



VALUE CHAIN ANALYSIS OF WHEAT AND RICE IN UTTAR PRADESH, INDIA

Partnership for Innovation and Knowledge in Agriculture

Prepared by Stephen McCarthy, Deo Datt Singh, and Hannah Schiff of
ACDI/VOCA for World Vision

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This report presents the finding of a value chain analysis of the rice and wheat value chains in the state of Uttar Pradesh, India. The analysis was preceded by a value chain training delivered by Stephen McCarthy of ACDI/VOCA for World Vision India staff. The training was held from November 5-7, 2008 in Lucknow, India. From November 8-18, the newly trained World Vision staff formed interview teams led by Mr. McCarthy and Hannah Schiff of ACDI/VOCA and Dr. John Russell and Dan Norell of World Vision. Deo Datt Singh of ACDI/VOCA also participated in the field analysis. The analysis teams included the following World Vision India staff: Harish Chand, Samir Mukha, Shivank Srivastava, Sanjeeb Kumar Naik, Biplab Ketan Nayak, Nikhil Singh, Deepak Daniel Mohan, Sheeledra Kumar Singh, and Rajendra Suryawanashi. The team leader thanks all team members for their dedication and commitment. Dr. Fredrick Christopher of World Vision Asia Pacific Regional Office also provided technical advice to the teams. The team leader wishes to sincerely thank Dr. John Russell and Dan Norell for their invaluable technical advice throughout the process and the World Vision Lucknow office for their wonderful logistical support, particularly Dr. Sanjay Mall, Esha Chattree and James Varghese.

Stephen McCarthy
Team Leader, ACDI/VOCA
Lucknow, India
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ACRONYMS

ADP	Area Development Program (World Vision unit of operation)
AFPRO	Action for Food Production
APMC	Agricultural Produce Marketing Committee
CA	Commission Agent
DAP	Diammonium Phosphate
FCI	Food Corporation of India
IFFCO	Indian Farmers Fertilizer Cooperative
ITC	India Tobacco Company
NAFED	National Agricultural Federation
NPK	Nitrogen, phosphorus and potassium
PIKA	Partnership for Innovation and Knowledge in Agriculture
Rs	Indian Rupees
SHG	Self-help Group
ToT	Training of Trainers
UP	Uttar Pradesh

I. Background

High local, global and regional demand for rice and wheat could greatly benefit smallholder farmers of both of these staple crops in the rural areas of the state of Uttar Pradesh, India. Uttar Pradesh is responsible for the production of 35 percent of the country's wheat and 14.5 percent of the country's rice.¹ Land holding is estimated to be less than an acre for more than 75 percent of the state's farming population. Rice and wheat are the staple foods for India's 1.3 billion people, and while both crops have experienced great growth in yields over the past several decades, national demand has grown even faster, outstripping production by millions of tons.

In addition to unmet demand for staple crops, another trend smallholder farmers can take advantage of is the rise of organized retail in India. This trend has been documented by various studies, demonstrating rapid growth in the last year and predicting a doubling of the organized retail market in the next three years. Smallholders, the major engines of production in India, can take advantage of these growth trends to meet this demand and increase their incomes.

Taking advantage of these parallel trends will require farmers to increase production, reduce post-harvest losses and market their crops in new ways. Amendments to the restrictive state marketing channel (through mandis, or wholesale markets) are beginning to allow farmers to access more profitable channels for their produce. The mandi system does not reward farmers for higher-quality produce as alternative market channels would, such as direct supply to supermarkets. Farmers will need to learn proper techniques for ensuring the quality of their produce to satisfy the requirements of supermarkets. Other challenges faced by farmers are lack of appropriate irrigation technology and shortages of fertilizer that drive prices up in the black market and leave farmers with insufficient inputs and lowered yields due to poor-quality substitute fertilizers.

This value chain analysis focused on the rice and wheat sectors in three specific districts of Uttar Pradesh: Barabanki, Sitapur, and Unnao. Interviews with actors at all levels of the value chain were conducted over the period of November 8-18, 2008, and an initial stakeholders' workshop was held on November 21, 2008. This report presents the preliminary findings and recommendations of the analysis.

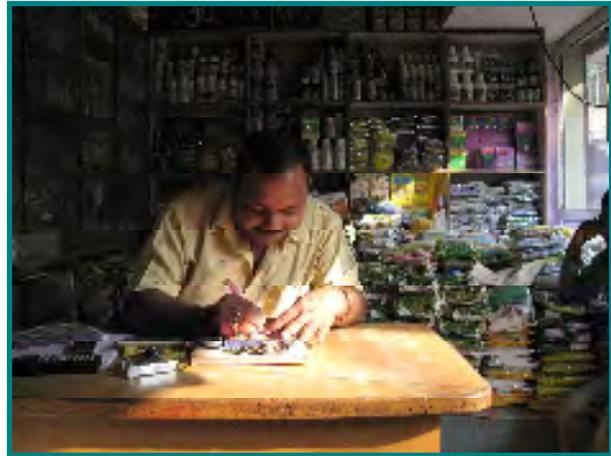
II. Actors

The major actors in the rice and wheat value chains are input suppliers (including manufacturers, wholesalers and retailers); producers; a large number of intermediaries (including collectors, traders, commission agents, and brokers); wholesalers; processors (including rice and flour millers); and retailers. This section will describe the role of each in turn.

¹ "Study of Cultivation Area in Uttar Pradesh." Dr. RP Singh, forthcoming.

