

# Tomato Value Chain in East Singhbhum and Santhal Pargana—A Study

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*Favourable agro-climatic conditions, high market demand and proper crop management practices have led to the rapid growth of the tomato sector with various tomato clusters springing up in Jharkhand and the crop being grown all through the year*

Tomato, locally known as *Vilayti* or *Biloti*, has become one of the most popular vegetable crops among the farmers of Jharkhand. In some pockets of the state, the farming system has been organized around tomato cultivation; this rapidly growing sub-sector has begun to generate returns for farmers, who have come to rely on this crop completely for their cash income. Tomato cultivation is a labour-intensive activity and, therefore, provides an opportunity for poor households with surplus workforce to be engaged in income generation. Despite the rapid growth of this sub-sector in the state, the participation of the resource poor, and small and marginal farmers has been limited. This section of farmers has not benefitted greatly by the growth of tomato cultivation in the state.

Vikas Bazaar Net (VB.Net), a forum of development organizations engaged in the promotion of market-led livelihoods for the rural communities in Jharkhand, sponsored this study—An Analysis of the Tomato Value Chain—in East Singhbhum and Deoghar regions. VB.Net, along with other stakeholders, initiated the study, in order to understand the existing tomato value chain and to formulate an intervention strategy to include the poor. The objective of the study was to provide a comprehensive understanding of the entire value chain of the tomato sub-sector, identify the constraints and understand the tasks involved in developing a pro-farmer tomato value chain in East Singhbhum and Santhal Pargana regions of Jharkhand.

## **TOMATO VALUE CHAIN IN EAST SINGHBHUM**

Commercial tomato cultivation in East Singhbhum district is largely concentrated in Patamda block. The farming system in the area has been changing over the years, from a cereal-based system to a vegetable-based system. Vegetable cultivation for local consumption has been an old practice in the area but commercial vegetable farmers in Patamda have begun to grow a variety of vegetable crops such as

tomato, cucumber, cauliflower, cabbage, brinjal, chilli and other seasonal vegetables. In the other areas, vegetable cultivation continues to be mainly for local consumption.

### VALUE CHAIN ANALYSIS

The core processes involved in the tomato value chain in Patamda have been identified as:

- 1) Input provision
- 2) Cultivation
- 3) Collection
- 4) Trading
- 5) Consumption

The farmers in Patamda source their inputs from shops located at Patamda, Kattin, Barabazar, Burdwan and Bodam. Most of the farmers are required to pay upfront for the inputs. Some farmers, who have had a long-term relationship with the seed dealers, get inputs on credit. The tomato production

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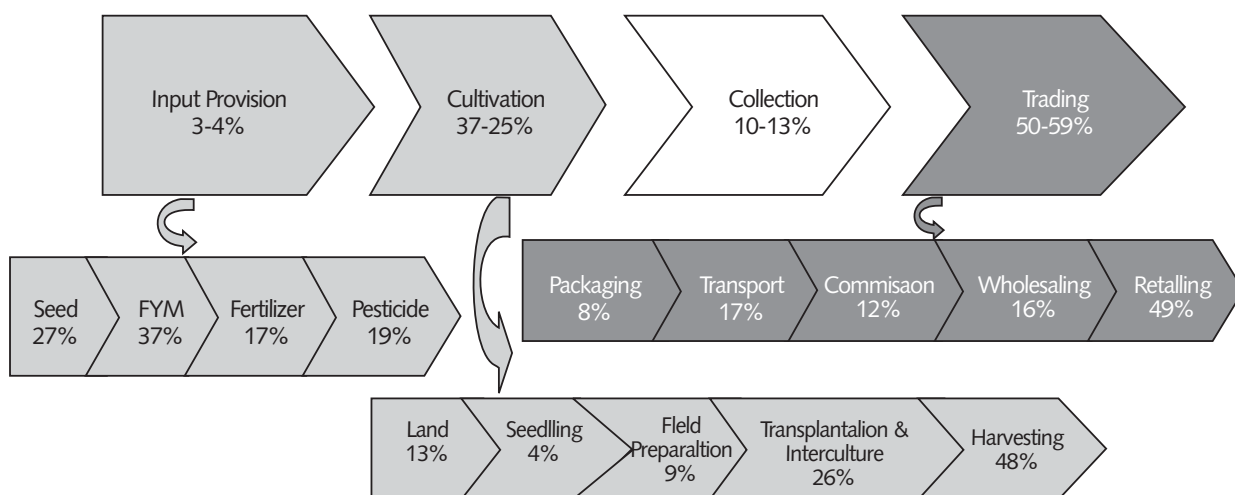
process in Patamda comprises six basic operations:

