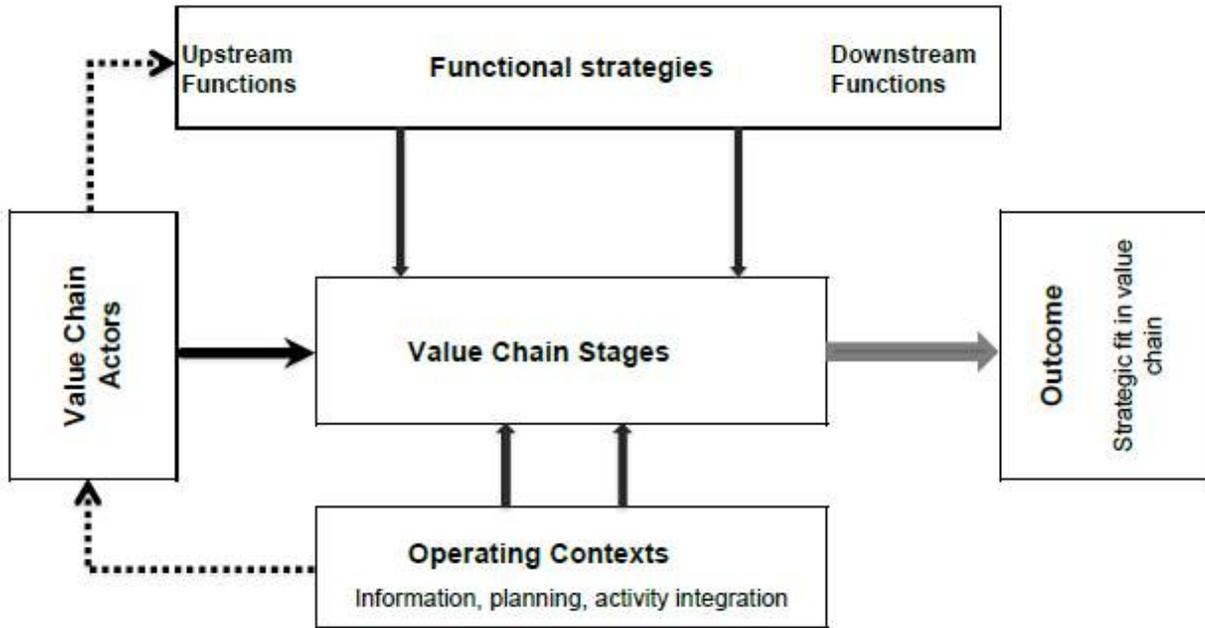


Figure 1 Strategic fit in value chain (Adapted from Timsina et al, 2015)

3.2 Methods

This study used both primary and secondary sources of information. The primary sources mainly included various actors/stakeholders directly involved in production, assembling, marketing and distribution of vegetable crops. While the vegetable producers and traders at the DSI4MTF interventions districts were focus of the study, it also tried to include all actors associated with fresh vegetables value chain at district and other levels: producer farmers, farmers' groups, traders at different levels, input suppliers and service providers. We collected all the available information related to fresh vegetables from the beginning of input supply to the end-users (at retail sale level).

The study covered five key actors: producer farmers from DSI4MTF intervention sites; farmers' group in DSI4MTF intervention sites; traders at local weekly market as well as district and regional market; input suppliers at nearby market and district market; and service providers at the district. We used a separate checklist for each category of actors (please refer to Annexes 1-5).

4. Value chain mapping of vegetables: Actors and linkages

[Who are actors (Input suppliers, Farmers, Farmers Groups/Cooperatives, Traders (collectors, wholesalers, retailers), and Service providers); what are their functions; what relationships exist among them) – Vertical and horizontal integration of value chain actors

Relationship among involved actors is crucial in achieving the value chain goals (Beamon, 1998). Value chain performance depends on coordination among the components and the actors. This coordination requires that each stage of supply chain take into account the effects of its actions on other stages (Chopra and Meindl, 2012). Some coordination mechanisms could help improve the supply chain performance (Arshinder and Deshmukh, 2008). One important issue in supply chain is to achieve a strategic fit between overall supply chain strategy and functional strategies involved in the process (Chopra and Meindl, 2012). Many parts of the Nepal have shown potential to produce fresh vegetables. While in some areas farmers have been able to harness the potential, but, because of the poorly developed value chain, still Nepalese farmers largely are not yet able to tap this potential. In this context, this section tries to analyze the overall strategic fit in the fresh vegetables value chain in Nepal.

Several categories of actors play key roles in value chain of fresh vegetables in Nepal, and particularly in production pockets of Saptari and markets in the region. This analysis covers two villages of Saptari district, namely, Kanakpatti and Koiladi as key production areas, and nearby markets including regional market in the region. Right from the pre-production preparation through production, distribution and consumption stages actors exhibit diverse specificities and roles in value chain.

Key actors identified included: individual farmers, farmers' groups/cooperatives and traders at different stages (collectors, wholesalers, retailers). Input suppliers and service providers were also among the key actors in the chain. Figure 2 presents the key actors and enablers in fresh vegetables value chain in Nepal.



Figure 2. Actors and enablers in fresh vegetables value chain

4.1 Upstream functions in value chain: Producing quality vegetables ensuring profitability

In case of fresh vegetables value chain, producing the good quality vegetable is the key. From the overall value chain perspective, the functional strategy at this stage should be to provide good quality vegetables to the further stages in the value chain. This study covered vegetables producing farmers from Kanakpatti and Koiladi villages in Saptari district of Nepal.

4.1.1 Production environment and selling practice in Kanakpatti village

In Kanakpatti village, farmers are cultivating a range of vegetables. This subsection mainly focuses on farmers who are cultivating being part of three different groups facilitated by the project. Farmers of Kanakpatti group 1 and 2 cultivate different types of vegetables such as chilli, tomato, zucchini, and pumpkin. Farmers in the third group of Kanakpatti (Dalit group) are engaged in farming activity for the first time since the project started. They have farmed crops such as maize, potato, onion, chili, eggplant and so on. Some crops they use for self-consumption and others they have sold.

Farmers use external inputs such as seeds, fertilizers and pesticides in the production process. In case of fertilizers such as DAP, Potash, Urea they purchase from a local cooperative at Traffic Chowk (1km). For seed and pesticides, they also go to Rupni cooperative (4km), bigger one in comparison from Traffic Chowk. Farmers in groups 1 and 2 got subsidized wheat seeds for Rabi 2016/17. While the normal cost of wheat seed was Rs. 45/kg, they could buy wheat seed for Rs. 25/kg. Farmers mostly buy chemical fertilizer. The cost for organic fertilizer for a kg is Rs. 10/kg. Farmers in group 3 of Kanakpatti purchase fertilizer and seeds from Traffic Chowk. Farmers from Dalit group (group 3) do not have information on governmental support and policies.

Most of the farmers in these groups have reported profit from the vegetable crops though it varied significantly across the seasons and farmers. Details of the profitability of the vegetables grown need to be extracted from seasonal economic data collected separately.



One of the farmers selling her product in local haat

Farmers normally sell their produce to local and nearby weekly haats. Sometimes, traders come to Kanakpatti to purchase vegetables from local farmers. However, traders prefer to buy crops in high volume. The quantity of vegetables intervention farmers from Kanakpatti produce is not in large bulk. Farmers believe if all the members of group would produce same crop, there would be mass production. Subsequently, seller would be interested to come to the village for buying vegetables. Although, they perceive the benefit, they are concerned about receiving less price due to the supply increase of same crop. Despite the reduction in application of labor for vegetable sale, farmers are worried of getting low return. They give example of tomato crop. Few farmers who produced tomato at the beginning of the season fetched Rs. 50/kg. Later, the tomato supply substantially increased as many farmers has farmed tomato. Farmers were hard hit due to mass production in the area as the price reduced as low as Rs. 3/kg. In case of other crops, since farmers are growing multiple crops, the quantity produced is not very huge.

