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Value Chains Studies and their Contribution to Rural Livelihoods

GRETCHEN PHILLIPS

Exploring the questions that are typically addressed in a Value Chain Study and the approaches to conduct such a study, the article dwells on how these studies can be used to inform the engagement of livelihood practitioners.

In PRADAN's approach to livelihood engagement, once communities have been mobilized, we engage with them to understand their context, resources and assets base as well as their aspirations with respect to livelihoods. To complement these discussions, we also conduct local area studies, which help us understand the household and village contexts, and the local markets for goods and services, and help us generate potential livelihood options. A local area study, in combination with community engagement, enables our professionals to generate a comprehensive set of livelihood options for a given community, and understand which of these have the highest potential in contributing to improving lives and livelihoods.

Once these high potential livelihoods have been clarified, the next step is to conduct a Value Chain Study. In this article, we explore the questions that are typically addressed by a Value Chain Study, the approaches to conduct such a study and how these studies can be used to inform the engagement of livelihood practitioners.

WHAT IS A VALUE CHAIN STUDY?

A value chain is reflective of the complete range of activities required to produce and add value to a product or service, from its production through delivery to the final consumer. The details of value chains are all unique to their corresponding product or service but would typically include consideration of its conception/design, inputs, financing, production, packaging, transportation, marketing and distribution, as well as value addition at all stages. The objectives of a Value Chain Study may vary, depending on the context; however, in PRADAN's context, there are three things we typically hope to accomplish in conducting such an analysis.

- Build a robust, common fact base and perspective on the potential and the opportunities for a given value chain for PRADAN staff, the communities and the relevant value chain stakeholders.
- Engage communities and the relevant value chain stakeholders to set overall priorities for a given value chain.
- Ensure the best possible livelihood intervention outcomes in a given value chain for the community.

A value chain is reflective of the complete range of activities required to produce and add value to a product or service, from its production through delivery to the final consumer.

The objectives, along with the context, will shape both the questions that we seek to answer in conducting a Value Chain Study and how we conduct the study. Although the specific questions that a study seeks to address will vary, depending on the context and objectives, there are at least three critical issues that are important to address if one seeks to develop a robust perspective on the potential and opportunities related to a given value chain: market attractiveness, smallholder suitability, and opportunities and interventions.

CONDUCTING A VALUE CHAIN STUDY: LEARNING FROM THE FIELD

PRADAN has conducted Value Chain Studies across many sectors of its engagement over the past few years, including of vegetables (tomato, cabbage), fruits (mango), livestock (goats, poultry), and forest products (lac). The broad approach to conducting a Value Chain Study involves three distinct phases: planning the study, collecting and analyzing information, drafting the report and developing an action plan.

Within this broad approach, professionals who have engaged in past Value Chain Studies have identified several tips and lessons, which may be of use to colleagues who are embarking on new studies.

Team composition: Wherever possible, involve internal staff, community members or others, engaged in the value chain interventions to conduct the study (versus outsourcing it to a third party) because the study will help these people develop relationships with key sector stakeholders and gain an in-depth understanding of the industry.

End product: Have a vision of the end product and key analyses upfront. Otherwise, you may collect data and information that will not be used, or you may find that once you have completed your data collection and interviews, you have failed to gather the necessary information. Work plan: It takes a lot of time to analyze information and develop insights once you have it. Make sure you allow for sufficient time to analyze, discuss, debate and syndicate (both internally and externally) beyond your data collection, interviews and field visits.

Interviews: Remember to prioritize your questions for each interviewer, based on her/his experience and perspective. Even if you have 50 questions, which of these are the most critical, to which this person can contribute real insight? Also, be sure to give any interviewee sufficient context to engage, and be mindful of her/his interest and biases as she/he shares information and data.

Data collection and analysis: Don't be afraid to estimate. If you are having trouble getting

data after sufficient research, chances are it is not available. So use your judgement to come up with a realistic approach to develop an estimate.

Interventions: Similar to our engagement with the community, value chain development is a long-term engagement. As you identify and prioritize interventions, try wherever possible to sequence them so that the team can focus on successfully implementing the highest potential priorities rather than trying to do all the things at once (which risks doing none of them well).

Gender issues: Given PRADAN's focus on women, it is important to explore gender roles and dynamics at different stages of the value chain. Are there specific segments of the value chain in which women are more or less engaged? Why? What are the implications of the different interventions for women? Are there ways to increase the benefits to women?

Value Chain Studies are only useful to the extent that their findings can be implemented for the benefit of our communities. It is, therefore, important that the study addresses the relevant questions or concerns of both the team and the community.

HOW CAN VALUE CHAIN STUDIES HELP INFORM OUR WORK ON RURAL LIVELIHOODS?

At the end of the day, in a PRADAN context, Value Chain Studies are only useful to the extent that their findings can be implemented for the benefit of our communities. It is, therefore, important that the study addresses the relevant questions or concerns of both the team and the community. The studies should be conducted in a manner that brings the team, the community and the relevant stakeholders together as part of the process so that once it is complete, it is possible to move forward. Done properly, the study should provide a map for a specific livelihood engagement over time—providing clear direction on the key issues of market attractiveness, the ability of communities to compete, and the corresponding intervention priorities and action plans over time.

The author gratefully acknowledges inputs and insights of the many PRADAN professionals engaged in Value Chain Studies and interventions, and the comments and feedback from Anif Khan, Ashok Kumar, D. Narendranath, Lutfur Rahman and Venu Aggarwal.

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

SUNIL KUMAR SINGH

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 Singbhum 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.

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

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 process in Patamda comprises six basic operations:

a) Seedling preparation
b) Field preparation
c) Transplantation
d) Inter-culture

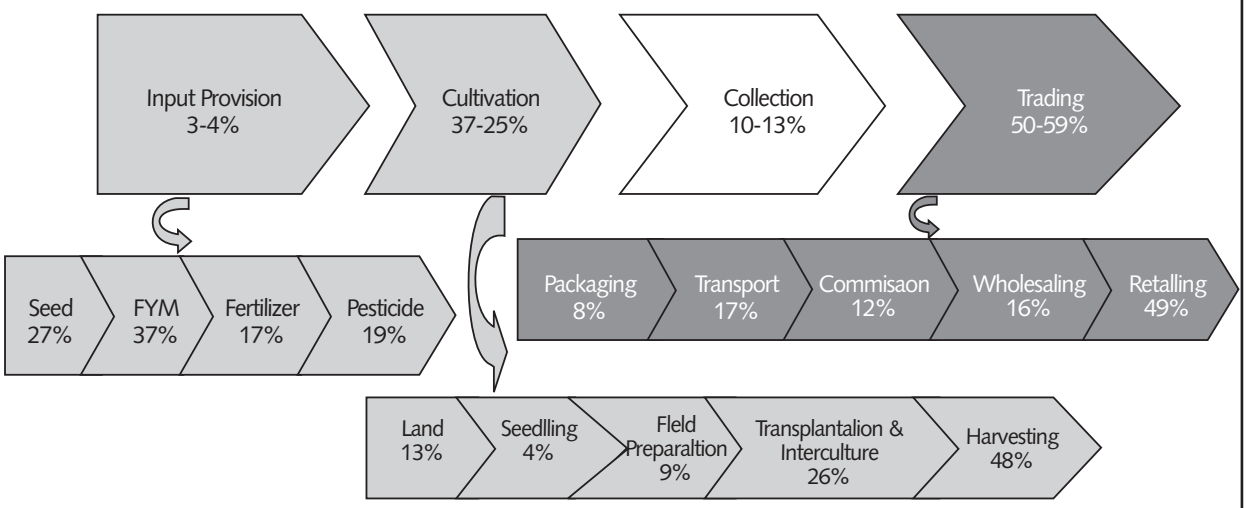
Maintenance activity (such as de-weeding, breaking the crust, earthing, applying fertilizer, spraying pesticide and irrigation)

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.

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.

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.

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.

The most important actors in the entire value chain are the input wholesalers, big traders and the commission agents.

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, 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:

a) Input provision
b) Cultivation
c) Trading
d) 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
Strength	Favourable agro-climatic conditions. Well-established network of agri-input suppliers. Experienced farming community.	Large volumes of produce (around 1,00,000 MT annualy. 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 *mandis*—Balarampur and Jamshedpur. Substantial market size in eastern India.
Weakness	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
Opportunity	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.
Threat		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
Weakness	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 facility, etc. The 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 collective procurement mechanisms.	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 and pesticide use. Lack of knowledge of the right agronomic practices for effective production. Lack of knowledge of effective pest and disease 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 weaken the farmers' bargaining power. Lack of credit availability for value chain actors. High rate of wastage in transportation due to poor packaging systems. Under-developed local vegetable markets act as an entry barrier for small and marginal farmers.	High seasonal price fluctuation. Lack of organized trading mechanisms. Lack of access to markets for small farmers. Lack of transparency in the market place.
Opportunity	Collective input procurement. Linkages with banks/MFI for crop loans.	Pooled irrigation with effective methods. Provision of electricity for irrigation. Better crop-rotation and intercropping 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.	Facilities for sorting-grading and short-term storage. Use of proper packaging material such as PVC crates. Value addition through primary and secondary processing.	Huge unmet demand form 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 intermediate markets at Sarwan. ICT-enabled market intelligence system. Pre-production contract. Linkages with organized retailers. Exploring new markets.
Threat		Over-use of land and water resources. Degrading the eco-system with over-application of chemical fertilizers, pesticides, etc.		Increasing production in competing clusters.