- a) Seedling preparation
- b) Field preparation
- c) Transplantation
- d) Inter-culture
- Maintenance activity (such as de-weeding, breaking the crust, earthing, applying fertilizer, spraying pesticide and irrigation)
- e) Harvesting
- f) Marketing

The following figure presents the share of the different processes in the consumer's price.

The first row of the diagram below represents the distribution pattern of the consumer price in tomato value chain processes. A large part of the consumer price (50-58 per cent) is retained by the trading process, followed by cultivation (25-37 per cent); collection (10-13 per cent) and input provision (3-4 per cent). The second row represents the cost

**DIAGRAM 1: Share of the different processes in the consumer's price in the Patamda area**



structure of the three main processes. In input provision, FYM accounts for 37 per cent of the cost, followed by seeds 27 per cent, pesticides 19 per cent and fertilizers 17 per cent. In the cultivation process, harvesting accounts for 48 per cent of the cost, followed by transplantation and inter-culture (26 per cent), rent (in case of leased land) or the opportunity cost for the land (13 per cent), field preparation (9 per cent) and seedling preparation (4 per cent). In trading, retailing accounts for 49 per cent, transportation 17 per cent, wholesaling 16 per cent, commission 12 per cent and packaging 6 per cent.

#### INPUT SUPPLY AND SUPPLY CHAIN

The forward and backward linkages for tomato cultivation at Patamda are well-developed. Tomatoes of the area pass through multiple channels and routes to reach the final consumer. There are different categories of intermediaries operating in the area, catering to different markets and segments of consumers. Some farmers despatch tomatoes directly to distant markets whereas others are dependent on wholesalers to market their produce. There are also retailers (bicycle vendors), who sell vegetables in Jamshedpur and other *haats*. There are six different marketing channels involved in tomato marketing in Patamda. Each of these marketing channels involves a different set of actors. Of these six marketing channels, the following three marketing channels are the dominant ones in the area and handle around 80 per cent of the tomatoes produced in area. The two most important processes in the tomato supply chain are collection and trading.

*Wholesalers and medium-sized input dealers also provide various pre-cultivation services related to the selection of variety, cultivation techniques, crop management practices, plant protection practices, etc., as an embedded service.*

The input supply network in the area is well-developed. Shops are located in Patamda, Kattin, Barabazar, Burdwan and Bodam (Barabazar and Burdwan are in Purulia district of West Bengal) and are the main centres for input supply. Usually, farmers procure inputs as and when they require them. Farmers in the area mostly use hybrid tomato seeds of Nunhems (5005), Pahuja (Ganesh),

Anapurna (Himalaya), Sygenta, etc. Of these varieties, 5005 and Ganesh are the most popular in the area. The cultivation of hybrid tomato was introduced in the area about 10–12 years ago and has been growing steadily. The compost that is required is either produced in-house or is sourced from dairies located in Jamshedpur. A network of input dealers supplies seeds, fertilizers, insecticides, pesticides, etc., to farmers. DAP, potash, urea, biozyme, pesticides, fungicide, etc., are the main items used for tomato cultivation. The farmers have also begun to use boron and calcium. The use of chemicals with a higher strength and a higher cost is increasing. Wholesalers and medium-sized input dealers also provide various pre-cultivation services related to the selection of variety, cultivation techniques, crop management practices, plant protection practices, etc., as an embedded service. They also provide inputs, specifically seeds, on credit to farmers, who have a good repayment record and loyalty. This network also organizes product demonstrations with the help of input manufacturers. Small and marginal farmers, however, receive very little support from this network. Most of the retailers do not have any technical training in plant protection measures and they try to prescribe solutions based on their own experience and guesswork.