A. Input Suppliers:

Input suppliers include major chemical companies, government distributors, small wholesaler/retailers, and even smaller retail shops that sell small quantities of seed, fertilizer and pesticide to farmers at the village level. The most common variety of wheat sold is PBW343, and the most common varieties of rice sold are local varieties, with US6444 being the most common hybrid. There are some farmers who are still using other older varieties of wheat. There is also enough scope for trying newly developed drought-resistant varieties, i.e. HI 1455, PBW 550 and HD 2932. Similarly there are some very productive traditional varieties of Karnataka that may warrant introduction in the project area. New seed varieties are developed by four universities in Uttar Pradesh, as well as by large private suppliers such as ProAgro (Bayer CropScience subsidiary) and Pioneer (PHI India). Fertilizers are widely used in the production of wheat and rice. These include DAP, urea, NPK (usually 20-20-20), muriate of potash (MOP), and to a lesser extent micronutrients such as zinc and sulfur. Pesticides are used for both production and storage.



Input Wholesaler/Retailer in Barabanki

Government Distributors: The U.P. branch of the National Seed Corporation produces and subsidizes less than half of the seed available on the market in the state, and the rest is produced by other government agencies, private companies, and farmers themselves. The National Seed Corporation has four distribution channels: government, cooperatives, parastatal entities, and private certified dealers. About half of the distribution is through government-registered cooperatives. The U.P. National Seed Corporation produces approximately a third of the seed required for production in the state. The rest is produced by a combination of private seed companies, other agencies (central government departments), and farmers' own production.

The government sells subsidized DAP at Rs 472/50 kg bag through government cooperative societies and the Indian Farmers Fertilizer Cooperative (IFFCO). In order to acquire government-supplied fertilizer at the subsidized rate, farmers must obtain an account with the government cooperative society and make a deposit of 10 percent of the amount of fertilizer they need to buy for their land. IFFCO provides fertilizer to registered members of its own cooperative societies and to government cooperative societies (in cases where IFFCO does not have its own). One farmer estimated that only about 5 percent of farmers get one of the most important production inputs, DAP, through these two channels due to the procedures involved and general fertilizer shortage. Long lines form outside IFFCO franchise offices and government distribution centers that operate through a coupon-like mechanism, and farmers wait for days and sometimes still leave empty-handed. Farmers interviewed indicated that DAP is also being diverted from this channel to private retailers at a mark up of as much as Rs 200/50 kg bag. In addition to fertilizer mentioned above, the

government acts as a primary input supply wholesaler for other inputs as well for example seed through state offices i.e. The U.P. Seed Development Corporation.

Wholesalers: Input wholesalers at the district level buy seeds, pesticides, and fertilizer (to the extent possible, given the shortages and other problems) from the government and other private providers in the nearby cities of Lucknow, Faisabad and Kanpur. They supply village input stockists/retailers. Some smaller wholesalers supply directly to farmers as well as to smaller retailers. One wholesaler we met with sells only pesticides and seeds. He does not sell fertilizer because of the corruption problems and because suppliers sometimes refuse to sell to him unless he also buys a certain amount of other products.

Retailers: Input retailers operate small shops in the villages of the districts around Lucknow. They buy from private wholesalers in the area or in neighboring cities. They sell a number of varieties of wheat and rice, but the most popular are PBW343 for wheat and local varieties for rice. Rice hybrids such as US6444 are just coming on the market and demand for them is growing. There appears to be a shortage of storage chemicals that can be used safely and effectively on the farm. The most widely used currently are Celphos (aluminum phosphide) tablets, a popular fumigant, and malathion. Celphos tablets are now banned and malathion use is restricted, but both are still commonly sold. Farmers lack awareness of use of the Celphose powder that has replaced the tablets.

Retailers also sell various fertilizers produced by non-government certified manufacturers and formulators, whose quality is doubted by retailers and famers alike. A good example is the emergence of the “bio-fertilizers” (see section on Fertilizer Shortages).

In Sitapur and Hardoi, two companies have established themselves as one-stop shops for input supply to retailers and farmers. These two stores, Hariyali Kissan Bazar and Kushali Centers, sell seed, fertilizer, pesticides, bio-fertilizer, and implements.

B. Producers

Land holdings for smallholder farmers in the three districts studied ranged from .5 to 3.5 acres of land, with averages less than 2. Land is passed down from generation to generation and sometimes divided among the children of a family. Farmers grow wheat, rice, maize, mustard seed, peppermint, and a variety of pulses and horticultural crops. Wheat is the major crop for most farmers, as it is a traditional crop and requires less water than rice. Most farmers have practiced a crop rotation pattern of rice and wheat on the same fields for years rather than alternating with other crops such as pulses, oil seeds, or vegetables. However, these other crops do not yield enough to meet household food and cash requirements. Smallholder farmers use grain for family consumption, and marketable surplus is sold for purchase of other household needs. When they need to buy



Producers in Unnao

inputs for the next planting season, many farmers sell more of their crop and later purchase the grain necessary to feed the family. Reported estimates for production costs for both wheat and rice varied from district to district. Rice production costs were more consistent, and averaged roughly Rs 13,850/acre. Wheat production estimates varied widely, from Rs 8,800/acre to Rs 15,200/acre.