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.

Agricultural Production Clusters

RAHUL KUMAR, DEBANJAN GHATAK AND
SYED REHMAN, WITH GRETCHEN PHILLIPS

Well-developed mutual aid and support groups of poor people can be the building blocks of large-scale social mobilization, leading to a change in the self-belief and identity of an entire community of people.

BACKGROUND AND RATIONALE

Since the country's independence in 1947, India has made great strides in agricultural development. Cereal production has more than quadrupled and the country has attained self-sufficiency in food grains production. These gains, however, have not been uniform across the country. Whereas irrigated plains and deltas have developed, the largely rain-fed, undulating, hilly and mountainous regions have lagged far behind. Farm productivity in these regions remains very low and farming a highly uncertain enterprise. In the rain-fed regions of central India, almost three-fourths of the population derives its livelihood from the farm sector. Not surprisingly, these regions face extreme poverty and have become hot spots for civic strife, led largely by violent leftist movements. Rapid agricultural development is thus imperative to remove mass poverty, spread the fruit of development equitably, reduce social strife, spur sustained economic growth and secure ecological stability.

Fortuitously, investments to develop these rain-fed regions have high economic returns because these areas have had little prior investment and there has been little or no capital formation; many, indeed, would argue that overall there has been capital erosion. The interventions required to develop rain-fed regions are highly labour intensive and, therefore, will also provide much-needed employment on a large scale and in the short run.

Irrigation has been the prime mover of agricultural growth in the plains, combined with new, input-responsive crop varieties—the so-called Green Revolution 'package'. Rain-fed regions are not endowed with significant and widespread irrigation potential. Thus, agricultural development in these regions calls for a fundamentally different approach that intertwines resource husbandry into the production system, rather than looking at it as an input-to-output transformation process. Given the scale and concentration of poverty in this area and its impact

on national food security and ecological stability, it is imperative to have a focused national effort to develop agriculture.

PRADAN introduced the concept of Agricultural Production Cluster (APC) with the objective of bringing together 3,000 to 4,000 families for intensive farming. This method of farming will form a crucial component in establishing sustainable linkages with the market, and the farmers will be able to, in the long run, access these markets even without the support of PRADAN. The APC also focuses on developing input linkages; eventually, these clusters will become a hub in which all services, ranging from cold storage, processing industry, credit facility, input supply and market, will be available for the farmers in close proximity.

GOAL

In a period of four years, from April 2009 to March 2013, PRADAN will assist 70,000 rural families from Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan and West Bengal, to become involved in sustainable farm-based livelihoods. PRADAN plans to enhance family incomes by 75-100 per cent, that is, by Rs 12,000-15, 000 per annum. Simultaneously, an additional 50,000 families will participate in various interventions under this project and will be at different stages on the path of sustainability, enhancing their incomes by 100 per cent.

In the process of implementing this project, PRADAN will develop and fine-tune community based institutional models for scaling up, and will introduce new extension methodologies, using ICT and knowledge building and sharing, with national and global perspectives.

WHAT IS AN APC?

APC is a concentration of producers, agri-business players and institutions from the same sector. It addresses challenges that are common among producers and provides opportunities for growth for them and other stakeholders. An APC promotes inter-firm cooperation, provides efficient channelling of public support and increases competitiveness among stakeholders.

Considering the problems poor people face to harness the potential of farm-based livelihoods, a multi-pronged strategy is needed to achieve this goal. Broadly, the issues that need to be addressed are:

- Stimulating confidence among poor people in their own abilities
- Helping them realize the potential of their farmland by jointly developing and implementing viable micro-level plans to enhance its carrying capacity and productivity,
- Leveraging finances to implement plans
- Building skills of project families, to realize the potential of farm-based livelihoods
- Fostering linkages with markets

STAGE I: SOCIAL MOBILIZATION

Large-scale mobilization has always been known to change the self-perception of the poor and oppressed communities. Whereas social and political movements have historically been the harbinger of such mobilization, there is evidence from the grass roots initiatives now (including from PRADAN's projects) that a systematic process

of working with small groups for mutual help around existential issues such as access to credit in emergencies can also lead to significant social mobilization. Experience suggests that well-developed mutual aid and support groups of poor people can be the building blocks of large-scale social mobilization, leading to a change in the self-belief and identity of an entire community of people. Keeping this perspective in mind, PRADAN organizes the most vulnerable among the poor, that is, women from poor families, into small (10 to 20 members), self-selected Self Help Groups (SHGs) with small savings and credit as the initial purpose. As these groups stabilize, cluster associations and federations of SHGs are formed and nurtured, in close geographic proximity. A larger coalition enables the women to tackle issues of identity and roles—as women and as poor people. The SHGs take up social issues affecting members such as domestic violence and poor public services in numerous cases in the project.

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The unusual experience of working outside their traditional domains, solving their own problems without beseeching others for small needs, working with similarly placed others and the assurance of mutual support, develops confidence and keenness among women to work towards changing their lives in concrete ways. Envisioning, planning, experimenting, taking risks, challenging and making demands become possible. This forms the platform for the next stage when women with their families will make livelihood plans, access finances from banks and government programmes, and manage market linkages. Simultaneously, unknown to the women, a grass roots social infrastructure is created, as a base to launch a fast-paced and large-scale development programme.

STAGE II: PLANNING

At this stage, PRADAN helps group members and their families develop concrete plans to improve their livelihoods, taking their assets and endowments into account. Because almost all members own land, the primary focus is one of enhancing its carrying capacity and productivity. An Integrated Natural Resource Management (INRM) plan is prepared for the entire hamlet. It typically includes resource-enhancing measures such as decentralized rainwater harvesting; resource-development measures such as wells and other means of irrigation; productivity enhancing plans such as induction of better farming technique; intensive cultivation of market-oriented crops such as vegetables; and measures that serve all three purposes such as diversification of land use into tree crops, soil enrichment, composting, etc.

STAGE III: IMPLEMENTATION

The process of planning and its subsequent implementation is done in a manner that the SHG members and their families take responsibility and ownership. Skills and knowledge are imparted to them so that they do not depend on PRADAN for long. The PRADAN staff work with the SHGs to make micro-plans and set norms and systems to implement them. Developed jointly, these norms set priorities, sequence the activities,

cost and responsibility sharing, setting up of the project management mechanism, etc. Typically, productivity enhancement activities for existing crops are implemented right away, using modern techniques.

The process of planning and its subsequent implementation is done in a manner that the SHG members and their families take responsibility and ownership.

The SHGs are assisted by PRADAN to access bank loans and government grants, to implement the various components of the micro-plans. Bank loans are always given directly to the SHGs. In the case of government grants as well, PRADAN negotiates with the government to provide funds directly to the SHGs or other people's organizations. PRADAN staff assists groups to implement plans and maintain books of accounts, which are audited by government officials, in the case of government-funded projects. The SHG/hamlet chooses one of its members to help implement INRM activities and PRADAN then trains him/her as a 'community resource person' (CRP). The CRPs are trained as village extension workers, to help farmers adopt modern farming techniques, and are hosted in community organizations (SHGs, SHG clusters, producers, collectives, etc.). They provide services to the farmers and are accountable to and paid by their collectives for services at mutually agreed rates. Initially, PRADAN subsidizes the cost.

The project also prepares the ground for scaling-up. This entails developing knowledge systems for scaling-up and piloting the idea of building effective partnerships with like-minded organizations to use and adapt systems, methodology and processes developed by PRADAN for poverty elimination in selected poverty pockets of the country.

DEVELOPING KNOWLEDGE SYSTEMS

1. Building know-how and tool kits

- Documenting the knowledge and know-how generated from this project, for example, concept guides, manuals, case studies and training modules for staff and community persons.
- Developing ICT-based, effective agriculture extension methodologies, including the use of audio-video devices, community radio, GIS and weather information usage.
- Developing ICT based-monitoring and evaluation systems that stimulate learning by staff, capture project progress and help measure results on the ground.
- Developing human process tool-kits for standardization and wider replication of human process interventions, as developed by PRADAN.

INFLUENCING THE POLICY ENVIRONMENT IN INDIA

Stakeholder meets (workshops with government personnel, other practitioners and researchers) are organized, to discuss the lessons learned from the project and establish linkages with the media to disseminate project experience.

ENABLING THE USE OF PROJECT LEARNING IN OTHER POVERTY REGIONS, ESPECIALLY IN AFRICA:

- Engaging with civil society practitioners working in other poverty regions. This could be in the form of exchange visits, staff exchange programmes, training events, etc.