Due to small volume of production, simpler means of transportation are in use. In case of groups 1 and 2, women farmers from these groups are used to cycling whatever there is to sell to the market. Mostly women are engaged in selling activity. They keep income made to themselves and spend for covering household expenses such as children's education and group savings.

In case of group 3, marketing of the produce is being done by them for the first time. normally, they carry vegetables to the market place. All dalit group members do not have cycle. So they have to carry the load up to the market. The task of vegetable sale is done by women, their children assist. Since, men are engaged in wage labour activities outside, men do not have the time to engage in this work. Since, dalit group members are farming vegetable for the first time, rather than only selling the produce, they are also consuming it. They are particularly excited about having vegetable to consume.

4.1.2 Production environment and selling practice in Koiladi village

Fresh vegetables production was not a common practice in this village though there were few growers in nearby villages cultivating vegetable for commercial purpose. Farmers organized into two groups and are producing vegetables commercially for the first time in the winter 2016/17. They decided to crop cabbage, cauliflower, onion and so on. Crop selection was based on the farmer's belief the crops would fetch more income.

Farmers bring seeds, fertilizers and pesticides from cooperatives at Hanumannagar. It is 4 km from Koiladi. Normally they buy in group, and the chairperson of the group is responsible for buying these inputs. In other cases, male family members of other group members carry out this activity. Farmers commute to Hanumanagar by cycle. The cost of DAP/kg is Rs 50, Urea is Rs 20/kg. They purchase from the cooperative. Inputs such as seeds is available at Hanumannagar, the price in which they purchase is normal. Sometimes the quality of seeds and fertilizer is not good. Farmers complain about it to the agro-vet.

There are no availability issues with seeds and fertilizers. However, quality becomes an issue sometimes. There are no shortages as such to access the seeds. They can buy it whenever they need. Some years back, farmers had to purchase seeds/ fertilizers from Indian boarder, Laukahi. In case of fertilizer, they has to pay more money for fertilizers: DAP, urea. It used to cost them Rs 1200 to Rs 1400 for a sack of DAP of 50 kg. At present, they purchase DAP for Rs 900 for 50 kg sack. This is remarkably lower than what the used to spend.

Farmers sell vegetables directly to the Koiladi weekly market which is in 1 km distance from the village. This year, cabbage was sold for Rs 10 per kg. Despite high expectations from the vegetable farming, this year due to delays in transplanting cabbage and cauliflower to the fields and pest infestation, the produce did not turn to be of good quality. They had to compromise of the price at which it was sold.

Male family members assist in harvesting the vegetables. Female transport the produce to the market on *dhaki*, bamboo basket. Occasionally, some male cycle the produce to market. Selling activity is done mostly by women. Income is used for household expenses as well as children's education. Crop failure at Rabi season has lowered farmer's motivation to some extent. Farmers hope to do better in the upcoming season. Parliament member, Mr. Jay Prakash Gupta, local representative from Congress party helped to build Koiladi market area 10-12 years ago (2052 B.S). VDC is responsible for building market infrastructure. Individual farmers pay Rs 10 the contractor every day for the market space they occupy to Market Management Committee (MMC). MMC helps organize the market, income made from such collection is used to construct and improvise market infrastructure.

4.2 Value chain Actors and their enabling functions

4.2.1 Input suppliers

A number of input suppliers operate their business in the vicinity of vegetable production villages discussed in previous sub-section. We conducted interviews with selected number of such input suppliers covering both villages. It was noted that farmers get necessary inputs required for cultivation either from agro-vet traders, or the cooperative societies.

Focusing the **Kanakpatti village**, we included one cooperative and one agro-vet from nearby market. The **cooperative society**, which operates from Traffic Chowk, was established in 2066 BS with 25 members altogether at the time of initiation covering members from different part of the village (in fact from the village development committee – VDC). In 2066 B.S, VDC had a scheme that provided the support of Rs 1 lakh to the cooperative. So, the current operator started the cooperative naming it *Saputh Mulyako Pasal*.

Current operator has been involved with the cooperative since its establishment and looks after the business made by cooperative. He supposed to give 5-10% of the income to the cooperative. At present, the cooperative runs at collection center at Traffic Chowk. He does not pay any rental charges. The cooperative was located at another place before. It has been 3 years that the cooperative has shifted to Traffic Chowk.

Fertilizer tend to sell more in the months of Ashar, Shrawan (mid-June, July) and Falgun(Feb/Marc).. Farmers have started purchasing more fertilizers in recent years than they did before. These are paddy and wheat season. Farmers in the area crop mostly paddy and wheat. Hence, in these seasons the demand tend to increase. Farmers from Kanakpatti as well as nearby villages of Sambhunath come to purchase the inputs. Farmers seek information on the quantity of fertilizer to apply and pesticides.

The cooperative gets supplies from Krishi Samagri Sanstha. The cooperative has to prepare an audit report. The cooperative sells grains and vegetable seeds, fertilizer and pesticides. Annually, it sells approximately 1000 sacks of DAP (50 kg sack). The rate for different fertilizers:

Fertilizer name	Rate (per kg)
DAP	46
Urea	20
Potash	35
Zinc	100

Demand for wheat seeds is high followed by paddy. As for vegetable seeds is concerned, he sells ladyfinger and cucumber seeds. Other items sold is spray pumps. The operator is positive about good quality fertilizers and seeds are sold.

Another input supplier included was an **Agro-vet** operating from Rupani market. The Agrovet was opened up around 10 years ago in partnership as a private institution not as a cooperative. The Agro-vet owner used to be a JTA and worked at iDE. The agro vet sells pesticides, seeds, sprayers, pest traps and fertilizers. They once tried selling drip kit. Farmers from 4-5 nearby VDCs purchase various items from here.

They purchase supplies from Agricultural Input Corporation, Raj Biraj and Biratnagar. They also get supplies from Nepal Agro Centre Birgunj, Biratnagar. Some seeds are also purchased from India. On the month of Jestha (mid-May), paddy seeds are purchased and on the month of Ashar(June), fertilizers are purchased. Apart of supplying to the farmers, the agrovet supplies to small agrovets as well. They are part of Krisak Maha Sangh. Sometimes paddy and wheat seeds produced by farmers' group are also sold. It is procured from Rupni and Lahan. Farmers in the area do not produce vegetable seeds. Usually personnel from District Agricultural Office call and they go to procure such seeds.

Inputs are sold as per season. In case of any loss of the products, agricultural offices do not compensate. This year the agrovet did business of Rs. 10 lakh from seeds. Fertilizer of approximately Rs 20 lakh was sold. In a day, around 100 sacks of fertilizer was sold in season. In a day, pesticide of Rs. 50,000 was sold. Annual turnover of the agrovet is around 50 lakh. When farms buy in high volume, the price of fertilizers is in reduced price. Price of DAP has gone down from Rs 1000 to Rs800 for a sack of 50 kg.

Quality check of the items sold is done by District Agriculture Development Office. In terms of availability, there are no shortages. Rarely, there is fertilizer shortage. Farmers tend to seek advice on agricultural matters. So, they advise them. Not all the advices are followed. Among organic and chemical fertilizer, farmers purchase the latter mostly. Farmers prefer speedy growth of plants and higher yield. So, they demand for fertilizers, hormones which enable them to do so.

Before farmers were not involved in vegetable farming so much. They did seasonal vegetable farming. Now farmers have started demanding for hybrid seeds as well as off-season seeds. Also the involvement of women have increased now comparatively in agriculture. Farmers give feedback on fertilizer, pesticides, seeds they have purchased. They share which of these items they would lie to buy more. Taking this into consideration, the agrovets buys items to be sold. The respondent gives an example of lady finger seed in the last season. Farmers complained about the low yield. So, they stopped purchased that particular variety this year.