Estimated Wheat Production Cost per Bigha² Based on Sale Price of Rs900/quintal

Cost	Unit	Price Range	Total Cost	Gross Margin ³
Plowing	4-6 times	Rs 300	Rs 1,200-1,800	
Irrigation	5 times, 4-8 hrs each	Rs 60-80	Rs 1,200-3,200	
Seeds	40 kg	Rs 560-720	Rs 560-720	
DAP Fertilizer	50 kg	Rs 475-650	Rs 475-650	
Urea	50 kg	Rs 251	Rs 265	
Weeding			Rs 1,000	
Pesticides/Herbicides	1 kg	Rs 300	Rs 300	
Harvesting	10% of quintal sale price	Rs 900	Rs 900	
Threshing	10% of quintal sale price	Rs 900	Rs 900	
Total			Rs 6,786-9,735⁴	Rs 2,214 to -735

Smallholder farmers sell grain to local collectors or traders. Local collectors come to the villages and pick up small amount of grain, which they sell to larger traders. Farmers obtain price information through various mechanisms. The minimum support price is announced through radio and newspapers. Farmers often bring samples of their grain to the market, where they obtain price information from various traders, although the price does not vary much. When they find a buyer, that collector/trader comes to the farm to pick it up. Grain quality is checked by sight at time of purchase.

Farmers manage crop marketing in varied ways. Most farmers sell the majority of their rice crop at harvest time, keeping only what is needed for home consumption. For wheat, farmers generally store about 10 quintals on-farm that is used for home consumption, cash flow needs, and as a grain bank for the purchase of inputs for the coming season. Marketable surplus is handled in two ways: Some farmers sell it all at harvest time, while others try to take advantage of price differentials over time during the crop season. However, storage losses often thwart this effort.

Smallholder farmers store their grain in three ways. One way is by storing bags of grain on top of husks and covering the pile over with husks again. Another is by digging a pit, sometimes inside the house, and stacking loose or bagged grain inside, and then covering

² The use of the land unit *bigha* can be confusing as the unit of land varies considerably from place to place. The following is what was found to be generally accepted as the conversion from bigha to acres but still there are local discrepancies: 1 bigha = .7 acres, 3.5 bighas = 1 hectare. The ADPs should develop a conversion chart for each of their locations that bases all land use figures in acres.

³ Gross margins are based on an estimated 10 quintals/bigha.

⁴ Some farmers do not calculate labor cost, as it is performed by family members. Extracting labor costs through labor provided by household members rather than hired daily laborers lowers the estimated production cost Rs 2800/bigha.

with husks plus sometimes mud and sacks. The third method, called a *bakhari*, is by constructing a small cement room to store the grain in. Some chemicals are used for storage, including Gamaxine and Celphos, the latter of which is more popular. The most commonly used storage insecticide is Malathion.

Both wheat and rice in the PIKA program area are produced under irrigated systems. Farmers have very few bore wells, and most rent diesel-operated pumps. Farmers reported the cost of renting the pumps at between Rs 60 and 80 per hour to as high as Rs 100 and 120 per hour. Time to irrigate an acre also varied widely, ranging from 4 to 8 hours. Other irrigation issues include hard water, salinity, and uneven land, the latter causing irrigation at higher elevations to run off and flood lower lands. Evaporation and drainage requires farmers with higher lands to use more water for maintaining both crops, and greatly impacts their ability to grow rice, which is very sensitive to drought. Farmers generally focus on quantity produced rather than quality, so varieties that produce more under these conditions are preferred to lower-yielding but higher-value varieties.

C. Collectors and Traders

The spectrum of aggregators includes small collectors and larger traders dealing in quantities from 10kg to minimum shipments of 10 tons. Initial contact with farmers is made at the market, where a farmer brings a sample of product, or at the farm gate, where a collector travels to arrange a sale before harvest, based on existing community relationships. Some opportunistic collectors wait for farmers to come directly to them with an offer of a sale. Traders check the quality of the product by sight for grain size and damage, and some go further to check the whiteness of rice. They then offer a price based on quality inspection, and once agreed upon, they send transportation to pick up the grain. Small collectors arrive by bicycle or horse cart to pick up small amounts and deliver them to larger traders. In rural areas, traders transport a standard quantity of 50 quintals in tractor-trolleys. Where road networks allow, trucks ranging from pickup trucks to 10-ton lorries transport grain to wholesale markets or millers. Traders sell paddy and wheat to millers or mandi wholesalers. Traders are also involved in other types of transactions, such as selling wheat directly to retailers and buying polished rice from processors to be sold to retailers.

In general, traders and collectors make their livelihood based on volume, rather than on large margins. Margins for traders are Rs 1-2 per kilo or sometimes even less. This is largely due to the fact that quality differentiation is so limited, especially for wheat. Margins for wheat are less than those for rice throughout the program area.



Barabanki Trader

Economics of Wheat for Small Collector⁵

Quantity	Farm Gate	Mandi	Gross Revenue	Operational Costs	Net Revenue
Per kg	Rs 9.5/kg	Rs 10/kg	Rs .5/kg		
1 quintal	Rs 950	Rs 1,000	Rs 50		
50 quintals	Rs 47,500	Rs 50,000	Rs 2,500	Rs 750-950	Rs 1,750-1,550
3000 quintals (in 60 days per season)	Rs 2,850,000	Rs 3,000,000	Rs 150,000	Rs 45,000-57,000	Rs 105,000-93,000

D. Wholesalers

Wholesaling occurs at the mandi, where wholesalers work through licensed traders, or commission agents, to buy and sell grain. The commission agents purchase from smaller collectors and traders or directly from farmers. Mandi wholesalers and their commission agents sell grain to millers and retailers.

Economics of Wheat for Mandi Commission Agent⁶

Expenses	Rate	Total per Quintal
Purchase price	Rs 1,000/quintal	Rs 1,000
Mandi tax	2.5%	Rs 25
Sales tax	4%	Rs 40
Labor (offload, on-load)	Rs 12/quintal	Rs 12
Total Costs		Rs 1,077
Sales to NAFED	Rs 1,102	Rs 1,102
Net Revenue		Rs 25

E. Brokers

Brokers are used at various levels of the value chain to arrange deals, for example between traders and large millers and between millers and wholesalers. The primary difference between brokers and traders is that brokers rarely, if ever, take physical possession of the commodity. Brokers serve a number of functions, including ensuring payment and delivery, acting as a trust mechanism between actors who do not know each other, reaching more distant markets throughout India, and triangulating price information.