- Engaging with donors and multilateral agencies to help contextualize the learning of this project to the programmes and interventions in other poverty zones of the world.
- Engaging with international research studies, to test the efficacy of this approach in poverty elimination.

The key expected outputs are:

- Eight thousand five hundred SHGs of about 1,20,000 women, their cluster associations and federations.
- Comprehensive micro-plans for INRM in 1,500 habitats (hamlets/villages).
- Rs 450 million mobilized to implement plans.
- INRM plan implemented in 40,000 ha of land.
- Six thousand hectares of irrigation potential created through decentralized micro-projects.
- All project participations have annual agricultural plans.
- Twenty-two thousand five hundred hectares of land owned by poor families brought under intensive farming.
- One thousand four hundred CRPs trained and serving the community to achieve the goals of this project.
- Five production and marketing clusters developed.
- Fifteen thousand families engaged in co-ordinated intensive, market-oriented production.
- Five PCs set up for input-output linkages to farmers.
- Linkages initiated between retail chains and PCs as suppliers.
- Seventy thousand project families achieve food sufficiency and surplus of at least Rs 7,000 per annum.
- Five thousand additional families attain the above-mentioned goals by way of support provided to other development organizations under piloting 'non-direct' engagement strategy approach.

The beginning of the 21st century has seen large-scale modification in the agricultural pattern of the world. There have been many innovations, and constant technological up-gradation is taking place all around the world. There has been growth in demand for quality products that has led to high-scale production as well as innovations in retail and packaging. Agricultural needs have grown manifold and this has become a potential tool for the formation of an agriculture cluster.

APC IN GUMLA

Agriculture is the primary source of livelihood for 80 per cent of the families in Gumla. Although the outcomes are currently poor, the potential for agriculture is high, with the ability to ensure not only food security but also an average annual income of Rs 70,000 for families. The existing conditions are promising.

An average family has:

- **Land:** One hectare of land, with irrigation support for up to 30 per cent of the land; Highly suitable for vegetable cultivation
- **Bullocks:** Two to three for agricultural use
- **Labour:** Two or three, unskilled in agriculture
- **Credit:** The SHG is the source for credits, some have access to banks
- **Practices:** Traditional systems of farming with limited use of pesticides and fertilizers
- **Markets:** Deficit regional markets for fresh vegetables
- **Mindset:** Farmers show interest in agriculture as a source of livelihood, with a steady increase in the number of

families shifting from subsistence to cash crops such as vegetables.

Training programmes were also conducted for all the 600 farmers in the APC, in nursery growing, transplantation, wire staking, disease and pest management, and post-harvest technology.

STRATEGIES TO ACHIEVE THE OBJECTIVES OF THE APC IN GUMLA

The team has identified three blocks, namely, Ghaghara, Palkot and Raidih, to anchor the production cluster with an expected outreach of around 3,000 farmers by 2012 and 15,000 farmers by 2015. These areas have been selected, based on farmers' request, availability of resources and the pro-active stance of farmers in adopting new technologies. For each of these areas, a three-year strategy, based on the context and key bottlenecks, has been developed. The key intervention priorities that emerge across APC areas include the following elements.

STAGE I. SOCIAL MOBILIZATION

Social mobilization began with a vision building exercise for the farmers. Concept sharing meetings were organized in all the selected villages by March 2010. The farmers were given exposure to nearby production clusters of Pithoria and Patamda (both in Ranchi). The farmers were also given an exposure to regional markets, to make them understand demand, supply, volumes and the nature of transactions taking place at various *mandis*. The farmers were taken to the Ranchi, Rourkela, Jamshedpur, Ambikapur, Patna (Mithapur) and Durgapur *mandis* for exposure. Some community service providers (CSPs) from each village were trained and sent to various *mandis*, to help them develop entrepreneurial skills.

STAGE II. PLANNING

A large amount of time has been invested in planning, implementing and reviewing of the APC work, both at the team level as well as in the field. Table 1 gives an overview of the planning in the first year of the APC.

STAGE III. IMPLEMENTATION

During the *kharif* planning, a hamlet-level meeting of about 25 families was organized to discuss investments, inputs, the systems for input purchasing, land preparation and the date of planning the common nursery. The team organized a common 'Net House' in the village, where all the farmers would have their own small nursery beds. All the nursery beds would be covered with a net to protect the young seedlings from heavy rain, insects, pests, etc. It was also an opportunity for the farmers to learn from their peer groups.

All the APC farmers in Gumla worked on their nurseries on the same day in two phases (the 1st and 15th of June 2010). This led to transplanting on the same day and, hence, the produce also came in bulk, which helped its aggregation for marketing. Apart from the production advantage, this system helped the farmers recognize the right time for planting the kharif tomato and cabbage.

MARKET STRATEGY IMPLEMENTATION

During the planning stage, the Gumla team had decided to develop village-level entrepreneurs to do the marketing for the APC farmers. One person from among 25–30 farmers was selected, based on criteria such as literacy level, honesty and the willingness to work hard to market the APC products. A stock centre was established in each of the 20 villages where the produce would be sorted, graded and cleaned for sale.

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The selected entrepreneur will arrange a vehicle to carry the produce to the market for sale. He then distributes the farmers' share after accounting for the cost. In this marketing system, the entrepreneur plays a major role in the marketing arrangements, in decision-making for the selection of the *mandi* (based on the prices in the different mandis), and in selling the produce at the highest rate. He also deals with the people involved at every stage (vehicle owner, commission agents of the mandi, the Mandi Committee, the labour for loading and unloading, etc.). It was decided that for this entire work he would get a commission of seven per cent of the total sale value, which comes to approximately Rs 500/2 MT of the produce sold. It was expected that at least 50 MT of the produce would be sold from a village; so the entrepreneur would earn Rs 10,000–15,000 per season.

Table 1: Planning at Various Levels–Team-level planning

No.	Planning	Rationale
1.	A workshop with the Gumla team	To understand the present agriculture development approaches and whether there is a need for an APC in Gumla.
2.	Area and family selection planning	Setting up the criteria to assess with whom we need to promote vegetable production and in which villages of the Gumla district.
3.	Crop selection planning	To figure out the most profitable, small-holder/climatically suitable crops.
4.	Marketing strategy planning	To look at the best possible market interventions, the possible *mandi* to start with building linkages.
5.	*Kharif* intervention planning	To choose the best possible intervention for triggering production and finalize the implementing strategy.
6.	Monthly reviewing and planning	Month-wise progress of the APC and discussion on issues.
7.	*Kharif* review and planning meeting.	To be held at the end of the season, to know what worked well and what did not in the entire season.

Table 2: Planning at Various Levels–Farmer-level planning

No.	Planning	Rationale
1.	The APC concept sharing	To identify the need for an APC, farmer vision building.
2.	The APC kharif planning	To make land selection, input arrangement, investment layout, timeline of activities such as nursery, transplanting, etc.
3.	Kharif marketing planning	To discuss farmers' perspectives on marketing and also explore the possible marketing channels.
4.	Monthly activity planning	To help farmers understand that activities need to be carried out according to a timeline.

PRODUCTION

To ensure smooth flow of production in the region, the team will focus on land treatment and land utilization in the most efficient manner. The focus will also be on growing crops that are both profitable, sustainable and cater to the local, regional and national market demands. The production will be increased in priority crops through the adoption of technology and optimal Package of Practices (POP).

The focus is on strengthening market linkages, to ensure timely availability of inputs, reduce cost overtime and secure optimal price realization by improving the quality through sorting/ grading and packaging.

MARKET LINKAGES

The team will focus on strengthening market linkages, to ensure timely availability of inputs, reduce cost overtime and secure optimal price realization by improving the quality through sorting/grading and packaging. The team has built certain linkages but they are not yet enough to cater to the needs of the farmers. It is also exploring regional *mandis* to strengthen the linkages. Building local entrepreneurs for establishing market linkages will also be on the agenda of the team.

ENABLERS

In order to attain the objectives of the programme, the team will work on building farmers' capabilites and perspectives in production and marketing. Training in production technology and motivation for taking up vegetable production as a business is being imparted to the farmers. The team also needs to ensure that farmers have access to the credit they require to invest. Farmers need help to develop community institutions required to support a market-oriented agriculture. PRADAN is also motivating the community to build roads and other infrastructure required to access markets, and is ensuring that the interventions do not increase the farmers' risk beyond their capacity to take it. All interventions need to be sustainable and ensure that agriculture is well integrated with other forms of livelihood.

However, there are a number of factors which affect the productivity and profitability of agriculture in the region. These are:

- **Production:** Even after such an intensive intervention in the region, the focus of the farmers is on subsistence crops such as paddy. Large tracts of land are untreated; this reduces the productivity of the land during the non-monsoon seasons and, hence, vegetable, are grown only during the *kharif* season. Uneven rainfall affects the productivity of the crop.
- **Market Access:** The farmers in the region are not organized; they are, therefore, unable to access regulated markets, resulting in more price volatility and losses to the farmers. Inaccessibility to regulated markets leads to a glut in the local market, which then affects the price of the crop and leads to a loss for the farmers.