Focusing at the **Koiladi village** we interviewed one input supplier from nearby market named Hanumannagar. The **cooperative** has been in operation for 4 years now. He used to have a dealer before which is now converted to cooperative. There are 25 members in the cooperative, once a year they sit for a meeting.

The cooperative sells fertilizers, pesticides and seeds. DAP, Urea and potash and pesticides are sold in larger quantity than grain and vegetable seeds. Farmers from nearby villages buy vegetable seeds mostly from India, and less from the cooperative. Seeds are available in comparatively lower price there. So, they do not sell vegetable seeds in larger quantity. Wheat seeds is sold in larger quantity, paddy seeds are also sold but not as much as wheat. Mostly chemical fertilizer are sold as these are demanded and less expensive. Once organic fertilizer was bought from Jhapa but no one purchased it. DADO at Rajbiraj also supplies organic fertilizers but not in large quantity. Farmers do not believe that organic fertilizer can help to increase the productivity.

Fertilizer is less expensive in Nepal than India Seeds are comparatively cheaper in India. So, farmer mostly make the choice of purchasing vegetable and seeds keeping the price factor in consideration. In some cases, seeds that are no longer available in Nepal are bought by farmers from India. Kanchi paddy variety was known for higher productivity. Though this variety is no longer available in Nepal after government banned it, farmers still buy it from Indian side. Farmers prefer seed variety that gives higher yield such as Sanamansuli. The operator complains about government policies that subsidizes varieties such as basmati that does not give as higher yield. Farmer complain about the unavailability the variety they prefer to buy.

The operator also complains about the paddy seed quality. Last year, Rastrya Beeu Bijuan Karlaya, Krishi Khadyan Sanstha supplied Radha paddy variety. He had bought the seed for Rs 25000 but seed of only Rs 17,000 was sold. Initially they sold it for lower price and later when no one purchased it, he had to mill seeds and consume it. Though he had anticipated the difficulty to sell this variety, he was forced into procuring it. The office forced him stating wheat seeds would not be made available to him.

The cooperative does the business of around 80 to 85 lakh in a year. In paddy season, in a day, seeds and fertilizer of Rs 60-65000 is sold. There are no issues in terms of availability of seeds and fertilizers. There are 5 to 6 cooperatives in Hanumannagar. Everything is sold mostly as they are in high demand. Also fertilizers are bought in more quantity in season not off season. So, stocks are purchased assessing the demand season. Agricultural Input Cooperation provides some assistance/subsidy.

4.2.2 Traders

Traders are key actors in the value chain of the fresh vegetables. This study covered three categories of traders: retail traders operating at local level mainly at haat market; retail traders operating at district market on regular basis; and retail traders operating at distant markets.

At local level, several smaller retailers operate their business focusing mainly at weekly haats near production areas. Noor Md Miya primarily operating at **local haat of Traffic Chowk**, the nearest market point from **Kanakpatti village**, reported that he is a farmer as well as a vegetable trader. He has been trading vegetables for 2 years now. Before vegetable business, he used to be a foreign migrant. Now he farms some vegetables such as pumpkin, bitter gourd, cucumber and trades as well.



Weekly haat of Traffic Chowk, Kanakpatti in Saptari

He buys vegetables from different market such as Inarwa, Golbazaar, Rajbiraj and so on. So far, he has not bought vegetables from intervention farmers of Kanakpatti village. According to him, the farmers demand for higher price for vegetables than what he would like to pay. So, if he buys from Kanakpatti farmers, the chances are that he will not receive much profit. He buys vegetables in relatively larger quantity (> 100 kg/day) and brings on the bus. According to him, the profit he makes ranges from Rs 4000 to Rs 5000 a month (usually getting correct information on income is tricky, the information given could be incorrect or far lower than real income). In vegetable season, he is able to sell around 1 quintal of produce.

Likewise, Mrs Sanita Mandal, is a vegetable trader primarily operating from local haat near to **Koiladi village**. She started selling vegetables 1.5 years back. Her husband had migrated to Saudi prior to that. He returned Nepal due to an illness that got him paralyzed. They depended on remittance money for day-to-day survival. Now after her husband is no longer able to support the family, Sanita has started selling vegetables.

Normally, she buys vegetables from Kunauli, a small border town of India. She sells in three Hatiyas: Koiladi, Barsain and Mansapur.

Weekly Market Location	Distance from Koiladi (km)	Market Days
Koiladi hatiya	1	Sunday and Wednesday
Barsain		Friday and Tuesday
Mansapur	3	Saturday

She purchases around 10 kg of each vegetables and sometimes buys 40 kg of vegetables if her son accompanies her. If he does not, she buys less quantity. On the day of the interview, she had bought 50 kg of bitter gourd, which she was hoping to sell in the price indicated in the table below. She makes profit of Rs 300 on normal days and Rs 500 during festivals. When she buys 40 kg vegetables, she is able to finish off selling 90 kg and 10 kg is sold following day at the other market.

Vegetable Bought	Quantity (kg)	Bought Price (Rs)	Sold Price (Rs)
Bitter gourd	50	32	40
Lady finger	10	30	40
Sag- Leafy Vegetable	10	10	15

She purchases vegetable of Rs 1000 a day. She also gets vegetables on credit and pays the traders the next day. She pays Rs 10 as market space rent for a day and gives vegetable to the cleaning lady. Earlier she was not much aware about the price fixation mechanism. Now she has started knowing about the price and rate for vegetables and also about where to go and sell so that she receives maximum profit.

She has taken loan of Rs 30,000 from saving and credit group she is a member of. She has to pay an installment of Rs. 1500 in 15 days, the interest rate is high i.e, 24%. The group is made by Showdek bank by FORWARD. Save the children has formed a group named Aaya Arjan Samuaha for vegetable traders and provided a weighing machine in the village. She wants to be part of this group but there is no time left for her to participate in the meetings. She is occupied taking care of her sick husband and carrying out trading work.

At district level, several retailers and wholesalers are involved in fresh vegetable business. Rajbiraj is district headquarter of Saptari district, where these traders operate their business based at a

fixed place in the town. Those traders purchase fresh vegetables from various regional markets and sometimes from the vegetable growers from nearby villages. The vegetable growers come to the Rajbiraj market and these traders buy vegetables from them. Through Rajbiraj vegetable market opens every day, the haat bazaar fall on Monday and Thursday. Around 500 quintal of vegetables arrive at Rajbiraj market every day.

Mr Ghiran Das is **retail vegetable trader** based at Rajbiraj market. He is relatively a small trader. He started trading since 2040 B.S. He had limited land and needed money. So, he had to start the business. He sales Rs 4000 to Rs 5000 worth vegetables every day. He sells all types of vegetables. Supplies from Biratnagar, Inarwa, Lahan are bought in rickshaw. He travels to the market on bus and directly bring them in market. Even farmers from nearby villages sell to traders. In Inarwa market also he buys from farmers. The operation of market he is based has been contracted in Rs. 50,000 for a year but there are no market related facilities. He has to pay rent of storage as Rs 30/day. But wastage is major issue as there is no proper storage facility in the market.

Mr Jagannath Das is a **wholesale vegetable trader** based at Rajbiraj market. He continued his family business that has been continuing from his father's time. Supplies from Inarwa, Ithari, and Indian markets such as Pani Tanki Jogbani are brought. They buy from the traders as well as farmers especially the ones who bring their produce to the market itself. Everyday vehicle goes to all places and collect about 3 tons of potato, onion, ginger and other vegetables. In a day, he brings vegetables of around 100 thousands. In Nepali month of Shrawan, vegetables supply is less compared to other months. When there is less supply of vegetable, the cost involved to purchase them is higher. Vegetable that would cost 100 thousands in other season costs around 300 thousands during off season.