F. Millers

Millers in the rice and wheat value chains deal in one or both crops. Rice processing involves cleaning, polishing, and packaging. Wheat is milled into four products: bread flour (*atta*),

⁵ These figures do not account for the collector's own labor.

⁶ Commission agent interviewed in Kanpur Mandi quoted these figures. He cited a commission of 2.5 percent on wheat and 1.5 percent on rice. Interviews with other value chain participants indicate that labor charges may be lower than stated here. Furthermore, official mandi taxes should be Rs 25/quintal as shown, but it was reported that corruptive practices decrease this to Rs 4/quintal in reality (Rs 200 per trolley load of 50 quintals).

cake flour (*medha*), semolina (*suji*), and bran. The by-products, wheat husk and de-oiled rice bran cake, are sold for use as animal feed. Rice husks are sold to solvent plants that extract oil and a base for soap.

Small millers at the village level process very small quantities of wheat or rice for home consumption as a service for villagers. Medium- and large-scale millers buy raw grain from the mandi through traders, and a few are registered as traders themselves. They offer prices based on quality. The quality characteristics of rice are the length of the grains, whiteness, and amount of broken pieces. For wheat, quality is measured with a simple machine for moisture content and by estimating percentages of foreign matter content and pest damage (empty grains). Millers set an acceptable level of each quality characteristic and discount the price given for each percentage over the acceptable limit, rejecting when damage or moisture is above a certain percentage.

G. Retailers

ITC, a major Indian retailer of foods and other products, has established buying centers for wheat that purchase grain from April to June. They use an e-Choupal network with *Sanchalaks*, or buying center managers in the villages. The e-Choupal system uses information technology to allow farmers to access information and to allow ITC to procure directly from farmers. ITC carries out a crop survey prior to harvest to decide upon the location of buying centers. This process, however, must be done in consultation and negotiation with the government because of the complicated licensing process for buying centers. ITC processes and brands its own wheat flour, called Ashirwad.

Big Bazaar is another major Indian retailer of a wide variety of food and non-food products (similar to U.S. stores like Target). They sell many varieties of rice and flour. They purchase food products through Pantaloon Foods, their parent company, which has a license to buy from the mandi traders and farmers. (Big Bazaar itself does not have a mandi license.) Big Bazaar also purchases Ashirwad flour from ITC. During the course of the team's interview with a representative of Big Bazaar, the representative mentioned that Pantaloon Foods has a proposal in the pipeline to establish a buying center in Lucknow to procure directly from farmers to supply Big Bazaar, along the lines of ITC's procurement model.

Small retailers generally stock between 5 and 20 varieties of rice and sell 2 grades of wheat flour, regular (bread) and fine (cake), as well as other wheat products such as semolina (for porridge) and bran. They purchase through traders from the mandi wholesalers in larger towns and cities and sell to local villagers. In addition to grain, they often stock a wide variety of other products. The varieties of rice grown locally sell for Rs 10-18/kilo at retail, whereas varieties imported from other states may sell for as high as Rs 25 or 30/kilo.

III. Factors and Relationships

A. Support Services

Extension and Training: The private-sector market for extension services is currently limited, although several input companies are employing outreach programs as a means to

increase sales. IFFCO has also established one of its two training centers in Phoolpur, U.P. with a capacity to train about 12,000 farmers per year. Chambal Fertilizers has a farmer outreach program called Kissan Bandhan, and Tata Chemicals has one called Kissan Sansar, both of which provide advice to farmers on input use. Several private input suppliers also provide technical advice, mainly on an *ad-hoc* basis either at point of sale or during sales trips.

Contract Plowing: Contract plowing is widely practiced throughout the area with farmers renting tractor services several times during the season. The RWC recommendation for laser land leveling could be a logical follow-on to this service with farmers renting the leveler in groups.

Transportation: Transporters hired by traders, farmers, and the government generally do not specialize in transporting grains, and thus do not adequately clean and maintain their trucks for this purpose. According to the interviews, transport is a very difficult business, plagued by fluctuations in diesel prices, poor road conditions, and hassling and extortion from transportation officials.



Grain Transportation

Financial Services: Farmers with adequate landholding (2.5 acres or more according to one farmer group) are able to get bank credit cards. However, it is infeasible for most smallholders to do so given bank requirements and procedures. Oriental Bank of Commerce is beginning to work with self-help groups and to provide some credit services to smallholders, through branchless banking, but these services are not yet reaching surveyed farmers. Some credit is extended between actors in the value chain based on established personal relationships. Examples were observed between millers and traders, traders and farmers, input wholesalers and input retailers, and input retailers and farmers. FCI, the largest buyer of grain in the country, will provide advance payment for purchase orders exceeding Rs 5 million.

Irrigation Equipment: Farmers utilize both diesel-powered and electric irrigation equipment, but they depend more on diesel power due to the unreliability of electricity. The majority of smallholders rent this equipment from larger farmers at Rs 60-80/hour.⁷ Some small village-level millers also rent irrigation equipment to farmers. The primary water sources for this irrigation are tube wells and catchment water, with surface water (lakes, rivers, and canals) utilized where available. The introduction of plastic flexible irrigation pipes by World Vision and others has had a positive impact on expanded use of irrigation equipment, water use efficiency, convenience, and availability. However, there is a significant lack of adequate bore holes.