DIFFERENCE BETWEEN THE APC APPROACH AND THE TRADITIONAL AGRICULTURE APPROACH

The desired end-state of the APC is not necessarily different from the normal agriculture activities; however, in the APC, there is a holistic approach—not only for agricultural production but also for all the elements of the desired end-state—that includes market linkages, infrastructure,

know-how (human capital) and sustainability of resources.

Some specific elements upon which the APC is focusing on and which were not as much in focus in the traditional agriculture activities include:

- Growing one or two vegetables each season, based on the regional market demand, yield, farmers' expertise/ confidence, competitiveness, agro-climatic suitability, to lead to a sustainable vegetable cluster.
- Reducing the risk through promoting crops or one crop that is highly remunerative.
- Using an area approach, with consideration of family resources, to make a sustainable vegetable cluster (For example: Nasik, Pithoria, etc.).
- Developing backward and forward linkages around potential vegetable clusters.

IMPACT ON YIELD

Despite very low rainfall, the farmers were able to draw a production of 2.5 kilos of saleable yield per plant in the tomato crop. The low rainfall caused problems during inter-culture operations, which adversely affected crop growth. Cauliflower farming was done for the first time in the cluster and the results were encouraging. The selection of the variety was done on a trial basis. Namdhari 60 and 131 are found to be the good varieties for early *rabi*. GS-10 has been found to be a good variety with uniformly filled pod, bearing 10 uniform, healthy seeds per pod. The fruits are very attractive in colour as well as in size. This variety will be used in the next season as well.

Table 3: Impact–Yield and Income Data from Kharif 2010

Crop	Area (Acre)	Germination %	Survival in Main Field %	Production (MT)	Yield (MT/ha)
Tomato	86.4	75	80	750	22
Cabbage	57	60	90	132	7.5
Cauliflower	65	80	80	520	20
Peas	40	75	85	142	10

Table 4: Income Data (Based on Sample Data taken for 30% farmers)

Crop	Net Family	Investment Family (Rs)	Total Investment Family	Average Income (Rs)	Total Income (Rs)
Tomato	576	1,400	8,06,400	8,871	45,77,436
Cabbage	576	500	2,88,000	3,895	17,25,485
Cauliflower	416	600	2,49,600	4,226	17,58,016
Field Peas	428	900	3,85,200	6,653	28,47,484
Total			17,29,200		1,09,08,421

IMPACT ON LINKAGES

A fund of two crore rupees has been mobilized from the District Rural Development Agency (DRDA), Gumla, for 36 lift irrigation schemes in the APC area. Along with these, 11 grading and sorting centres have been sanctioned in these three clusters. The DRDA has provided 11,000 plastic crates for vegetable storage and transportation. Linkages with external stakeholders such as transport agents, commission agents of the vegetable *mandis*, and seed shops have become more vibrant now. Linkages with the banks have been established and almost 50 per cent of the farmers are accessing KCC loan from the leading banks such as the Punjab National Bank and the Bank of India. Crop demonstration has been organized on a cluster basis so that the farmers are able to aggregate the produce. The marketing was very smooth due to collective action. In the aggregated system of marketing, farmers are able to get a consolidated amount just after the sale of the produce, which is very encouraging for them.

IMPACT ON PRODUCTION METHODOLOGY AND MINDSET

In most of the uplands and medium uplands, the cropping intensity has almost doubled now. After growing tomato in the uplands, the farmers now take on another crop of field peas or cauliflower. In addition, the area under vegetable cultivation has increased from 15 decimals to 30 decimals in the *kharif* season. The farmers now grow tomato in almost 20–25 decimals of land, instead of the earlier 15 decimals.

Of the 600 farmers in the first year, 30 farmers did not have their own land and had leased-in the land from the other farmers in the same village. In the second year, the number of farmers who had leased-in land for vegetables is higher. Almost 20–25 decimals of land are leased-in by each farmer. Approximately five per cent of the farmers are landless but still cultivating vegetables.

The interest level/engagements/investments are quite high. In a year, the investment in vegetables is almost Rs 7,000, which is much higher to the farmers' earlier investments. However, the returns are also two to three times higher than their earlier annual returns. The APC is a profitable experiment, which is why landless farmers are also leasing-in land for vegetable farming.

IMPACT ON INFRASTRUCTURE

Three power tillers worth Rs 3,60,000 have been purchased in three villages. Five water lifting devices worth Rs 50,000 have been purchased, and net houses have been created in 52 villages with the farmers' own contributions.

VIBRANT ENTREPRENEUR MODEL AROUND AGRICULTURE—INPUT AND OUTPUT LINKAGES

Entrepreneurs have been selected based on criteria such as interest in business, age, present occupation and education. These entrepreneurs have been engaged in developing linkages with regional *mandis* and existing production clusters through training and exposure. Entrepreneurs have been engaged in procuring input supply for the farmers in bulk. They are also responsible for the sale of the farmers' produce in the market on a commission basis. Advanced technological support in the farmers' fields is also provided by the entrepreneurs.

THE WAY AHEAD

The experiment in Gumla, where the major

focus has been on developing and strengthening systems, has started showing positive results. With an investment of Rs 1,729,200, the farmers were able to generate an income of Rs 10,908,421, which is six times more than the total investment by the farmers. At the same time, a cadre of entrepreneurs has been developed within the cluster with the prime objective for establishing a robust system of marketing, which will help the farmers gain maximum price for their products. Such an intervention can help in developing agriculture-based clusters across the regions and farmers will have access to markets, where they will be able to fetch respectable prices for their products.

Mango Horticulture: A Livelihood Opportunity for the Poor

A WORKSHOP REPORT EXTRACT

Highlighting the recent developments in the mango sub-sector, the workshop identified the opportunities for enhancing the potential of this promising source of livelihood for farmers with small holdings in eastern India.

INTRODUCTION

India is the largest producer of mangoes in the world, producing 40 to 55 per cent of the global supply in any given year. There are over 200 varieties of mango, and its cultivation covers over 30 per cent of the total area under plantation, and represents 20 per cent of the total national fruit production. The fruit has been cultivated on the Indian sub-continent for over 4,000 years and is favoured for its nutritive value, taste, attractive fragrance and health promoting qualities.

WORKSHOP OVERVIEW

A two-day workshop on 'Mango Horticulture: A Livelihood Opportunity for the Poor' was organized by the National Resource Centre on Rural Livelihoods, in collaboration with Oxfam India, in Ranchi on 24 and 25 March 2011. The objective of the workshop was to explore the recent developments in the mango sub-sector, and to identify the opportunities to enhance the potential of this promising source of livelihood for farmers with small holdings in eastern India. There were about 60 participants from various government departments, agricultural institutions, NGOs and market players.

The first day of the workshop was spent in the field, visiting the communities engaged in mango horticulture in Gumla district, Jharkhand. On the following day, there was an interactive session, to address the objectives of the conference and to assimilate the lessons from the field visit.

TECHNICAL BACKGROUND

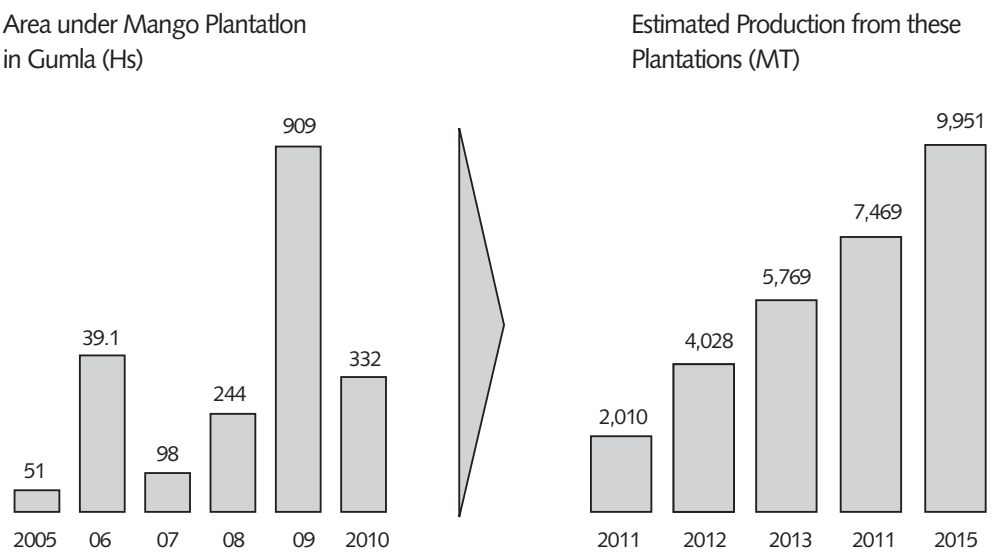
Leading government research agencies such as the Indian Council of Agricultural Research (ICAR) have been conducting research on mango horticulture in the Jharkhand region. Based on their work, Dr. Bikas Das, senior scientist from ICAR Ranchi, highlighted both the process to establish productive orchards

PRADAN's Intervention in Jharkhand

PRADAN works with over 2,00,000 small and marginal farmers in central and eastern India on community mobilization, empowerment, asset creation and livelihood development. Over the past five years, PRADAN has increasingly focused on promoting horticulture as one of the sources of livelihood. During this period PRADAN has planted mangoes in over 2,000 ha of land. This is estimated to lead to a production of 10,000 metric tonnes (MT) of mangoes by 2015 (see Figure 1). Of the total mango production in PRADAN geographies, 70 per cent is from Jharkhand. The key elements of PRADAN's implementation model include building community interest and understanding, ensuring the selection of suitable farmers/areas, careful consideration of suitable varieties based on smallholder suitability and market attractiveness, developing locally tailored prototypes (including inter-crop), building community level capabilities and resource persons, completing detailed planning and ensuring family level ownership, through weekly review meetings.