### PRICE SPREAD ANALYSIS

There are two important value addition processes in the fresh tomato supply chain—collection and trading. The aggregators, or the collection agents, the traders, the commission agents, wholesalers and retailers all contribute to value addition. The profit margin or the price mark-up is the highest at the retailer level. This is due to low volumes, the risk of unsold produce and the high price uncertainty. The profit margin at the wholesaler and the commissioning agent level is 6 per cent. At this level, the risk is very low and the transaction volume is high. The highest risk in the entire tomato supply chain is faced by the trader. To offset this risk, he operates at comfortable margins. The risk at the collection level is low because it is a very short-term activity.

### IMPORTANT ACTORS AND THEIR INFLUENCE ON THE TOMATO VALUE CHAIN

The most important actors in the entire value chain are the input wholesalers, big traders and the commission agents. The input wholesaler influences the cultivation practices as well as the farmer's selection process of various inputs such as seeds, fertilizers and chemicals. The wholesaler generally provides seeds and chemicals on credit to retailers and big farmers. The important market actors are the village aggregator, the trader, the commission agent and the wholesaler. This channel uses relationship-marketing strategies for both procurement as well as selling of produce, and it interlocks the entire value chain. The responsibility of developing this relationship rests mainly on the commission agent, whose role appears to be the simplest but is, in fact, the most critical. The commission agent's activity includes the supply of credit to wholesalers and retailers,

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investment in godowns and storage facilities, investment in trade licenses, and determining the price in the market.

In the *mandi*, the commission agent is the most experienced person. He observes the market

trends through the year and because of this, his role in price determination is the most critical. He builds associations with a sizeable number of wholesalers and retailers, who can lift all the produce that comes to his *adhat*. He builds associations with traders and farmers, who supply the produce to the *mandi* regularly. He networks with the commission agents operating in other markets, to keep track of the market price and produce arrival. He sources the produce from other *mandis* or despatches it to other markets, depending upon the requirements of the market. The business of a commission agent completely depends on his ability to get a satisfactory price for both the sellers (farmers/traders) and the buyers (wholesalers/retailers). He has to perform in a way that both parties are satisfied and he is able to earn a substantial amount as commission. The most important stakeholder in the tomato value chain is the commission agent operating at a terminal market, where the entire system operates on information asymmetry. The local trader generally procures the produce on credit and makes the payment after selling it in the *mandi*. The traders' procurement price is generally Rs 3 per kg below the prevailing terminal *mandi* wholesale price.

### SWOT ANALYSIS

A SWOT (Strength, Weakness, Opportunity and Threat) analysis of the tomato value chain in Patamda area has been provided in the following table below:

### TOMATO VALUE CHAIN IN DEOGHAR

The commercial tomato production in Deoghar is mainly concentrated in and around the Sarwan block. Tomato is also cultivated in a few villages of the Sarath and Mohanpur blocks. A cluster of 52 villages in Sarwan block, situated on both the sides of the Ajay River, has developed as a vegetable growing cluster.

### VALUE CHAIN ANALYSIS

The core processes involved in the tomato value chain in Deoghar are:

- Input provision
- Cultivation
- Trading
- Consumption

The farmers in Sarwan purchase inputs from Sarwan and Deoghar. Most of the farmers are