There are no storage facility as such but he has rented a room by himself to store vegetables His vegetable stall rent is RS 2000 a month. Farmers also bring vegetables from nearby villages. He mentions some Kanakpatti farmers bringing vegetables for sale at Rajbiraj market.

Vegetables are transported from rented vehicle; it costs Rs 3000 (to pay for vehicle rent). The shop is registered as Jayama Bandi Gahil Store and PAN number has been generated. As for the rate of vegetable sale, he keeps 5% profit margin. Fixing the rate of vegetables also depends on the price at which he buys the supplies. There have not been any changes in his business as such over the years. Now he has started selling vegetable in more quantity than he used to some years back.

He reports the market is not well managed. There is no market management committee that looks over the market area. There are vegetable waste thrown everywhere. Since the vegetable selling platforms are not concrete and there are no proper roofing, when it rains, leakages and water flow

makes the market area even more unmanaged. Sometimes traders and buyers make purchases on credit. There are no guarantees when credit will be debited.

At the **distant markets**, a range of small to large traders are involved in fresh vegetables business. Mr. Bishnu Shah is a **retail/wholesale trader** based at **Inarwa** market in Sunsari district, nearly 85 km from production areas in Saptari. Inarwa vegetable market is a big one, it opens from early morning and closes by 10 am. Vehicles come to pick up and transport to different locations such as Kathmandu, Butwal, Pokhara. In season around 50 trucks of vegetables goes to different locations. During off-season around 10 trucks goes around.

Supplies from India, Sunsari, Birpur, Dewangunj are brought. In the month of Ashar and Shrawan, vegetables comes from Dhankuta, Hetauda and Kathmandu. Vegetable supply from different places depends on different seasons. During off-season, vegetables from hilly area of Nepal are brought in the market such as Dhankuta. Different variety of vegetable comes from different market. For example, cabbage, bottle gourd comes from Ram Nagar. Vegetables from Inarwa are supplied to all over Nepal. Large scale traders send supplies in Kathmandu as well.

Sunsari has medium and large scale vegetable farmers. They farm vegetable in the area of up to 4 bigga. Medium and large-scale farmers sell their produce to traders like him at Inarwa. Not just nearby Nepalese farmers but Indian farmers also come to Inarwa market They have to pay tax at the border. Around 500 of them come in a day. There are 150 Nepali farmers. Some supplies such as cauliflower is sold by Nepali farmer first. During off-season, one truck vegetables cost RS. 50,000. For the same quantity, in season, it costs Rs 20,000. Durable items such as onion, potato are kept at storage. Fresh vegetables are sold the very day of purchase.

Niranjan Shah is a **retail/wholesale trader** based at **Biratnagar market** in Morang district, nearly 120 km from production areas in Saptari. His family has been in business for 50 to 60 years. He is involved in both wholesale and retail trade of fresh vegetables.



A wholesale trader in Biratnagar market

Vegetables come from Kathmandu, Dhankuta, Hile, Dharan, Rajbiraj and other places. Vegetable is supplied from different places in different seasons. Farmers also bring fresh vegetables from different villages (such as Manyari, Kasaini) in Morang and Sunsari district. They do not come to the market directly but send it in vehicles, collectors send it. Traders from India also come to Biratnagar market to sell vegetables. For example, a trader named Arun Kumar is a coriander seller from Batana/Purnia, India.

Market is managed by municipality. There is no market committee here. Municipality cleans the wastage in the area. They have made vegetable stalls. He pays Rs. 1750 a month for his stall. His shop is a registered one, has to pay Rs 5600 as tax in a year. Due to perishable nature of the commodity, there is chance of wastage all time.

Likewise, Rabri Shah is a **female retail vegetable trader** based at **Biratnagar market**. She is a medium-sized trader and has been in the business since 35 years old. Supplies come to Biratnagar from Dharan, Ithari, Inarwa, purnia, Pharwesgunj. Vegetables does not come from Siraha. She mostly sells tomato. She buys 1 quintal of tomato from whole seller at Biratnagar. Farmers also sell their produce but sell themselves. They have to pay Rs 5 a day for the market space. Big traders keep vegetables in store. She has also taken up a stall for which she has to pay Rs. 1200 a month. She pays tax of Rs 100. According to her, municipality charges them money but has not managed market well.

4.2.3 Service providers

Besides input suppliers and traders, a range of other service providers also play enabling functions in case of fresh vegetables value chain. This study covered market management committee and contractor that operates local market.

Market management committee existed in nearby local markets of both Kanakpatti and Koiladi production areas. We interviewed Mr Pulkit Chaudary: He is the chairman of *Trakari tatha Falful Bajar Samitee (Vegetable and Fruits Market Committee)*, Sambhunath. The haat market at Traffic Chowk started 8-10 years before in unregistered public land. Land for market was not available, no one volunteered to contribute. One Collection Centre was constructed with the support from iDE. The market management committee included about 15 members at the beginning but it soon became dysfunctional. The collection centre includes one tomato sauce machine and one weighing machine as assets to the committee. There are no other assets. Mr. Pulkit believes that the committee is not working at present due to lack of unity among the farmers. He adds farmers sell vegetable individually not together to trader. So, there is no meaning of collection centre. At present, the collection centre is being used by the cooperative operated by Mr Nageshwor Shah, and sells fertilizers and other inputs.

Even though the collection Centre is defunct and the committee is not working well, Mr Pulkit thinks the committee should be revived with new members. The committee should be working well by making new rules. There should be communication between the committee and the group and strong linkages should be developed.

Traffic Chowk town area included another **informal Market Management Committee**. Mr Ganesh K Chaudary is the chairperson of the committee that includes 13 members as well. They oversee the market issues inclusive of vegetable as well as the larger market. This is an informal committee because of its no formal registration status. So, far they collected money to repair Traffic Chowk road, they collected bricks for the construction work. According to Mr. Ganesh, there is planned market area and collection centre, it has been given on rent. VDC contracts weekly market to individuals and farmers have to pay Rs 10 (for the batti-sale area and basket). Money is not given to committee but to the contractor. He mentions about the talks of VDC allocating 50 lakhs for making market shelter to the committees. However for this to materialize, 7 lakh has to be contributed by the committee. This is not a registered committee, so there are complications in receiving this scheme.

Local weekly haat of Traffic Chowk is managed through a contractor. Mr. Md. Musai is the **market contractor** of Traffic Chowk weekly market at Kanakpatti. He has been managing the market for 3 years now. He has experience of contracting Kathauna weekly market (4km from Traffic Chowk) for 30 years. He used to collect 250-300 thousands Rupees income in a year from this market. To get the contract for market, he has to fill in the tender that VDC announces every year. In the Nepali month of Ashar, the bid for contract opens up. The contractual fee has been increasing dramatically from the first year. For Traffic Chowk Market, the first year, he paid Rs. 51,000. The second year, the amount rose to Rs. 1, 51,000. Third year which is current year, he got the contract for Rs 1,81,000. From Traffic Chowk, annually, he makes around 250 thousand Rupees in total. From, one day of haat bazaar, he receives an amount from Rs 1500 to Rs 2400. His role is to provide selling platform to the vegetable traders and farmers at the time of weekly haat (every Sunday and Wednesday). He has employed one staff who assists in collecting *batti*(market rent from individual farmers). He is paid 20 a day. There are no facilities such as drinking water in the market. Market area is cleaned by the VDC. There are no concerns about the quality of the product. This is largely because the vegetables brought for sale are by farmers. Traders bring in fresh supplies as well. There is no linkage between him and the market management committee, in fact there is no formal committee as such other than the informal one discussed above.