Mango plantation has had a great impact in the Gumla area of Jharkhand. Eighty per cent of the land utilized for mango cultivation is now covered with irrigation facilities, and a good vegetative and reproductive plant growth. Eighty-five per cent of these fields are under inter-cropping, generating an additional income of Rs 8,000 to 20,000 annually per family, which can then be reinvested in the fields. The projected production of mangoes for the 2011 season is 400 MT and is likely to increase to 4,000 MT by 2015.

DIAGRAM 1: PRADAN Mango Plantation In Gumla

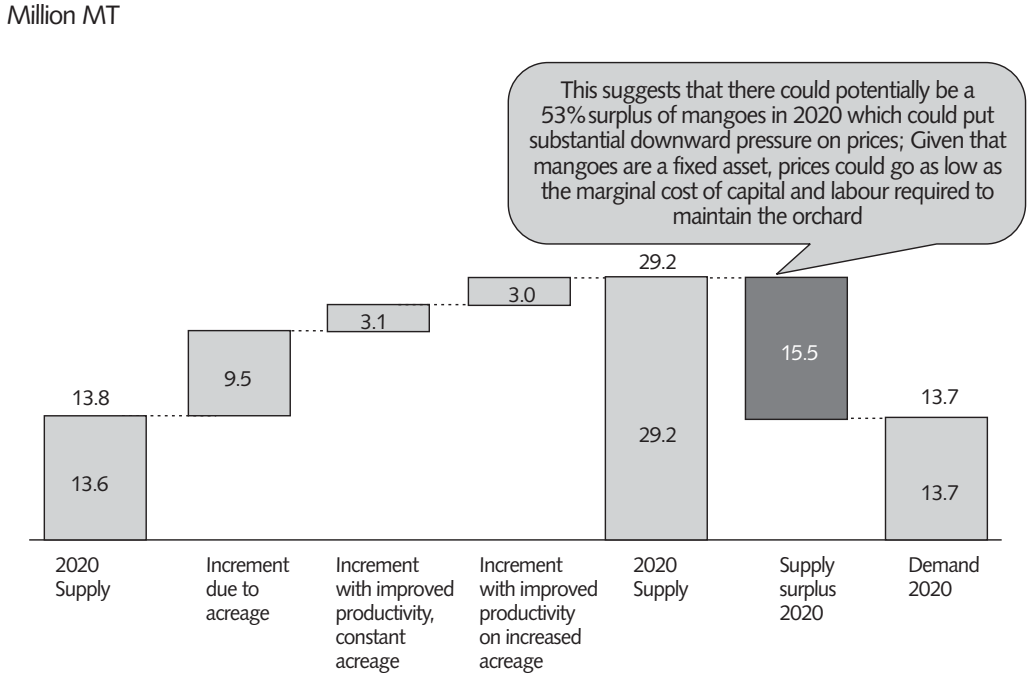


Report: Mango Horticulture–A livelihood Opportunity for the Poor

as well as technical opportunities to improve productivity and profitability for small-holders. A selection of insights is shared here:

- **High density cropping:** A higher density of plantation of trees has been identified as a suitable and attractive proposition for the region. This method has reduced the spacing between plants from 10 to 2.5, which has increased the number of plants per hectare from 100 to as many as 1,600.
- **Variety selection:** Dr Das highlighted that the amrapalli variety is a feasible option for small-holders in Jharkhand, given its low gestation period, suitability for Jharkhand's acidic soils (49 per cent of the area's soil is highly acidic (pH>5.5)) and its market attractiveness (size of 200 gm, which is highly compatible with consumer demand). However, he also suggested that it would be important to explore the potential for new varieties such as Himsagar, Banglora II, Langra as well as other horticulture crops, which could be introduced over time.
- **Best practice POP elements:** Dr. Das reviewed a range of best practices for the amrapalli that can help small-holders maximize yield. This included guidelines for fencing, pit preparation, planting, maintenance and canopy management. The details of these best practices can be found in the HARP presentation.

DIAGRAM 2: Projected Mango Production Profile in India



SOURCE: APEDA, India Stat, PRADAN projections

MANGO MARKET OVERVIEW

The mango sector appears to be poised for growth. Domestic demand is expected to grow at six per cent, bolstered by rising incomes and increasing urbanization. The processing industry has also witnessed a dramatic growth, which is expected to continue in the coming years. Given the attractiveness of this market, a growing number of small-holders have ventured into mango plantation with support from the government, through programmes related to the National Horticulture Mission, Swarnajayanti Gram Swarozgar Yojana (SGSY), TWC and others, as well as through civil society initiatives. This has contributed to a doubling of nationwide acreage under mango plantation over the past decade.There is also substantial scope to increase productivity by at least 20 per cent.

Mango production in the eastern region is expected to grow dramatically at eight per cent per annum in the coming 10 years

The acreage and productivity improvement are projected to increase the annual production by more than 100 per cent by 2020, which could contribute to a surplus of 50 per cent in mango supply by 2020 (see Figure 2). In this scenario, there could be a substantial downward pressure on prices; given that mango plantations are a fixed asset, prices could go as low as the marginal cost of capital and labour required to maintain the orchard.

In Jharkhand currently, 15,000 ha of land is covered with mango plantations, which produce 2,54,000 tonnes of mangoes. This is very low in relation to the current demand, which is primarily met by imports from other states. Its neighbouring states—Bihar, Orissa and West Bengal—have a much larger combined area of 4,11,000 ha under mango cultivation and account for 2.5 million tonnes of production. In the present scenario, the preference for mango horticulture among small-holders in the eastern region (Jharkhand, Orissa, West Bengal and Bihar) is growing. The promise of higher returns from mangoes, as compared to traditional food crops, is attractive in spite of the time lag in receiving these returns.

Mango production in the eastern region is expected to grow dramatically at eight per cent per annum in the coming 10 years compared to the relatively modest growth of demand at three per cent per annum. Depending on the mortality of the new acres, there will likely be a displacement of imports from other regions, and a potential supply surplus of 35 per cent by 2020. However, unlike in the national market, in Jharkhand, there is very limited understanding of the true micro-market dynamics, given the nascent stage of the market. So, a further study of the sector is required.

OPPORTUNITIES

After discussing multiple technical and commercial aspects of mango production in Jharkhand, the participants worked in groups to identify concrete opportunities to make mango production beneficial for the small-holders in the state. Stakeholders across various sectors worked to concretize both the opportunities and the collaborations required to realize the full potential of this sector.

Four concrete initiatives were discussed:

1. Disseminating PRADAN's mango prototype: PRADAN, as well as other NGOs, have demonstrated that with

limited stakeholder support, mango horticulture can be a remunerative and attractive livelihood for small-holders. The terrain and climatic conditions of the region are also suited to mango plantation. The group identified a few steps that could be taken to enable a further scale-up of this livelihood:

- Increasing awareness about mango as a source of livelihood
- Providing small-holders access to financial and technical support, as well as guidance, based on previous experience through collaboration with various stakeholders
- Financial support from NABARD, TWC, NHM, Watershed programme, NREGS.
- Technical support for research and development.
- Guidance from other implementing agencies.
- Increasing irrigation support in the region and also trying to use wasteland These interventions, however, should only be pursued if the value chain in the region is properly developed, and proper market linkages can be established to ensure that these orchards will be profitable. Given the potential oversupply scenario, over the near term, greater focus should be placed on improving the quality of existing programmes, rather than establishing new ones. However, over time, a large number of small-holders could benefit from the opportunity.

2. Increasing availability of quality saplings: Large-scale implementation of mango horticulture programmes in the eastern states has resulted in a scarcity of quality sapling availability. As a result, unsuitable saplings are being used, which is contributing to higher mortality and lower returns for both donors and small-holders. A few steps were identified to solve this problem:
   - Identifying pockets—farmer groups, implementing agencies, etc., willing to invest in sapling/nursery development
   - Providing these pockets with managerial, financial and technical support to establish the nurseries
   - Training or facilitating the training of grafters
   - Ensuring availability of certified mother plants for sapling nurseries
3. Positioning the amrapalli and mallika varieties favourably in the market: Seventy-five per cent of increased production in the eastern region over the next 10 years is likely to come from these two varieties. Whereas they have been promoted on the basis of their small-holder suitability, these varieties at preseat have a very limited market in Jharkhand and its neighbouring states. Conscious branding and sales promotion exercises are the first and obvious step towards building the market for the upcoming production to avoid a scenario with excessive supply surplus or inferior positioning, in relation to the traditional and more popular varieties. The group identified two initiatives that could be considered:
   - Brand promotion.
   - Organizing/participating in *melas* to promote the variety in national/ international markets.
   - Establishing outlets/moving stalls for tasting and selling fruit in the local markets.
   - Advertising in newspapers/local

media, focusing on the speciality of these brands and the recipes they can be used for, to increase awareness and demand.
- Sales promotion.
- Developing a thoughtful pricing strategy based on the desired market positioning.
- Creating mechanisms to facilitate easy transactions between buyers and farmers (for example, packaged/customized services).