Pest Control Services: There are various pest control companies in Uttar Pradesh, but smallholders interviewed are not currently utilizing these services due to lack of size and economies of scale necessary for warehouse storage. Larger wholesalers and retailers do

⁷ Other locations reported costs as high as Rs 100-120/hour for the rent of this equipment.

utilize the services of these companies. The team met with one such company called Pest Mortem Ltd. Pest Mortem provides post harvest management and storage of rice and wheat including pest control, warehouse management, as well as fumigation and other services. Working with a company like this to provide training to smallholders may help reduce post-harvest losses greatly. Another firm dealing mainly with large warehouse operations is National Bulk Handling Corporation, Ltd.

Soil Testing Services: Soil testing services are available from IFFCO, Tata Chemicals, Chambal Fertilizers, and other private companies. Services are rendered free of cost or at highly subsidized, nominal charges (e.g, Rs 50 per test). IFFCO reported conducting 50,000 soil tests last year for farmers, but few of the smallholders interviewed in this analysis reported using these services.

B. Business Enabling Environment

The key aspects of the business enabling environment for the rice and wheat value chains in Uttar Pradesh are:

- government-provided research and extension services;
- transportation infrastructure;
- the government mandi system; and
- the minimum support price mechanism.

The government provides research and extension services at the district and block levels. Extension agents are few and far between; one farmer in the program area estimated that there is one extension agent per 3,000 people, but the national average is one agent per 16,000 farmers.⁸ Some farmers expressed the opinion that government extension are often learning as much as they are teaching. The extension agent the team met was providing information on soil testing and making composted fertilizer. He said he had received three days of training in these areas.

At the macro level, Indian transport networks appear adequate for the movement of large quantities of both input and output. At the village level, lack of rural feeder roads and farm-to-market access increase transaction costs at several levels of the value chain.

Transportation infrastructure is a problem for traders and transporters, who face very poor road conditions that make travelling costly, dangerous, and inefficient. There were a number of reports by transporters of what was termed “police harassment” which included road blocks designed to extort un-official fees when moving produce. Transport operators claimed being forced to pay police because of some supposed traffic infraction or vehicle road unworthiness.

The government mandi system in India was established in the 1960s with the passage of the Agricultural Produce Marketing Committee Act (APMC).⁹ This act has historically restricted the agricultural commodities markets to localized wholesale markets (mandis). Mandi traders,

⁸ GMED Final Report

⁹ Thomas, Susan. 2003. “Agricultural Commodity Markets in India: Policy Issues for Growth.” <http://www.igidr.ac.in/~susant>

commonly referred to as commission agents (CAs), are licensed by the district mandi board to enable them to purchase and sell through the mandi system. Private retailers who wish to purchase from mandi traders must also be board-licensed. In Uttar Pradesh, CAs pay a mandi tax of 2.5 percent plus an operational tax of 2.5 percent.

Although the APMC Act is starting to be amended on a state-by-state basis to allow direct trading outside the mandi system, most smallholder farmers are currently unable to take advantage of alternative marketing channels. Due to lack of mandi capacity in proper handling and postharvest practices, there is limited quality differentiation and widespread price collusion among the commission agents and brokers. The mandi system therefore offers farmers little incentive to improve their product quality. Traders also reported lengthy bureaucratic procedures and late payments from FCI, along with extortive practices leading to higher costs.



Mandi in Unnao

Subsidies and minimum support prices have led to market distortion. The government very heavily subsidizes DAP, and Indian manufacturers alone do not possess the capacity to meet demand. Fertilizer is imported in bulk as well as in raw materials, such as phosphoric acid. The actual landed cost of DAP, whether imported or manufactured internally, is calculated at around Rs 2,600 per 50 kg bag. The subsidized price is Rs 472 per bag, and on the parallel market it is sold for upwards of Rs 650 per bag. The low price of government-subsidized DAP makes it unprofitable for private manufacturers to produce it. Private fertilizer manufacturers and dealers also often engage in “cutting” DAP with inert materials or substituting such things as NPK, both of which result in an ineffective product. Overall, there is a major shortage of DAP.

The government also sets a minimum support price determined annually prior to harvest for wheat and paddy. This price is currently set at Rs 10/kilo for wheat and Rs 8.5/kilo for paddy. Coupled with the fertilizer subsidy, which skews estimated production costs, this support price effectively acts as a determinant of a tacit retail ceiling price, restricting trade in the commodity to operate in a relatively narrow band. This is the price at which FCI purchases grain, theoretically only from farmers. In actuality, local traders depress the minimum support price at the farm gate by about Rs .5/kg and then sell the grain to FCI buying stations for the minimum support price. Farmers have the option to seek a higher price should it be available. Theoretically, higher prices can be obtained at mandi trader levels based on personal relationships and quality, but this is rare. This combination of factors often results in break-even production of wheat under actual production costs and yields.

C. Upgrading

There is a general lack of capital and incentives for upgrading throughout the value chain, though some actors did express a ready willingness to invest in their businesses with credit availability and proper incentives.

D. End Markets

End markets for rice produced in Uttar Pradesh are mostly local retailers. This is probably due to the low quality of the product. Better-quality rice sold in retail shops is imported from other states in India. There are about 10 varieties of rice available from retailers. The varieties grown around the ADP areas generally fetch Rs 12-15 per kilo, whereas imported varieties can get up to Rs 25 per kilo. Farmers do not produce these higher-value varieties because they give lower yields, and with such small margins, farmers make their income based on quantity. Seasonal price fluctuation is within Rs 1-2 per kilo at retail.

End markets for wheat include small local retailers and large retail chains in the nearby cities. There is almost no product differentiation in wheat. Bakers interviewed by the team indicated that they do not use different qualities of flour for different products; they simply buy the flour that is available on the market. Even at the larger millers interviewed, the only differences in flour were fineness—all wheat that came to the mill was processed into the same quality grade. In many other sectors, utilization of end market signals provides incentives for value chain upgrading. In the wheat value chain, however, such signals were not observed.