Like in Kanakpatti, a market management committee exists in **Koiladi** as well. There was a market committee at the VDC but it was not working well. Market area needed work, it had ditches. Also the money of the committee was not properly used. Assessing the situation, the VDC Chairperson called for a meeting and the committee was formed. When Jay Prakash Gupta became parliament

member, he allocated some of Sansad Kosh-fund for the market development. How much was actually given for this task is not actually known.

Mr Ram Mangal Chaudary is the secretary of ***Gajendra Narayan Hatiya Bikas Samiti (a market committee)***, at Koiladi-3. It is registered in District Administration Office. There are 11 members in the committee and has been working for 6 years. Market shed was constructed three years ago in the haat area. The committee has also constructed around 5 rooms which are rented at Rs 2000 each. Annual income made by the committee is Rs 1,65,000 and Rs 24,000.

Koiladi haat days are on Sunday and Wednesday. Mr Krishna Mandal is the contractor of Koiladi haat. The market has been contracted by the VDC in Rs. 1,65,000 for a year. At the market, vegetables as well as other day to day usage items are sold (Sold items are vegetables, grains, meat, fruits, and cosmetics and so on). Cost of vegetables are determined by the traders and farmers follow the same price. Around 150 to 200 farmers gather from nearby villages and some traders from India. In an average, one farmers brings around 20 to 40 kg of vegetables and batti rate is Rs 10. Vegetable comes from Koiladi, Rampur Malaayani, Bhagwanpur, and India. More of farmers are selling vegetables around 90%, traders are around 10%. Trader come to buy as well as sell. Sometimes there is conflict among the farmers regarding space. Such conflicts are managed by farmers themselves and the contractor.

The committee meets every month, there are no women members. A women is employed to clean the market on haat days. She is not paid in cash but kind, i.e, vegetables. At present, Mr Ram Mangal shares that they want to spend the money for maintenance of the sheds such as polishing them. Mr Ram Mangal keeps the record of committee finances. The committee is also supposed to submit audit report annually. They carry out audit all the expenses made. There is altogether 250 thousands rupees in the committee fund.

5. Value chain stages and major activities

[Input supply, farm production, assembly, processing and logistics)

Fresh vegetables value chain in Nepal includes various stages and activities. Observation showed that same actor was playing different roles in different stages of value chain. There are instances when some value-chain stages, such as assembly and processing are bypassed by the farm production stage to be directly sold to retailers as indicated by the arrow (Figure 4). There are events when the farm production stage directly sells to the processing stage (though there is not any such significant stage involved), thus bypassing assembly stage or local traders. However, it is seen that majority of the transaction and volume would be following value stages indicated below in Figure 3, prior to being sold at the retail level.

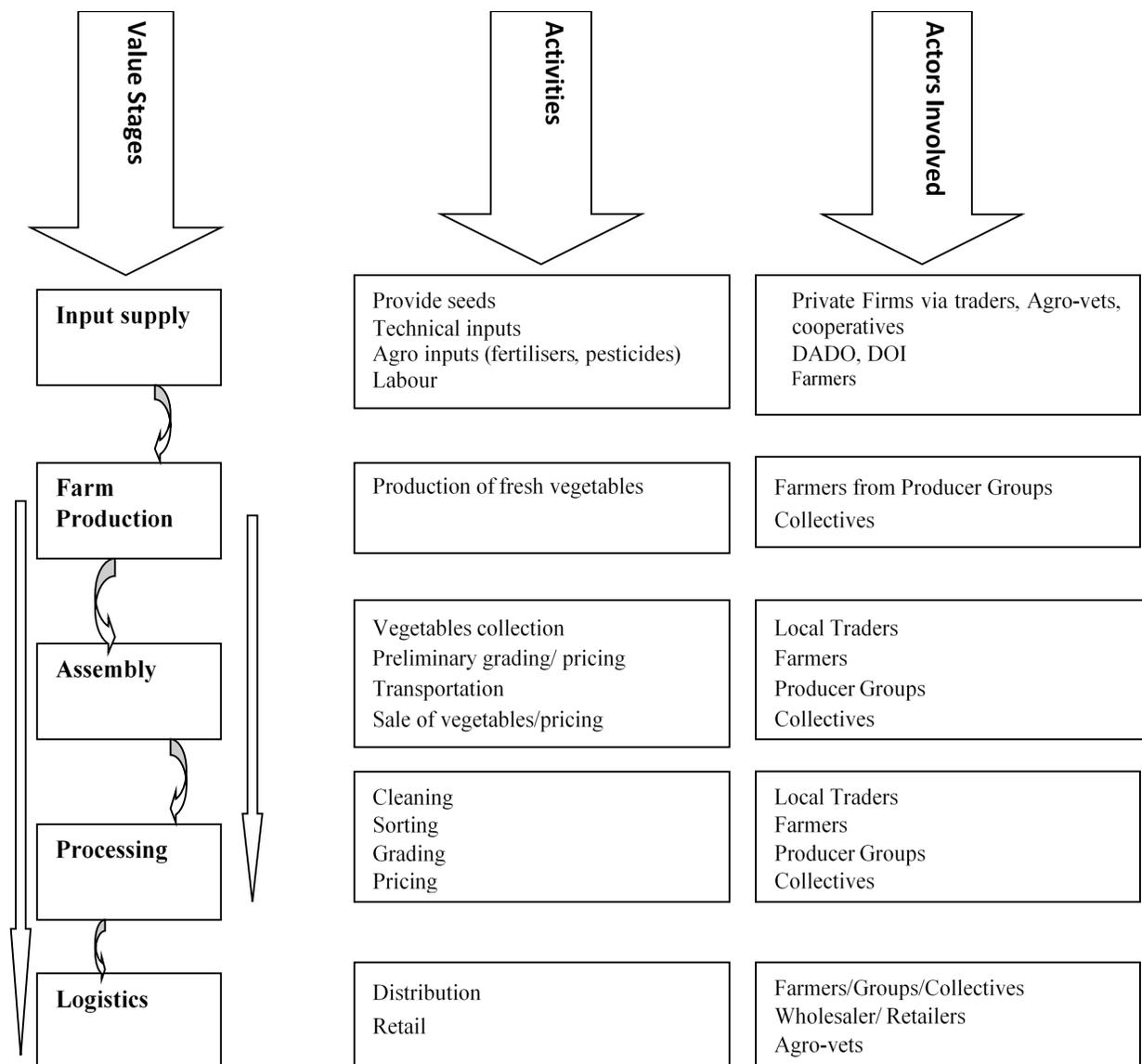


Figure 3 Value stages and activities of the fresh vegetables value chain

Key features of fresh vegetables value chain is that limited value-addition activities happen at any level. Though a range of traders are involved, if we consider the selected production areas (of Saptari districts), and the fresh vegetables trade is dominated by small retail traders.

5.1 Limited value addition activities at farmers level

Farmers sell vegetables fresh after harvesting from the field. Most of the cases they sell the produce the very day it has been plucked from the field. They do not follow any systematic processing or grading of vegetables. However, they do sort vegetables. For examples, farmers in Kanakpatti reported sorting in case of vegetables like cucumber, pumpkin, eggplant, tomato on the basis of their size and shapes. In case of tomato in Rabi 2016/17, the fruits were infested with pests. So, they had to throw the damaged ones. On one hand, good quality vegetables are categorized. On the other hand, it helps while weighing them to make up for the required weight.

In case of Koiladi village, both groups do not follow any grading and processing mechanisms to add value to the vegetables. They follow simple grading mechanism i.e. on the basis of size. However, one woman member makes snacks from onion and cabbage, and sells at market. According to her, rather than selling vegetable directly, selling snacks is more profitable. When she sells onion, the rate is Rs 10 per. When she makes onion snack (pyazi), she is able to make 100 pieces out of 1 kg of onion. One piece is sold at Rs 1, she gets Rs 100 for 1 kg of onion. Taking into account the cost of oil and other materials required to go with the snack, she estimates the profit of Rs 40/kg.