4. Establishing forward market linkages and facilitating aggregation: Because customers are relatively unfamiliar with these two varieties, it is critical to establish forward market linkages to provide security in the near term and stability going forward. However, most such exercises come with scale, making aggregation at different levels critical. The steps identified by the group to take this intervention forward are:
   - Generating tradable volumes
   - Collaboration with different stakeholders—producers, implementation agencies, etc.
   - Developing infrastructure for post-harvest handling—integrated packaging houses, laboratories, refrigerated vans, cold storages—to ensure minimum wastage and standard quality norms.
   - Exploring new markets while working with different stakeholders.
   - Working with APEDA to explore the processing export opportunities.
   - Identifying and tapping buyers such as hotel chains and corporate companies.
   - Organizing/participating in forums where buyers and sellers can meet nationally and internationally.

CONCLUSION

There is little question that mango horticulture represents a great opportunity for small-holders in Jharkhand and its neighbouring states. Whereas the discussion highlighted many of the noteworthy successes to date, it also flagged the emerging challenges that require action by the full spectrum of industry stakeholders, to ensure that this livelihood continues to achieve its full potential.

Chickpea Value Chain—A Study

SHIVAJI N. CHOUDHARY

With its increasing demand, its high nutritious value and ability to grow in drought conditions, the chickpea provides a viable and sustainable option for farmers in rain-fed areas

Pulses are consumed widely in India and *chana*, or chickpea, tops the list. The chickpea, a light brown pulse, known also as Garbanzo bean, is a good source of protein. It is used for making flour in many parts of the world. The crop has the capacity to grow in drought conditions and does not need nitrogen fertilizers. Chickpea is a highly nutritious pulse and is placed third in the list of importance of legumes cultivated in the world. It contains 25 per cent proteins, which is the maximum provided by any pulse, and 60 per cent carbohydrates. The variety of the chickpea is determined by its size, colour and taste. Two of these varieties, namely, the *kabuli* and the *desi*, are very important in terms of their usage and commercial purposes. India mostly produces the *desi* chickpeas and not the *kabuli*.

- ***Desi* chickpeas:** These are split peas, and are relatively small in size, with a thicker seed coat than the *kabuli*. These chickpeas are dark brown in colour and can be used and served in many ways.
- ***Kabuli* chickpeas:** These have a whitish-cream colour, are relatively bigger in size and have a thinner seed coat. *Kabuli* chickpeas are generally used in soups and salads or to make flour.

In India, the seeds for chickpeas are sown from September to November. The maturity period of the *desi* type is 95–105 days and of the *kabuli* type is 100–110 days. The harvesting of the plant is done when its leaves start drying and shedding in February, March and April.

CHICK PEA MARKET: ATTRACTIVENESS FOR INDIA

The demand for chickpeas in India is expected to grow at two per cent per annum over the next five years, owing to the growth in population as well as consumers choosing the relatively affordable chickpea over costlier pulses. The increased demand will put an upward pressure on prices; however, the current scenario suggests that this growth will mainly be met by imports.

- Historically, the demand for chickpeas has grown, in line with the growth in population (the annual rate of population growth is 1.5 per cent).
- Chickpea is a cheaper pulse and will always be preferred by a large segment of the population—urban or rural.

The demand for chickpeas in India is expected to grow at two per cent per annum over the next five years, owing to the growth in population as well as consumers choosing the relatively affordable chickpea over costlier pulses.

- The increased income of the population will lower the overall demand for *desi* chickpea, which is essentially a cheaper source of protein.

Domestic production is likely to grow at 1.2 per cent over the next five years, due to the low profitability of the crop, relative to other *rabi* crops, putting an upward pressure on prices.

- By 2015, there will be an additional demand of 8,00,125 MT. The demand will need to be met through new acreage, greater productivity or imports. With low profitability from the crop (Rs 1,200 to Rs 6,500 per ha), the primary growers will keep producing at sub-optimal levels and, thereby, cause domestic supply shocks.
- The acreage under chickpea cultivation has always been small at six per cent of the overall net sown area and is likely to remain so due to the low profitability and its secondary contribution to food security for the farmers.
  - Increasing the supply through new acreage will require an additional 3.32 million ha under chickpea cultivation (a 13 per cent increase from the current level). This expansion in acreage is very unlikely because chickpea is less profitable at Rs 1,200–6,500 per ha compared to wheat, which provides both—a greater income of Rs 6,500–21,000 per ha as well as food security and fodder.
  - The lack of investment in practices and technologies, in comparison to other crops such as wheat, means that there are few new technologies on the horizon that will dramatically improve chickpea productivity or returns.
- Productivity is very low, at an average of 0.788 MT per ha, and falters in comparison to countries such as Australia and neighbouring Myanmar.

India's productivity is currently low compared to other chickpea producing nations, with yields at 32 per cent lower than neighbours such as Myanmar, which has made giant strides in the last five years, and 25 per cent lower than best class nations such as Australia. The application of known practices and inputs can easily meet the incremental demand requirement. However, large-scale intervention will be required across a relatively fragmented production base, as is the case in Myanmar.

Myanmar is a case example of the chickpea productivity improvement. It has almost doubled its chickpea production from 1,19,000 MT to almost 2,20,000 MT from 2000 to 2002. In the same period, it enhanced its productivity from 700 kg per ha to almost 1,100 kg per ha (a 40 per cent improvement) and witnessed more than 30 per cent expansion in acreage. One of the major reasons for its increased production has been its proximity to India, which has a huge demand for chickpea (a third of the world's total chickpea imports) and a low production of the crop. Lesser flood irrigation requirements, appropriate soil qualities and its proximity to such a huge market have facilitated Myanmar's progress in becoming a major chickpea exporting nation. This has also been facilitated by the fall of the socialist

regime in Myanmar (post 1988). Trade has become easier and, therefore, India is a major market of chickpea exports from Myanmar.

As a result of low productivity in India, farm gate prices in India are at least 23 per cent higher than those of Australian and Myanmar's chickpeas, making low-cost imports an attractive alternative to local production.

- Farm gate prices in Australia and Myanmar are estimated to be at least 20 per cent lower than in India.
- Whatever portion of the projected supply and demand imbalance that is not met by marginal yield improvements will, therefore, most likely be met by imports from Australia (existing exporter) and Myanmar (which has recently begun surplus production).

India's productivity is currently low compared to other chickpea producing nations, with yields at 32 per cent lower than neighbours such as Myanmar, which has made giant strides in the last five years, and 25 per cent lower than best class nations such as Australia.

CHICKPEA CULTIVATION: ATTRACTIVENESS FOR SMALLHOLDERS

Neither the *desi* nor the *kabuli* chickpea is an attractive livelihood option for small-holder farmers in their current state, due to the relatively high risk and the low returns. However, only for limited segments of *desi* chickpea cultivators is chickpea among the most attractive livelihood options, with some potential to expand into cultivation of *kabuli* chickpea.

There are six major segments of small-holder farmers; within these segments, chickpea appears to be the most preferred crop for only four segments, representing approximately 10 million farmers.

Segment A: Irrigated wheat diet-based families. Chickpea is among the crops with the highest potential; currently, most engage with desi chickpea cultivation but have a high potential for growth of the *kabuli* chickpea cultivation (30 per cent of cultivators).

Segment B: Irrigated non-wheat diet-based families. Low growth potential because chickpea will always give lower returns than other potential irrigated crops such as vegetables.

Segment C: Un-irrigated paddy, maize and soybean with chickpea with a wheat-based diet. In the absence of irrigation, chickpea is among the highest potential crops (60 per cent of the chickpea cultivators).

Segment D: Un-irrigated paddy (*kharif*), maize, soybean and un-irrigated wheat (*rabi*) on black soils and chickpea if extra land with a wheat-based diet. In the absence of irrigation, chickpea is among the highest potential crops. Currently, cultivating *desi* chickpea although there is potential for the growth of *kabuli* chickpea cultivation (eight to nine per cent of the chickpea cultivators).

Segment E: Un-irrigated *kharif* fallows and chickpea (*rabi*) with a wheat-based diet. In the absence of irrigation, chickpea is among the highest potential crops (one to two per cent of the chickpea cultivators).