**Table 1: A SWOT (Strength, Weakness, Opportunity and Threat) analysis of the tomato value chain in Patamda area**

	Pre-production	Production	Post-harvest (primary Processing-Storage)	Marketing
<b>Strength</b>	Favourable agro-climatic conditions. Well-established network of agri-input suppliers. Experienced farming community.	Large volumes of produce (around 1,00,000 MT annually). Progressive farmers aware of the latest production techniques/seed/fertilizer/ pesticide options. High yield.	Availability of seven post-harvesting centres in vegetable pockets.	Well-developed marketing network. Participation of local traders-producers in the marketing activity. Comparative advantage of location. Close to two big aggregation <i>mandis</i> —Balarampur and Jamshedpur. Substantial market size in eastern India.
<b>Weakness</b>	Limited access to land by the poor. Majority of the farmers in the area are illiterate. Lack of irrigation facilities. Lack of agri-extension support, soil testing facilities, etc. Cost of agri-inputs higher than MRP. Spurious seeds, fertilizers and pesticides. Difficulty in accessing credit and demand of up-front payment by input suppliers. Lack of a collective procurement mechanism.	Higher irrigation cost. Increasing input cost. High production risk in early season due to high plant mortality (wilt incidence). Lack of proper guidance on fertilizer, micro-nutrient, pesticide use. Lack of knowledge of the right agronomic practices for effective production. Lack of knowledge of effective pest and diseases management. Limited availability of mechanized farming tools and equipment. Situation of glut during January–February. Lack of information on production trends.	Lack of local value addition facilities such as sorting-grading, packaging, storage and processing. Lack of storage facilities that weaken the farmers' bargaining power. Lack of credit availability for the value chain actors. High rate of wastage in transportation due to a poor packaging system.	High seasonal price fluctuation. Deferred/delayed payments. Lack of an organized trading mechanism. High marketing costs. Strong network of traders who use relationship marketing strategies very effectively. Lack of access to markets for small farmers. Lack of transparency in the marketplace.

	Pre-production	Production	Post-harvest (Primary processing/ storage)	Marketing
<b>Opportunity</b>	Collective input procurement. Linkages with banks/MFI for crop loans.	Pooled irrigation with effective methods/ provision of electricity for irrigation. Better crop-rotation and inter-cropping practices. Use of bio-fertilizers, bio-pesticides and micro-nutrients for sustainable farming. Preparation of healthy and disease-free seedlings under controlled conditions. Staggered production through proper scheduling.		Huge unmet demand during the months of June through November. Increasing demand of processed products such as tomato paste, puree and ketchup in the domestic market. Collective marketing through producer groups. Development of an intermediate market at Patamda. ICT-enabled market intelligence system. Pre-production contract. Linkages with the organized retailers. Exploring new markets.
<b>Threat</b>		Over use of land and water resources. Degrading the eco-system with over-application of chemical fertilizers, pesticides, etc. Problem of mono-cropping		Increasing production in competing clusters.

required to pay up-front for the inputs. Only a few farmers, who have established a relationship over a period of time with seed dealers, get inputs on credit. The tomato production process in Sarwan is similar to Patamda. It comprises six basic operations: a) Seedling preparation b) Field preparation c) Transplantation d) Inter-culture/maintenance activity (such as de-weeding, crust breaking, earthing up, fertilizer application, pesticide spray, irrigation, etc.) e) Harvesting f) Marketing The same actor performs the collection and the trading activities. Farmers sell around 70 per cent of their produce

directly to wholesalers or retailers, with the help of a commission agent. The role of traders in collection and trading is very limited. The farmers do the sorting-grading and packaging on their own. Wholesalers and retailers sell the produce in terminal markets.

#### **TOMATO SUPPLY CHAIN**

The tomato supply chain in the Sarwan cluster is simple and the number of intermediaries is limited. There are five to six intermediaries operating in the area, who perform the task of primary aggregation and dispatch the tomatoes to distant markets. Usually, the big

farmers dispatch their produce to distant markets on their own. To benefit from the economies of scale, they share the transport vehicle and workforce cost with other farmers. The usual practice is that one person from a group of four to five farmers takes the responsibility for marketing and all the farmers share the cost of the person (which is around Rs 200 per day). Also, there are retailers (bicycle vendors), who sell vegetables in other nearby villages and *haats*, where the local production is not sufficient to meet the demand. The four prominent marketing channels involved in marketing tomatoes and other vegetables in the Sarwan area are:

- 1) Producer—Commission Agent  
Wholesaler—Retailer—Consumer
- 2) Producer—Village Trader (Aggregator)—  
Commission
- 3) Agent—Wholesaler—Retailer—Consumer
- 4) Producer—Village Trader (Aggregator)—  
Wholesaler—Retailer—Consumer
- 5) Producer—Retailer—Consumer

### SWOT ANALYSIS

A SWOT analysis of the Tomato Value Chain in Sarwan area is shown in the table below:

The tomato sub-sector in Jharkhand as a

whole and, specifically, in Eastern Singhbhum and Deoghar shows the following characteristics:

- a) Increased price of inputs—seeds, fertilizers and pesticides
- b) High degree of supply and price volatility
- c) Almost no preservation
- d) Storage and value addition
- e) Severe price competition among production clusters within the state and the local producers of other states
- f) High degree of uncertainty in productivity and profitability of the farmers
- g) Lack of information on market demand and the production statistics of other competing areas
- h) Long chain of intermediaries
- i) High marketing cost

### INCREASING PRODUCTION OF MARKETABLE PRODUCE

The volume of marketable tomatoes can be increased by improving the yield per acre of land and reducing the wastage along the chain. A low tomato yield is the outcome of improper use of fertilizers, plant protection measures and poor crop management and

TABLE 2: A SWOT (Strength, Weakness, Opportunity and Threat) analysis of the Tomato Value Chain in Sarwan area

	Pre-production	Production	Post-harvest (Primary Processing/Storage)	Marketing Strength
Favourable agro-climatic conditions. Well-established network of agri-input suppliers. Experienced farming community.	Progressive farmers aware of the latest production techniques/seed/fertilizer/pesticide options. High yield.		Located close to large consumption markets. Participation of producers in marketing activities. Producers' share in retail price is high.	



	Pre-production	Production	Post-harvest (Primary Processing/Storage)	Marketing Strength
<b>Weakness</b>	<p>Limited access to land by the poor.</p> <p>Majority of the farmers in the area are illiterate.</p> <p>Lack of irrigation facilities.</p> <p>Lack of agri-extension support, soil testing facility, etc.</p> <p>The cost of agri-inputs higher than MRP.</p> <p>Spurious seeds, fertilizers and pesticides.</p> <p>Difficulty in accessing credit and demand of up-front payment by input suppliers.</p> <p>Lack of collective procurement mechanisms.</p>	<p>Higher irrigation cost.</p> <p>Increasing input cost.</p> <p>High production risk in early season due to high plant mortality (wilt incidence).</p> <p>Lack of proper guidance on fertilizer, micro-nutrient and pesticide use.</p> <p>Lack of knowledge of the right agronomic practices for effective production.</p> <p>Lack of knowledge of effective pest and disease management.</p> <p>Limited availability of mechanized farming tools and equipment. Situation of glut during January–February.</p> <p>Lack of information on production trends.</p>	<p>Lack of local value addition facilities such as sorting-grading, packaging, storage and processing.</p> <p>Lack of storage facilities weaken the farmers' bargaining power.</p> <p>Lack of credit availability for value chain actors.</p> <p>High rate of wastage in transportation due to poor packaging systems.</p> <p>Under-developed local vegetable markets act as an entry barrier for small and marginal farmers.</p>	<p>High seasonal price fluctuation.</p> <p>Lack of organized trading mechanisms.</p> <p>Lack of access to markets for small farmers.</p> <p>Lack of transparency in the market place.</p>
<b>Opportunity</b>	<p>Collective input procurement.</p> <p>Linkages with banks/MFI for crop loans.</p>	<p>Pooled irrigation with effective methods.</p> <p>Provision of electricity for irrigation.</p> <p>Better crop-rotation and intercropping practices.</p> <p>Use of bio-fertilizers, bio-pesticides and micro-nutrients for sustainable farming.</p> <p>Preparation of healthy and disease-free seedlings under controlled conditions.</p> <p>Staggered production through proper scheduling.</p>	<p>Facilities for sorting-grading and short-term storage.</p> <p>Use of proper packaging material such as PVC crates.</p> <p>Value addition through primary and secondary processing.</p>	<p>Huge unmet demand from June through November.</p> <p>Increasing demand of processed products such as tomato paste, puree and ketchup in the domestic market.</p> <p>Collective marketing through producer groups.</p> <p>Development of intermediate markets at Sarwan.</p> <p>ICT-enabled market intelligence system.</p> <p>Pre-production contract.</p> <p>Linkages with organized retailers.</p> <p>Exploring new markets.</p>
<b>Threat</b>		<p>Over-use of land and water resources.</p> <p>Degrading the eco-system with over-application of chemical fertilizers, pesticides, etc.</p>		<p>Increasing production in competing clusters.</p>