E. Inter-Firm Cooperation

Horizontal Linkages: Farmers have begun to form clubs of 10-15 farmers with the assistance of World Vision. Most have been formed within the past few months, and the main benefits realized so far are in the form of shared labor. Farmers in these newly formed groups still prefer to deal individually with traders rather than collectively marketing their grain. Trust in and among these groups is still lacking and must be developed before these horizontal linkages can be properly exploited. There appear to be virtually no horizontal linkages in the trading function of the value chain.

Vertical Linkages: Vertical linkages can be strong based on personal relationships. This is especially true at the village level between smallholder farmers and local traders. Some information on seed, fertilizer and pesticide use flows from input suppliers to farmers, but only on an ad-hoc basis. Some price information also flows from traders to farmers, but true price discovery mechanisms are non-transparent. Overall, there is a significant lack of vertical integration in these industries.

IV. Major Constraints

A. Fertilizer Shortages

The most prevalent complaint from farmers was the shortage of DAP fertilizer, and it was reinforced by interviews at various levels of the chain. Smallholder farmers complained repeatedly that the system favored large-scale farmers, who use capital and influence to monopolize access to government-supplied fertilizer.

The real cost of DAP, whether it is imported or manufactured, is around Rs 2,600 per 50 kg bag. The government produces it and sells it at a rate of Rs 472/50 kg. With this enormous gap and rising demand, the subsidy system is becoming unsustainable for the government. For example, a leading chemical manufacturing reported that the government had allocated Rs 360 billion this year for fertilizer subsidies. With the dramatic rise in petroleum prices in a short period of time, actual fertilizer subsidy costs were estimated at Rs 1.2 trillion. In addition, it appeared that in some instances farmers are over-applying chemical inputs including DAP and urea.

As an illustration of the scale of the fertilizer subsidy in India, a representative of a leading chemical manufacturer stated that the fertilizer subsidy is greater than the national defense budget.

The government-subsidized price for urea is Rs 251 per 50kg, and if there is any markup at retail, it is within Rs 10. The availability of urea was not cited as a major constraint for the farmers interviewed. But urea promotes only vegetative growth, not root system growth, and thus must be used in conjunction with phosphate-based fertilizers such as NPK or DAP.

NPK, or nitrogen, phosphorus and potassium, is another fertilizer used. The locally recommended formulation is a ratio of 20 percent of each of the three active ingredients (20-20-20). A leading chemical producer stated that manufacturers in India often produce at the ratio 12-12-12 due to unavailability of raw material inputs. This in itself is far below recommended formulation, and the product is further cut to the point of 6-6-6 or 2-2-2, which is nearly useless. More destructive yet, at the dealership level, NPK is being repackaged and sold in DAP bags for a much higher price (the price of a bag of NPK is Rs 327/50kg). Those farmers who cannot discern the difference visually buy the false DAP and unknowingly use it improperly (to reduced effect). A further problem was the availability on the open market of a range of poor quality fertilizer that had been cut with foreign matter. This extended to seed as well with non-certified seed falsely labeled being sold in local markets.

A further constraint in the fertilizer area is the emergence of the “bio-fertilizer” industry. Large numbers of very small manufacturers are producing bio-fertilizers of very questionable quality. There appears to be significant lack of regulation, grades, standards, or quality assurance in this industry. An example of this was explained as one manufacturer sourcing composted city waste for Rs 20-30/bag, labeling it “bio-fertilizer” and selling it to unknowledgeable farmers at costs upwards of Rs 600/bag. A fertilizer danger lies in the potential for health hazards due to the presence of high levels of heavy metals.

B. Lack of Knowledge in Cultivation and Post-Harvest Practices

Farmers prioritize volume over value, especially for rice. Information gleaned throughout the interviews indicated that farmers continue to use agronomic methods that do not optimize land and input use to maximize yields. For example, farmers use mixed seed and plant and fertilize by broad casting. Methods such as direct seeding for rice and zero-tillage for wheat are largely absent.

While some farmers reported only minor storage losses, many others experience large losses ranging as high as 10 to 30 percent and higher in some cases. Grain stored on the farm over the storage period is exposed to damage from both moisture and insect infestation, which result in rapid and extensive quality deterioration. Farmers use some chemicals such as Malathion and Celphos to minimize pest damage, but input suppliers interviewed noted that these chemicals are outdated and/or banned. When improperly used and applied, Celphos tablets in particular are extremely toxic and dangerous and have resulted in many casualties. The current method of farmer utilization of Celphos tablets is to insert the tablet, wrapped in cloth, into a bag of grain. This method is effective only for a relatively short period of time. A Celphos powder has replaced the banned tablets, but its use is restricted and many farmers are unaware of its use and availability. Another way grain is stored is in bulk in pits, as described earlier. If grain is not pre-treated with appropriate storage product dust or local remedies such as neem ash and tumeric powder prior to placement in the pit, and the pit is not sufficiently airtight, further damage will occur.

In addition, there is a lack of standard independent training and extension services relating to cultivation and post-harvest practices. While the government and various private entities offer some services, they are either not reaching smallholders, or they are available in superfluity and thus too confusing and time-consuming for smallholders to navigate.