Segment F: Un-irrigated *kharif* paddy and *rabi* fallow with a non-wheat-based diet. Chickpea cultivation is not viewed as a viable

alternative to migration and wage labour unless it can ensure a minimum return at a lower risk profile.

Desi chickpea is the dominant variety in India, representing 95 per cent of the current acreage. However, there are many impediments to its growth because it is not a highly attractive option for smallholders, due to the relatively low profitability and its minor contribution to food security.

- Ninety-five per cent of the chickpea is cultivated in six states: Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Uttar Pradesh and Karnataka.
- *Desi* chickpea is grown majorly in 6.4 million ha of land by farmers in segments A as well as farmers with un-irrigated land with lighter soils and without irrigation infrastructure in segments C, D and E.
- Farmers in rain-fed areas prefer the *desi* chickpea for its relatively low investment and input requirement as well as its drought tolerance.
- However, in its current state, the *desi* chickpea will continue to be a secondary crop due to its low returns (51 per cent lower than wheat and 47 per cent lower than vegetables), relatively high risk (50 per cent greater price volatility in chickpea) and comparatively low contribution to food security.
- There is potential for increasing the production of *desi* chickpea by improving productivity and profitability by up to 40 per cent (Rs 10,000) in rain-fed conditions. However, this will only make sense to farmers for whom chickpea is among the highest potential crops, namely, the 10 million farmers in segments C and E.
- For the segment that has irrigation (segment A), it can be a good option only for farmers who live in remote areas, are not well connected to markets and have excess land after having sown wheat. Chickpea has a longer shelf life than vegetables and, therefore, provides farmers with a robust option.

The demand for *kabuli* chickpea is expected to grow significantly with increased urbanization. It has the potential for improved returns to chickpea farmers although its prevalence among growers has been limited by the lack of varieties suitable to the Indian climate, by it being primarily an irrigated crop and by its low contribution to the food security situation of the smallholder and marginal farmer; therefore, in its current state, it is not viable.

- *Kabuli* chickpea represents only five per cent of acreage and is mainly found in black cotton soils in Madhya Pradesh, parts of Maharashtra and Andhra Pradesh.
- *Kabuli* chickpea is grown in approximately 0.5 million ha by farmers in segment A.
- In India, the *kabuli* chickpea is preferred by farmers who have land with heavier soils and assured sources of irrigation. The 'dollar' variety of seed thrives only with irrigation and makes financial sense for those farmers who have to account for higher seed rates and higher inputs due to the variety being uncertified.
- The acreage under *kabuli* chickpea cultivation is likely to increase by only five to ten per cent at the expense of the *desi* chickpea over the next five years because only farmers who have land with heavier soils and sources of

irrigation will be able take advantage of its comparatively attractive returns (50 per cent higher than the *desi* chickpea), and actually take to growing the *kabuli* chickpea.

Although incomes are rising, the structural issues in the pulse sector as well as the risks and higher investments by small-holders will keep the kabuli *chickpea out of the reach of the masses.*

Though the yields are the same, the *kabuli* chickpea fetches better prices in the markets (Rs 5,000 to 6,000 per quintal), which are 50 to 60 per cent higher than the prices of the *desi* varieties. Going by the prevalent conditions, the domestic supply of the *kabuli* chickpea will decrease (in the absence of appropriate varieties), thereby causing supply shocks. The demand will then have to be fulfilled by imports.

The demand too will remain moderate, despite rising urban populations. Although incomes are rising, the structural issues in the pulse sector as well as the risks and higher investments by small-holders will keep the *kabuli* chickpea out of the reach of the masses. The cultivation of the *kabuli* chickpea needs an investment of Rs 24,500 per ha (as compared to Rs 13,000 for the *desi* variety), which is almost 80 per cent more. Poor and erratic monsoons also force farmers, even in the Malwa region, to opt for the *desi* chickpea instead of the un-irrigated *kabuli* variety. No appropriate seed variety is available with the desired output characteristics. The one which is available is a non-certified variety, which is suffering from dwindling yields and high input costs. The farmers in segment A are the ones for whom the *kabuli* chickpea is a very good option because they have extra land as well as assured irrigation to invest in this new crop. This segment will make up about 30 per cent of the overall chickpea cultivators. A similar but a very small window (about two per cent) also exists in segment D (for example, in Malwa) where farmers without irrigation but with heavier black soils will be able to take up cultivation of *kabuli* chickpea as long as they have sufficient landholding to meet their wheat needs.

OPPORTUNITIES TO CREATE OR SHIFT VALUE IN THE CHICKPEA VALUE CHAIN

For the 10 million cultivators with over 7.5 million ha of land under chickpea cultivation, there is opportunity to improve productivity by almost 33 per cent (rain-fed) and 25 per cent (irrigated) and achieve at least five times higher profitability by intervening in production processes (by way of better extension services, better varieties), shifting to the *kabuli* varieties, bulk input procurement and investing in bulk storage facilities for farmers.

Of the eight opportunities identified to create or shift the value for chickpea cultivators, there are four high potential opportunities.

DEVELOP BETTER VARIETIES

Higher drought tolerant and wilt-, blight-, dry root- and rot-resistant varieties need to be developed for farmers of the *desi* variety. The purer form of the 'dollar' variety needs to developed indigenously so that the *kabuli* chickpea produced in India has the necessary output characteristics (higher seed weight, larger seed size, etc.). This step can help the farmers garner up to Rs 10,000 additional revenue from a hectare in irrigated conditions and Rs 8,000 extra in the rain-fed areas.

SUPPORT FARMERS FOR TRANSITION TO

KABULI WHEN APPROPRIATE

Wherever there are farmers, who have excess irrigation, after having ensured their food sufficiency, and where owing to remoteness, other more remunerative options are not possible (vegetables, etc.), it will be necessary to intervene and handhold these farmers into taking up the *kabuli* varieties as an irrigated *rabi* crop although the conditions favourable to the *chickpea* (irrigation, heavier soils, etc.) itself limits the overall potential of new additions. The resultant additions to the profits of the farmers will be Rs 28,000 per ha (irrigated) and Rs 19,000, approximately, per hectare (un-irrigated + heavier black soils).

IMPROVE YIELDS THROUGH THE APPLICATION OF BEST PACKAGE OF PRACTICES (POP)

India's average yields as of today are 42 per cent less than what they should be. The average productivity is languishing at 788 kg per ha. The best producers in the world have production levels close to 1,100 kg per ha, which can be easily achieved by concerted efforts at developing newer technology extension and adoption, combined with collective input procurement. The value that is lost in the absence of the above is to the tune of Rs 44 crores.

ENSURE ACCESS TO CREDIT

Farmers need to have access to easy credit so that they can invest in inputs such as good seeds, fertilizers, etc., to get better yields; this is a critical supporting enabler to the yield improvement recommendation. Farmer clubs and Self Help Groups (SHGs) need to be formed at village levels or cluster levels, and then financial institutions need to be motivated and directed to provide credit support to such groups.

There are two additional opportunities that may be pursued over the medium/long term, as appropriate.

BULK INPUT PURCHASE

Smallholders need to come together and form farmers' collectives or SHGs for bulk purchases of inputs such as fertilizers, seeds and insecticides so that they can use the advantages of scale to get the benefits when procuring such items.

STORAGE

Building of warehouses to assure better and accessible storage facilities for smallholders can unleash a potential of up to Rs 3,000 crores in the chickpea sub-sector (Rs 6,000 per ha). This will bring about an increase in profits of about 25 per cent in the un-irrigated variety and 55 per cent in the case of the irrigated variety for the farmer.

Finally, there are several opportunities, namely, milling, and sorting and grading, that should not be prioritized given their relatively low returns for farmers.

MILLING

Milling does not seem to be a very good option for small-holder collectives because the industry already has excess capacity and the margins appear to be quite low. It also requires significant investment (Rs 25 to 30 lakhs), as also inventory and risk management in which farmers may be at a disadvantage relative to other millers.

INTERVENTION AND RECOMMENDATIONS

Intervention in the chickpea value chain can create an estimated value for 10 million farmers, who depend on the chickpea as a key source of livelihood. A tailored set of interventions for each of the four priority segments of chickpea farmers is recommended.

SEGMENT A (IRRIGATED WHEAT DIET-BASED FAMILIES)

This segment of farmers can capture value by pursuing three priority interventions for three million farmers, based in Madhya Pradesh, Maharashtra, Andhra Pradesh and parts of Rajasthan. Unleashing the potential of this segment requires a basic investment, to enhance wheat productivity; this will ensure that farmers meet their food security requirement in the most efficient manner possible so that they can dedicate a maximum portion of their remaining land to chickpea. Improving wheat productivity requires the introduction of a scientific POP, and easily accessible and non-exploiting sources of credit for carrying out farming. This will have its own benefits of impact on food security and impact on income (if any). For the land that these farmers are able to dedicate to chickpea, wherever possible farmers should be encouraged to shift to the *kabuli* varieties, which will create up to Rs 55,500 per ha of value. The key interventions to support this transition will include the availability of the pure 'dollar' seed, dissemination of an appropriate POP and easy access to credit for the required investment.