agronomical practices. Awareness, knowledge and skills related to the recommended tomato crop management are very poor, specifically among small and marginal (tribal) farmers. The majority of the progressive tomato growers belong to the upper castes or the Mahto community.

The rate of technology extension and adoption is very slow, in the absence of institutional mechanisms, and farmers are working on a hit-and-trial basis. The balanced use of agri-inputs, combined with scientific crop management and agronomical practices, can result in doubling the per acre yield (from 12 MT per acre to 25 MT per acre. The highest yield observed in the area has been around 45–50 MT per acre. Considering the present annual production at 70,000 MT and the average price of Rs 3.5 per kg, the total value addition could be around Rs 20 crores per annum. The reduction in the supply chain wastage from the current 10–15 per cent to 5 per cent, by using sturdy packaging materials such as PVC crates or corrugated cartons (developed by IIM Ahmedabad for tomato packaging), could add a value of Rs 1 crore every year.

### **RISK MITIGATION AND OTHER OPPORTUNITIES**

Value addition opportunities also exist in risk mitigation and other areas such as household/cottage processing. The quantification of these activities will require more information and data. An analysis of the economics of the tomato value chain indicates that there exists a lot of potential for value creation and shifting for the benefit of small and marginal farmers through various interventions. The total value creation/shifting would be around Rs 33 crores, in the studied cluster.

### **SKILL DEVELOPMENT ON IMPROVED CULTIVATION PROCESS**

During the field survey, it was observed that the limited knowledge and information available to the farmers about the quality production of tomato is one of the critical constraints of the sub-sector. There is tremendous scope for improvement in growth, profitability and income opportunities for a large number of tomato farmers. This capacity development can be achieved through exchange and dissemination of information and knowledge to the sub-sector actors regarding:

- a) Improved cultivation techniques
- b) Integrated Crop Management Practice, including Integrated Nutrient Management (INM) and Integrated Pest Management (IPM)
- c) Benefits of soil testing
- d) Improved harvesting and post-harvesting techniques (including sorting-grading, packing and an arrangement for safe transportation)
- e) Quality seed production, preservation and use

### **VALUE ADDITION**

The local value addition to the produce can be helpful in enhancing revenue and profitability for a large number of farmers engaged in tomato cultivation. The following three forms of value addition are feasible in both the studied clusters:

- ♦ Primary sorting-grading and packaging at the village level
- ♦ Cluster-level storage for short durations (one to two days)
- ♦ Processing of tomatoes to make puree, paste, ketchup and sauce

### **BACKWARD AND FORWARD LINKAGES**

For sustainable growth of the tomato sub-sector in the study areas, it is important

to develop long-term strategic linkages with backward (seed, fertilizer, pesticide and knowledge inputs) and forward (trading, wholesaling, organized retailing) markets. This will help ensure access to quality inputs, reduce market/price risk and improve farmers' profitability. This can be done in the following ways:

- ♦ ICT-based market information systems for price, demand and supply situation.
- ♦ Bulk purchase of various inputs through

a collective forum of farmers or small traders.

- ♦ Knowledge and experience sharing among the farming community, through a farmers' newsletter and/or regular meetings and workshops. A group of progressive farmers, extension workers (NGO, government, KVK) and agriculture scientists (HARP, AVRDC, BAU) can lead the process.