5.2 Dominated by small retail traders

Most of the vegetables produced in the study villages was handled either directly by farmers or by small retail traders. The situation was similar in both villages. Those retail traders also are not involved in any kind of value addition activities. The retail trader at local haat of Kanakpatti (Traffic Chowk) reported that he does not store the vegetables but tries to sell fresh on the day of purchase. However, not all the vegetables are sold in a day. Sometimes, from a quintal of vegetables, about 10-12 kg goes to waste. In case of Koiladi local haat also, the retail trader is not involved in any value addition activities.. She sells fresh vegetables. She does not farm anything. To go to Kunauli, India border, it takes her 3 hours. The cost to go to the border from Dalwa Chowk is Rs 20. She usually goes in the morning, 8 am. Sometimes her son helps after school or during holidays to go up to Kunauli.

Neither of the traders interviewed in Rajbiraj, Inaruwa and Biratnagar market reported any value addition specific activities. There are no processing alternative at the market.

6. Product flow and price fixation at different stages

[Start from intervention sites – local haat market – district market – regional market – at least 4 different market. Document all types of existing channels

6.1 Product flow from the production areas

[one figure depicting product flow will be inserted here]

Farm to market

In case of Kanakpatti village, farmers of group 1 and 2 mostly sell vegetables in weekly market normally referred as haat bazaar. One of the major weekly market is Traffic Chowk. It is 1.5 km from Kanakpatti village. There are other weekly market as well where the farmers sell. Kathauna, 4 km away. Rajbiraj is 10 km from Kanakpatti. But, in case of group 3, so far, they have only sold at Traffic Chowk. Once trader came to their farm to purchase eggplant from the field. They received Rs. 20 per kg. Following table gives details on 4 markets Kanakpatti farmers sell their vegetable produce.

Weekly Market Location	Distance from Kanakpatti (km)	Market Days
Traffic Chowk	1.5	Sunday and Wednesday
Kathauna	4	Monday and Tuesday
Rupni	3	Wednesday and Sunday
Rajbiraj ¹	10	Monday

In order to manage weekly market, the norm is that VDC opens tender to contract out market management work. In order to secure space at the market area, each seller is charged Rs.5- Rs.10. The rate is based on the number of vegetable baskets the sellers have. If the quantity is more which takes up more space, more money is charged. Apart from Kanakpatti farmers, vegetable sellers from nearby areas such as Rajbiraj, Durgapur, Birenbazaar sell at Traffic Chowk. They have to pay an amount of Rs. 10 as batti at the local weekly market. This is the amount every seller has to pay to the local contractor as renting the space at market area.

From Koiladi the product mainly flows to the weekly market (haat) at Koiladi that fall on Sunday and Wednesday. In Koiladi, vegetables are sold at local Koiladi haat/weekly market. Cereals are sold at Hanumannagar. Price farmers receive is higher at local haat. Trader as well as farmers come to the weekly market from nearby villages and some from India side.

Flow to retail level

¹ Rajbiraj has a bigger vegetable market in comparison to other three markets mentioned in the table. Besides the weekly market days, farmers sell produce on other weekdays as well.

The retail traders purchase from different market and sales at different markets. For example, Mr. Noor Miya of Kanakpatti sells at different market on different days. On Sundays, he sells at Kalyanpur, Saischar. He is able to make profit when there is less supply of vegetables in the market. This is usually when farmers do not bring vegetables in large quantity. Likewise the retail trader from Koiladi reported that normally she buys vegetables from Kunauli, a small border town of India. She sells in three Hatiyas: Koiladi, Barsain and Mansapur.

Weekly Market Location	Distance from Koiladi (km)	Market Days
Koiladi hatiya	1	Sunday and Wednesday
Barsain		Friday and Tuesday
Mansapur	3	Saturday

Flow to and from distric/regional level

Several retailers and wholesalers are involved in fresh vegetable business. These traders operate their business based at a fixed place in Rajbiraj town. Those traders purchase fresh vegetables from various regional markets and sometimes from the vegetable growers from nearby villages. The vegetable growers come to the Rajbiraj market and from there these traders buy vegetables. There is a big market at Inarwa bus stop. Farmers cannot produce more vegetables and so supplies from Bengal, Farwesgunj are brought. For example, Pointed Gourd from India are better for him as trader than local ones because Indian ones are durable.

6.2 Price fixation

In case of fresh vegetables, the price fixation mechanism seems not well structured. Even though normally the price of products determined based on overall supply and demand situation, it seems most often traders practice a kind of cartel. In general, farmers have less say in price fixation even though at the beginning they start with the price they would like to sale.

Farmers from Kanakpatti village reported that there is no formal mechanism to set the vegetable price at the market. As they go to the haat bazaar, the price at which fellow vegetable seller sell their items determines the price. Farmers analyze the vegetable supply, if the quantity for particular crop type is high, the likelihood of selling the crop at less price is more and vice-versa. Farmers decide on taking the produce to particular market depending on firstly when the *haat* day falls. Secondly, they base it on their analysis as to where they would get higher price for the crop they are planning to sell. Consequently, they informally analyze and switch. Farmers of group 1 and 2 in Kanakpatti say that first they fix the offer price of crops but eventually it is decided at the market itself. For information about price, sometimes, they receive it from traders at Rajbiraj. Like at group 1 and 2 from Kanakpatti, price of vegetables are not prefixed. Market decides the price by itself. The group tries to plant the crop early so that they can get good price for vegetables.

At the retail level also the retail traders have to depend on the prevailing prices at other markets. Vegetable rate is written in the big markets. The retail trader of Kanakpatti informed that he gets the idea of price from there. In local haat bazaar, usually farmers first set the offer price analyzing the price at which other farmers are making sales. But bargaining takes place and often the traders have upper hand. Retail trader from Koiladi says there is no formal arrangement for fixing vegetable prices. Vegetable farming is not done in village so much. So, she cannot procure it from Koiladi. Vegetables are supplied from Kunauli, Darbanga, Simrahi, Supal. Earlier she was not much aware about the price fixation mechanism. Now she has started knowing about the price and rate for vegetables and also about where to go and sell so that she receives maximum profit.

In Rajbiraj market, trader mentioned that price of vegetables is determined by other traders. Ladyfinger bought at Rs 20 is sold at RS 30. Large trader reported as for the rate of vegetable sale, he keeps 5% profit margin. Fixing the rate of vegetables also depends on the price at which he buys the supplies. There have not been any changes in his business as such over the years. Now he has started selling vegetable in more quantity than he used to some years back.

In case of regional market such as Inarwa, the rate of vegetables are determined by the price trader have purchased either from farmers or bigger traders. There are difference in local and hybrid vegetable rate. The cost of local bitter gourd for local was Rs 40 a kg while the cost for hybrid vegetable was Rs 30 per kg. Traders at Biratnagar reported that the price of the vegetable at what he sells depends on the availability and supply. Price of vegetables is uncertain and in case of fresh vegetables, there is chance of wastage. Price of vegetables goes up in festivals such as Dashain and Tihar.

6.3 Relationship between production and market actors

Result revealed that there is often absence of or limited dialogue between buyer and production actors. In case of fresh vegetables, the formal contracts are not in practice; and all relationships are based on mutual trust. We can still observed insufficient professionalism in terms of technical knowledge, production and processing, which eventually may not be favorable for the quantity and quality of production. Some of the government organizations have also been working for the promotion of commercial vegetable production. Various programs have been taking initiative for linking the farmers' groups/cooperatives to traders at different levels.