Unleashing the potential of this segment requires a basic investment, to enhance wheat productivity; this will ensure that farmers meet their food security requirement in the most efficient manner possible so that they can dedicate a maximum portion of their remaining land to chickpea.

AVAILABILITY OF THE PURE 'DOLLAR' SEED

Farmers with sources of irrigation will be helped if they grow the *kabuli* variety with input benefits such as lower seed rates, less fertilizers and insecticides, and higher germination and productivity, with the desired output characteristics (seed of 100 seeds > 30g softer seeds, etc.). This helps farmers get at least Rs 10,000 additional value on their produce.

DISSEMINATION OF AN APPROPRIATE POP

During this process of change from the *desi* to the *kabuli*, farmers need to be supported through some measure of handholding because the cultivation of the *kabuli* chickpea is more intensive than the *desi* counterpart. Exposure visits to a successful area and meeting the farmers there are beneficial. Pilot projects will have to be taken up for early adopters and the successes of the first couple of years can then be spread across a larger geographical area.

ACCESS TO CREDIT

SHGs are needed for easy access to credit, so that the cultivators do not need to go to the local moneylender. Also, banks need to invest more into farmer groups and clubs with agriculture loans.

For those farmers who are unable to convert to the kabuli variety, there is still Rs 20,000 per ha of value that can be created by:

- Introducing effective extension services so that farmers are encouraged, motivated and handheld to adopt an improved PoP and enhance productivity to 18 to 20 quintals from the existing 10 to 12 quintals per ha.
- Providing accessible source of credit from banks and SHGs so that the farmers can take credit for investments that are required for adopting the PoP.
- Encouraging bulk purchase of inputs, to bring down costs for farmers and, similarly, bulk selling at least at the village level (if not at the cluster level), to ensure fairer returns.
- Finally, warehouses or storage houses at

the cluster level will need to be set up for the farmers to store their produce and take advantage of higher prices at a later time in the year. Investments need to be made for storage facilities at the cluster level, which will help them realize 15 per cent more farm gate prices. The produce can be housed or nested in farmers' cooperatives or collectives.

SEGMENT C (UN-IRRIGATED WHEAT-BASED DIET)

For the six million cultivators falling in this category in India, in Madhya Pradesh, Rajasthan, Maharashtra, parts of Andhra Pradesh, and Uttar Pradesh, value can be captured by taking the following four high priority steps.

- Enhancing productivity by:
  - Introduction of appropriate varieties that have the desired output characteristics (shininess, lustre, shape) and enhanced wilt, blight, dry root, rot and drought resistance. This will help farmers realize an additional 24 per cent increase in yields for the un-irrigated and 20 per cent for the irrigated.
  - Till such time that varietal improvements take place, introducing effective extension services so that the farmers are encouraged, motivated and handheld to adopt the improved PoP and enhance their productivity from 10 to 12 quintals per ha to at least 18 to 20 quintals per ha.
  - Providing accessible sources of credit in the form of SHGs/farmer clubs.
  - Facilitating easy agricultural loans through banks to farmer clubs and SHGs, to enable this enhancement of productivity in the pulse sector.
- Encouraging bulk purchases of inputs, to bring down the costs for the farmers.
- Encouraging bulk selling, to help farmers realize fairer returns and also cut down on transportation costs.
- Finally, warehouses or storage houses will need to be set up at the cluster level as well for farmers to store their produce and take advantage of higher prices at a later time in the year. Investments in storage facilities for farmers at the cluster level will help farmers realize 15 more farm gate prices. Storage facilities can be housed or nested in farmers' cooperatives or collectives.

SEGMENT D (UN-IRRIGATED WHEAT-BASED DIET FAMILIES)

This segment of chickpea growers mainly depends upon paddy or maize and soybean during the *kharif* season and then goes in for a combination of un-irrigated wheat and chickpea. For the 0.8 million farmers residing in parts of Madhya Pradesh (Malwa region) and Maharashtra in this segment, the following five value interventions are a distinct possibility:

- Unleashing the potential of this segment of small-holders requires a basic investment to first enhance their wheat productivity. The farmers have said that with dwindling landholdings, they would prefer wheat to chickpea or any such cash crop. This will ensure that more land is available for farmers after having secured food availability for their family. The land can then be invested in the chickpea crop, which is rain-fed but has a higher productivity due to better water retention properties.
  - Improving wheat productivity will

require the introduction and dissemination of scientific PoPs for wheat as well.

- ❒ Easily accessible non-exploiting sources of credit for farmers.

-

This step of promoting enhanced wheat productivity will help farmers ensure food security.

- Enhancing productivity of chickpea:
  - ❒ Introducing effective extension services so that farmers are encouraged, motivated and handheld to adopt the improved PoP, which will enable them to enhance their productivity from 8 to 10 quintals per ha to at least 12 to 15 quintals per ha.
  - ❒ Providing easy and accessible sources of credit, in the form of SHGs, so that farmers can avail of credit for investments that are needed for ensuring the PoP.
  - ❒ Facilitating easier agricultural loans through banks to the groups (SHGs/farmers clubs/producer groups).
  - ❒ In the long term, seed research varietal development will also have to be taken up by institutes such as the Pulse Research Institute.
- Encouraging bulk purchases of inputs to bring down the costs for farmers.
- Encouraging bulk selling to help farmers realize fairer returns and also cut down on transportation costs.
- Finally, here too, warehouses or storage houses will have to be set up at the cluster level for farmers to store their produce and take advantage of higher prices at a later time in the year. Investments will have to be made for storage facilities for farmers at the cluster level, which will help them realize 15 per cent more farm gate prices. The produce can be housed or nested in a farmers' cooperative or collective.

SEGMENT F (UN-IRRIGATED NON-WHEAT DIET BASED FAMILIES)

This segment normally does not cultivate chickpea because they are mainly in paddy growing areas, where the chickpea is only an option in the lowlands that have higher moisture retention. These lowlands are occupied until December by paddy and by that time it is too late to sow chickpea. Also, there is the option for these families to earn their livelihood through wage labour and migration, which are more reliable than late chickpea cultivation; therefore, this segment is not appropriate for such an intervention. Even if there is an intervention, adoption will be low and sustainability under the face of such intense competition from wage labour will be doubtful.

In addition to the segment-wise recommendations, we also think that a sector-level investment in developing improved germ plasm varieties could create up to Rs 8,000 per ha (un-irrigated) and Rs 10,000 per ha (irrigated) of value for just Rs 280 per ha of investment.

IMPLICATIONS OF ANALYSIS FOR AREAS UNDER THE RIUP

The population dealt with by the RIUP project is mainly in the segments C and F. Both these segments comprise farmers with un-irrigated land and with mainly lighter soils. We interacted with the farmers and the experts in this area and had the following observations:

- The productivity of the *kabuli* variety being used there (ICCV2 and KAK2) are very low (1.25 to 3.75 quintals per ha

versus the potential of 20 quintals per ha).

- Experts confirmed that the *kabuli* variety should be irrigated and/or grown on heavier (black) soils, to achieve its maximum potential.
- Farmers have been unable to sell their produce due to low local market acceptance. Local organizations have aggregated substantial quantities of the *kabuli* chickpea produce and have been unable to sell it for the past two years; when the kabuli chickpea is sold, its rates are low, yielding only Rs 1,800–2,000 per quintal compared to Rs 2,000–2,200 per quintal for the *desi* variety.

Based on our analysis, the *kabuli* variety without irrigation is not a competitive source of livelihood and food security. So, we would suggest the following modifications to the programme:

- Discontinue un-irrigated *kabuli* chickpea because it will not be a sustainable source of livelihood or food security.
- Shift the focus to promote the *desi* chickpea cultivation among farmers in segment C, which has better drought- and wilt-tolerant varieties; this will at least enable the farmers to meet their food security needs and can also contribute to their cash income.
- Implementation of the earlier segment C recommendations should result in improved yields of X per cent per acre, which would correlate to income improvements of Rs Y per hectare, if the farmers sold their produce.
- Activities with segment F should be discontinued, as per earlier recommendations, and the focus should shift to other relevant and more remunerative options.

In a PRADAN context, Value Chain Studies are only useful to the extent that their findings can be implemented for the benefit of the community. It is, therefore, important that the study addresses the relevant questions or concerns of both the 'team' and the community. The studies should be conducted in a manner that brings the team, the community and the relevant stakeholders together as part of the process so that once it is complete; it is possible to move forward.

Excerpt from Page 3

Pradan is a voluntary organization registered in Delhi under the Societies Registration Act. Pradan works through small teams of professionals in selected villages across eight states. The focus of Pradan's work is to promote and strengthen livelihoods for the rural poor. It involves organizing the poor, enhancing their capabilities, introducing ways to improve their income and linking them to banks, markets and other economic services. The professionals work directly with the poor, using their knowledge and skills to help remove poverty. News*R*each, Pradan's monthly journal is a forum for sharing the thoughts and experiences of these professionals working in remote and far-flung areas in the field. News*R*each helps them to reach out and connect with each other, the development fraternity and the outside world.

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