C. Land Management and Irrigation

There is a major lack of knowledge among smallholder farmers on proper land management, soil testing, and crop rotation. Most wheat and rice farmers use the same land for both crops, and plant a steady rotation of the two. Cultivating cereal after cereal does not allow the soil to replenish itself, resulting in high nitrogen depletion and lower yields. The resistance to crop rotation stems from the reliance on grains for food purposes and therefore a focus on quantity produced. For example, pulses, which would replenish soil fertility by nitrogen fixation, do not produce great enough quantities for subsistence and/or sale, particularly within small land areas. While soil testing facility seems to be fairly widely available, the farmers interviewed do not currently test the soil for fertility.

Irrigation is a major constraint for smallholders. Rice is particularly sensitive to drought conditions and wheat particularly susceptible to water logging, both of which were cited as frequent problems for farmers interviewed. Farmers in some districts, such as Unnao, also report considerable problems with high salinity. There are bore holes dispersed throughout the program area, but they are quite limited and many farmers indicated that they are too costly to drill. Most smallholder farmers interviewed rent irrigation pumps either individually or sometimes as a group. Again the potential for efficiency here is often lost as farmers prefer to deal with the pump renters individually thinking they can strike a better deal.

Uneven land is also a problem in some of the program areas, especially in Unnao. Lack of land leveling means that irrigation results in uneven water distribution as described above. Due to these risks associated with rice production, smallholders are reluctant to engage in the production of rice varieties with higher value and quality characteristics, and tend to focus on volumes of common varieties of rice and wheat for their livelihoods. Overall, the lack of knowledge, organization, and management of soil and water creates inefficiencies, losses, and reduced yields and incomes for smallholder farmers. PIKA has committed to measuring water use efficiency increases, current knowledge and understanding is weak, AFPRO will need to conduct detailed analysis of true cost of irrigation as an input.

D. Weak Horizontal Linkages

Although farmers' clubs have begun to form in the districts studied, they are new and lack organizational capacity. Trust among members is still nascent. The main benefits to membership that farmers see so far are shared labor and collective use of irrigation equipment. Farmer clubs are not yet being used for developing economies of scales or market bargaining clout. Concepts such as bulking or collective sales and direct linkages to higher levels of the value chain are untried. There is an additional potential for the development of community savings and credit. One of the main hindrances to group capacity development is the farmers' strong preference to deal on an individual basis when making decisions on these issues.

E. Lack of Vertical Integration

Market fragmentation at the production and trading levels is a clear constraint for the rice and wheat value chains in the areas studied. As noted earlier, one source estimates that 75 percent of land holdings in Uttar Pradesh are less than one acre. Smallholders produce small volumes (exacerbated by lowered yields due to the constraints mentioned above), and the lack of horizontal collaboration also noted above results in a large number of low-volume, high-cost transactions for collectors and traders. Poor transportation infrastructure also increases the difficulty in transporting economically viable quantities of grain from farm locations to higher trader levels.

In addition, there are a very large number of collectors dealing in quantities as small as 10kg, transporting grain by bicycle or horse cart. Take as an example Unnao, where about 650 mandi wholesalers or commission agents are supplied by 400-500 traders. In a market where profit is being made on the basis of volume, this fragmentation and high competition obviously lowers profitability for individual traders, and it also leads to inefficiencies in the value chain as a whole. It impedes the establishment of basic grades and standards and prohibits smallholder bargaining power. This fragmentation also leads to other systemic inefficiencies, such as a proliferation of scales with inexact calibration.

F. Market Distortion

In addition to subsidizing seed and fertilizer, the government sets a minimum support price for the purchase of grain. In theory, this is the price at which FCI would buy the grain from the farmers, but because farmers cannot aggregate, traders provide this function, paying farmers less than the minimum support price and delivering to FCI. While farmers are

technically allowed to seek higher prices elsewhere, the price generally marks what farmers can get for their grain. The intention is to keep prices at retail from rising above a certain unspoken level so that staples are affordable for consumers. Although retailers do not always stick to this understood level, the minimum support price does have the effect of narrowing the margin from sale at farm gate to sale to end consumer, and in turn, of holding down prices at farm gate. Temporal price variation is also quite small (within Rs 1-2/kg). The effects of the fertilizer subsidy program are also directly related to narrow trading range.

V. Opportunities

Despite the considerable constraints listed above, there are many opportunities for the rice and wheat value chains in Uttar Pradesh to increase efficiency, improve the flow of learning and benefits, and take advantage of market trends to increase incomes for smallholder farmers.

A. Improving Cultivation and Post-Harvest Handling Practices

There are many opportunities to increase yields and incomes through improved knowledge of planting and cultivation techniques and post-harvest handling. Training could be provided on direct seeding for rice and zero-tillage for wheat, and this should be coordinated with PIKA project partner, the Rice-Wheat Consortium, in conjunction with land management and water use recommendations emerging from AFPRO, another PIKA partner. In terms of post-harvest handling, there is an opportunity to reduce storage losses through education on on-farm storage techniques that utilize current appropriate technology solutions and correct chemical usage for controlling storage pests. Local remedies such as the use of neem ash and tumeric powder incorporated with the improved in-house pit method of storage should be



Rice Harvesting

extended. The adoption of these measures could greatly reduce storage loss and enable farmers to market surpluses to take advantage of price fluctuations without quality loss. At the very least, small-scale farmers should apply these improved practices to the storage of seed. Proper handling and storage of seed from one crop year to the next has the potential to reduce farmer input costs. In addition, at the milling level, improved storage capacity has the potential to allow the millers to operate at full capacity all year.

Another opportunity for increasing yields over time lies in better crop rotation patterns. Increased knowledge about and application of pulse crop rotation to fix nitrogen in the soil would produce higher yields over time and reduce fertilizer requirements (a serious constraint in itself). One way for farmers to increase their knowledge about this land management issue is through use of the soil testing services provided by private companies. This service appears to be readily available after talking with input suppliers such as IFFCO, Chambal Fertilizers, and Tata Chemicals, although interview data indicate smallholder farmer

utilization of this service is low. Educating farmers through soil testing services would improve land management and the introduction of balanced fertilization. Village youth can play an important role in this through a training program that focuses on youth as soil testers, providing them with adequate training and access to soil-testing kits.