The actors involved in production and marketing have divergent interest areas. The production side actors are typically interested in access to capital (credit/ loans) and technical inputs, market assurances (price and quantity), and highest prices from the market actors. While, the market actors expect shared risks and inputs, quality and quantity assurances and market-led price fixing

from the production side actors. These divergent interest areas often result in conflict of interest and thus loss of trust. No strong vertical value chain for fresh vegetables was found in the study area. Only horizontal value chain was observed and the coordination among the value chain actors was found weak.

7. Constraints and roles of collectives

7.1 Constraints in value chain

Key constraints associated with fresh vegetables value chain are categorized into three groups.

Input suppliers

Input suppliers in Kanakpatti reported that farmers sometimes do not pay for purchases they make right away. A lot of sales end up being made on credit. He shares at present, the cooperative is on credit of Rs. 50,000. Normally, farmers pay back. If some farmers do not pay, does not make transactions on credit with such farmers again. Access to capital/credit to invest would help him expand the business.

Farmers tend to purchase in credit. This means the agro vet will have to wait out to get the money. Sometimes farmers ask for fertilizers that are no longer available, the ones that are banned. They advise farmers in such cases.

Farmers

Farmers in Kanakpatti complained that the production of vegetable is affected by pest Farmers have experienced pest problems especially in tomato and eggplant. This affects the quality of vegetables and lowers the price they get from the sale. Pest attack is a major issue pointed out by the group 3 in Kanakpatti as well. In order to resolve the issue, they often seek advice from agro vets as well as project officers.

Another constrains is the land level (Land up, low level, this affects irrigation). Their land is supposed to be levelled by ledger to balance it out.

Current practice of transporting vegetables to nearby weekly market is labour intensive. They do realize they get more money by selling at weekly bazaar themselves.

Fluctuation of vegetable price is another constraint. Sometimes they may receive less price for the vegetables.

In Koiladi also, the major problem is limited production of vegetables. These farmers farm paddy and wheat mostly. Vegetable is produced merely for self-consumption in the kitchen gardens. Thought of commercial vegetable farming did not cross their minds basically due to limited experience and skills. Limited capital resource prevented from investing in water infrastructure that to at landlord's land

The primary concern of farmers in Koiladi is that production of vegetables should be more. They are new to vegetable farming and have no idea on when to sow, when to irrigate, how to deal with pest issues and so on. So, they want to have technical knowledge in these regards so as to be proficient in vegetable farming.

Traders

Traders in most of the markets report that wastage of vegetables is the major problem. For example, traders in Rajbiraj market mentioned wastage as the major issue. There is no proper storage facility.

Lack of investment capacity seems another constraint. For example retail trader in Koiladi said that she would want more capital for investment. She does not purchase any vegetables from the farmer group. The retail trader of Kanakpatti buys vegetables in a bulk not in small quantity. The problem arises when he has to sell the remaining vegetable the next day. When vegetables are not fresh, he has to lower the price. Otherwise, he may not be able to clear all of them which has higher loss risk. Having more money to invest would help him expand his business. Also if he could buy more varieties of vegetables, he thinks he could sell more.

In most of the cases, market is not well managed. There is no market management committee that looks over the market area. There are vegetable waste thrown everywhere. Since the vegetable selling platforms are not concrete and there are no proper roofing, when it rains, leakages and water flow makes the market area even more unmanaged.

Traders in Inarwa market had also same concern, as they said there is no market committee at Inarwa. There is a committee named Ram Janaki Mandir Samiti, a temple committee. This committee bought land for market and made shutters for rental. Trader Bishnu Shah pays Rs 3000 a month for his shutter. 1 sack nikasi costs Rs 5. These shutters are in the whole sell market area. For the retail market space, he has to pay rent of Rs 15 to 20 a day.

In Biratnagar market there are no other problem than uncertainty brought by price fluctuation and wastage. According to the female retail trader, municipality charges them money but has not managed market well.

Sometimes traders and buyers make purchases on credit. There are no guarantees when credit will be debited.

7.2 Roles of collectives in value chain

In groups 1 and 2 of Kanakpatti, two modalities of collective is followed. This they do in two separate plots. For the pure collective, in both the groups, they share all the input, labour and output together. In case of part collective, they lease land together and share water infrastructure. Selling activity is done individually. Marketing of crops is also depended on the collective model both the groups are following. In case of pure collective, the crops produced such as paddy and wheat are divided among themselves for self-consumption. Hence there is no question on marketing the produce. While in case of part collective, they farm vegetables which are market individually. Farmers anticipate that if the production is high, there is possibility to collectively market the vegetables.

In Koiladi, group 1 and have the history of practicing pure as well as part collective models in 2 different agricultural seasons. In monsoon 2016, both groups followed pure collective model for paddy. They carried out all the activities together. As for the paddy yield is concerned, they divided it among themselves for self. Marketing was not done. For vegetable farming in Rabi 2016/17, both groups decided to switch to part collective. Though land was divided among each member for individual vegetable farming, activities such as land preparation, input: fertilizer and seed purchase and operating water infrastructure were done collectively. Farmer's collectively purchase seeds and fertilizers. Land preparation activity is also done together by hiring tractor. Irrigation equipment is shared and scheduled among the members However, marketing is done individually.

Input suppliers reported that intervention farmers from Kanakpatti buy seeds of lady finger, bitter gourd from this agro vet. They have started buying since 1 year. Usually purchases are made as a group. They are able to sell more when farmers buy in a group. They are willing and have given discount of Rs 1 to 2. This agrovets has direct link with the farmers on supplying the inputs as well as providing advice.

In case of Koiladi, input supplier revealed that selected member of groups (Shiv Kumar and Ram Mangal) come to the cooperative to buy fertilizers and seeds. The rate at which different items are sold are same in which other farmers buy them. However, purchase of larger quantity i.e, sack of 50 kg reduces 1 rupee per kg. He advises farmers in quantity of fertilizer to be applied for different crops. However, they do not listen to the advice. One reason behind this is farmers do not have awareness and belief on the quantity to be applied. Another reason is that farmers do not have money. Some farmers only take DAP not Urea as they cannot afford the other fertilizer.

Some of the traders revealed that they buy vegetables directly from farmers. For example, the wholesale trader of Rajbiraj market buys from farmers at Inarwa market. But, there is no difference in the rate of vegetables while buying from traders or farmers. Further, the trader in Inarwa market is not aware whether farmers produce vegetable in group or collective, he is aware that farmers sharecrop. Samim Ansari is a medium scale farmers who crops vegetables in 4 bigga land. His contact number is 9813939904. He mentions of a farmer group under Krishi Bikas Bank (Agriculture Development bank) in his area. There are 10 to 12 members in the group. The bank provides them assistance in seed, fertilizers and credit. He is able to produce cabbage in 75 days.

Vegetables are marketed by individual farmers not collectively.

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9. Annex 1. Value chain study - Checklist – Individual Farmers

To understand the background of the respondent and inform understanding of underlying mindset behind decisions	Name, gender, contact details, location	
	Years in farming, education level, family background, household size, other occupations, other roles in community	
	What do women do to contribute to household incomes? How much do you earn [per day] doing this?	
To understand priorities and objectives	Ownership - assets; leasing (Do you own land? How did you obtain it?)	
	Why do you farm? What is women's role in the [operation]?	
To understand current involvement in the value chain	What do you produce (main crops grown, area allocated)? How much in a season (production and marketable surplus)? How much income does this give you (by different crops in a year)?	
To understand internal value-adding activities	What is farming like for you nowadays?	
	Do you sell immediately after or harvest? Any storage?	

	Processing of the produce?	
	Efficiency - what are the processes involved?	
	maintenance of product quality	
To identify limitations to successful inclusion <i>*Data required for econometrics</i>	Main inputs/costs - fixed and variable costs	
	Financing - How do you raise cash when you need it?	
	Availability, quality and cost of inputs - Who do you purchase inputs from? Who purchases it? How do you negotiate?	
	Availability of labour - who does what?	
	Quantity and quality of crop - How do you consider quality of the crop you produce?	
	Selling and markets - who, how, why, prices - Who is responsible for selling? To whom?	
	Transport - who, how, packing, costs	
	Returns and profit	
	Policy and government	

	support	
	What is it like, doing farming with your input supplier/buyer/transporter?	
	Relationships - how well do they work together? Plan?	
	How much information do you get from others? How the information is shared and used? What information did you wish you could get? What stops you from accessing this?	
	Ability to influence and plan - How much input do you have in planning for the future? For the next season - do you prepare cropping calendar before the season?	
	How has this changed over time? (in reference to all farming and value chain questions?)	
To understand current constraints in value chains	What are the problems you face in producing and selling your product? (ensure to focus on inputs and markets)	
	What have you done to try to address these?	
To understand aspirations for inclusion in value chains	What would you like it to be like?	

To identify opportunities for improved inclusion in value chains	What would you fix first to make farming better for you?	
To understand the roles of collectives in production and marketing of produce	Do you farm collectively (input purchase, labor contribution, marketing)? What are the opportunities for the collectives to establish the linkages in the value chain?	

10. Annex 2. Value chain study - Checklist – Farmers’ Group

To understand the background of the respondent and inform understanding of underlying mindset behind decisions	Names, genders, contact details, location	
	Years in operation, composition of members, function	
	What are the contributions of women members?	
To understand priorities and objectives	Ownership - assets; leasing	
	Why was the group organised? Who initiated it? What is its main objective?	
	What are the conditions of being part of the group?	

To understand current involvement in the value chain	What is your main activity? How much production in a season? How much income does this give your group?	
To understand internal value-adding activities	How does the group operate?	
	Do you sell immediately after or harvest? Any storage? Processing of the produce?	
	Efficiency - what are the processes involved?	
	maintenance of product quality	
To identify limitations to successful inclusion <i>*Data required for econometrics</i>	Main inputs/costs - fixed and variable costs	
	financing	
	availability, quality and cost of inputs	
	Availability of labour - who does what?	
	quantity and quality of product	
	Selling and markets - who, how, why, prices	
	Transport - who, how, packing, costs	
	Returns and profit	
	Policy and government support	

	What is it like, doing farming with your input supplier/buyer/transporter?	
	Relationships - how well do they work together? Plan?	
	information - what information and how is it shared and used	
	ability to influence and plan	
	How has this changed over time? (in reference to all farming and value chain questions)	
To understand current constraints in value chains	What are the problems you face in producing and selling your product? (ensure to focus on inputs and markets)	
	What have you done to try to address these?	
To understand aspirations for inclusion in value chains	What would you like it to be like?	
To identify opportunities for improved inclusion in value chains	What would you fix first to make [function, i.e. farming] better for you?	

To understand the roles of collectives in production and marketing of produce	Do you farm collectively (input purchase, labor contribution, marketing)? What are the opportunities for the collectives to establish the linkages in the value chain?	

11. Annex 3. Value chain study - Checklist – Traders

To understand the background of the respondent and inform understanding of underlying mindset behind decisions	Name, gender, contact details, location	
	Years in operation, function	
To understand priorities and objectives	Ownership - assets; leasing	
	What is the history of the business? Who initiated it? What is its main objective?	
To understand current involvement in the value chain	Tell me about your business. What does it do? How?	
To understand internal value-adding activities	What is your annual turnover for [a specific product stream]? How much income do you generate from business?	
	Any storage? Processing of the produce?	
	Efficiency - what are the processes involved?	

	maintenance of product quality	
To identify limitations to successful inclusion <i>*Data required for econometrics</i>	Main inputs/costs - fixed and variable costs	
	financing	
	availability, quality and cost of inputs	
	quantity and quality of product	
	Buying, selling and markets - who, how, why, prices	
	Transport - who, how, packing, costs	
	Returns and profit	
	Policy and government support	
	What is it like, doing business with your input supplier/buyer/transporter?	
	Relationships - how well do they work together? Plan?	
	information - what information and how is it shared and used	

	ability to influence and plan	
	How has this changed over time? (in reference to all function and value chain questions)	
To understand current constraints in value chains	What are the problems you face in buying and selling your product?	
	What have you done to try to address these?	
To understand aspirations for inclusion in value chains	What would you like it to be like?	
To identify opportunities for improved inclusion in value chains	What would you fix first to make [function] better for you?	
To understand the roles of collectives in production and marketing of produce	Do you purchase from any collective groups? If so, what is the difference than buying from individual producers? Do you have any prior	

	contract with producers?	
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12. Annex 4. Value chain study - Checklist – Input Suppliers

To understand the background of the respondent and inform understanding of underlying mindset behind decisions	Name, gender, contact details, location	
	Years in operation, function	
To understand priorities and objectives	Ownership - assets; leasing	
	What is the history of the organisation? Who initiated it? What is its main objective?	
To understand current involvement in the value chain	Tell me about your business. What does it do? How?	
To understand internal value-adding activities	What is your annual turnover for [a specific product stream]? (turnover can be monetary or quantity)	
	Do you supply any storage related materials such as bin...	
	Efficiency - what are the processes involved?	
	any inputs that help maintain	

	product quality	
To identify limitations to successful inclusion <i>*Data required for econometrics</i>	Main inputs/costs - fixed and variable costs	
	financing	
	availability, quality and cost of inputs	
	quantity and quality of inputs	
	Buying, selling and markets - who, how, why, prices	
	Transport - who, how, costs	
	Returns and profit	
	Policy and government support	
	What is it like, doing business with your input supplier/buyer/transporter?	
	Relationships - how well do they work together? Plan?	
	information - what information and how is it shared and used	

	ability to influence and plan	
	How has this changed over time? (in reference to all function and value chain questions)	
To understand current constraints in value chains	What are the problems you face in buying and selling your inputs?	
	What have you done to try to address these?	
To understand aspirations for inclusion in value chains	What would you like it to be like?	
To identify opportunities for improved inclusion in value chains	What would you fix first to make [function] better for you?	
To understand the roles of collectives in production and marketing of produce	Have you supplied inputs to any collective groups? If so what is the difference than working with individual producers?	

13. Annex 5. Value chain study - Checklist – Service Providers

To understand the background of the respondent and inform understanding of underlying mindset behind decisions	Name, gender, contact details, location	
	Years in operation, function	
To understand priorities and objectives	Ownership - assets; leasing	
	What is the history of the business? Who initiated it? What is its main objective?	
To understand current involvement in the value chain	Tell me about your business and services. What does it do? How?	
To understand internal value-adding activities	What is your annual turnover for [a specific product stream]? (turnover can be monetary or quantity)	
	Efficiency - what are the processes involved?	
	maintenance of product	

	quality	
To identify limitations to successful inclusion <i>*Data required for econometrics</i>	Main inputs/costs - fixed and variable costs	
	financing	
	availability, quality and cost of inputs	
	quantity and quality of product	
	Buying, selling and markets - who, how, why, prices	
	Transport - who, how, packing, costs	
	Returns and profit	
	Policy and government support	
	What is it like, doing business with your input supplier/buyer/transporter?	
	Relationships - how well do they work together? Plan?	
	information - what information and how is it shared and used	
	ability to influence and plan	
	How has this changed over	

	time? (in reference to all function and value chain questions)	
To understand current constraints in value chains	What are the problems you face in buying and selling your product?	
	What have you done to try to address these?	
To understand aspirations for inclusion in value chains	What would you like it to be like?	
To identify opportunities for improved inclusion in value chains	What would you fix first to make [function] better for you?	
To understand the roles of collectives in production and marketing of produce	Have you worked with any collective groups? If so what is the difference than working with individual producers?	

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