B. Leveraging Vertical Linkages

Vertical linkages can be leveraged to increase the flow of information to farmers. At the input supplier level, opportunities exist for vendors to act as conduits of information to the benefit of both the farmers and themselves. Some input suppliers attend government-sponsored seminars and workshops and are knowledgeable about the proper use of fertilizers, pesticides and storage chemicals, as well as seed varieties and planting techniques. If information transfer between input suppliers and farmers is better organized and communicated and linked to commercial incentives, it has the potential to gain trust and credibility within the smallholder community. Input suppliers have the opportunity to engage in promotional/education events which may lead to prepaid purchase schemes for seeds and other inputs to increase their sales and ensure farmers supply and access to information. Individual input suppliers, with the help of ADP staff, should organize direct contact with farmer groups. These contacts could then be used to stage input promotional events around the proper application and use of inputs including seed, fertilizer and chemicals. These events could then be directly tied to sales agreements that are tied to timely availability.

Strengthening vertical integration at the trading level also presents an opportunity to create efficiencies in the value chain. For example, local traders operate on margins of approximately Rs .5/quintal. Normal operations involve the consolidation of one tractor-trolley (50 quintals) per day during peak season. Peak season for wheat lasts approximately two months at harvest, April to May. By improving vertical linkages to producer groups, significant transaction cost savings could be realized. These savings could translate into increases of efficiency and income at both the trader and producer levels. A similar mechanism can be incorporated between higher-level traders and millers and village-level traders. For example, mandi traders require minimum shipments of 10 tons. Consolidation of this amount at the local trader level would eliminate transportation costs for local traders and provide greater efficiencies to mandi CAs through more rapid turnover.

C. Accessing Alternative Marketing Channels

Another way in which vertical linkages can be streamlined and leveraged is by taking advantage of alternative marketing channels to supply directly from farmers to large retailers. Retailers like ITC and Pantaloon Foods (Big Bazaar's parent company) have received government licenses to source grain directly from smallholder farmers, and are interested in doing so provided the product meets their quality standards. This alternative channel creates efficiencies by avoiding transaction costs associated with the mandi system. There is an opportunity for smallholder farmers to link directly with these large retail firms through buying centers established by the retailers. These buying centers were apparently only open for a window of approximately 3 months at harvest time (April-June). Prices quoted by farmers and ITC officials were approximately Rs 1/kg higher than prevailing market rates. This would require farmers to improve quality standards and grading at the farm level, but

could result in higher prices and higher profit through direct supply linkages. Through a more effectively instituted system of quality grades and standards, these alternative marketing channels appropriately incentivize upgrades at the input and production levels and give both farmers and retailers better control over the handling of the product. Direct procurement channels also offer reduced transport and transaction costs.

D. Strengthening Horizontal Linkages

There is a significant opportunity to strengthen horizontal linkages among farmers by increasing the organizational capacity of the farmers' clubs that are beginning to take shape in the program areas (see Improving Business Skills below). These clubs could be used as points of aggregation to create bargaining power and economies of scale for farmers. Traders could encourage farmer club bulking for price incentives and reduced transaction costs. Bulking at farmer collection centers has the potential to increase the volume small traders can move, and because traders make their incomes based on high turnover, this would be a sufficient incentive to pay a higher price than they do at farm gate. Mandis generally do not operate at full capacity, and could certainly absorb the increase at peak season. In addition, if farmer clubs can absorb the capacity to bulk 50-bag shipments, they can hire a tractor trolley and directly deliver to FCI buying stations, thus obtaining the full minimum support price (Rs 50/quintal price increase).

More efficient operation of farmer clubs inherent in aggregation activities and the associated creation of economies of scales and bargaining power may have the added advantage of increasing transparency in vertical linkages by influencing trader associations who currently operate primarily as price-fixers. Strengthened horizontal linkages among farmers could also lead to coordinating input purchases and arranging for collective acquisition and use of irrigation equipment. The clubs could also be a good organizational tool for training and retaining information in villages. There is also strong potential for links with existing self-help groups, particularly those operated by women.

E. Improving Business Skills

Most smallholder farmers interviewed do not currently have an accurate calculation of their land holding, costs of production, break-even points or revenues. They do not efficiently seek higher profits based on temporal or spatial arbitrage. There is an opportunity to improve yields and incomes by employing ACDI/VOCA's "Farming as a Business" training, which improves farmers' capacity to manage their activities from a more business-oriented standpoint, including introducing detailed record-keeping, cost controls, and analytic tools that result in improved economic performance. ACDI/VOCA has conducted this training successfully in a number of farmer communities, including non-literate, using a lead farmer Training of Trainers (ToT) approach. The ToT program could lead to building community-based extension capacity to deliver improved production and marketing techniques to lead farmers and producer groups.

There may also be opportunities for other actors in the value chain to improve their business skills, service provision, and service diversification through ACDI/VOCA's business development skills training.

F. Developing Support Services

Making better use of existing support services and working collaboratively to develop others may increase efficiencies in the value chain. Specifically, existing support services in soil testing and pest management, which are currently unused by smallholder farmers, have the potential to improve their land management and minimize storage losses, as noted above.

An emerging trend in financial services is “branchless banking,” whereby a bank sends a representative to villages to collect deposits and issue withdrawals. Discussions with one such operation are underway, which will enable farmers to apply for loans at a ratio of four to one up to Rs 50,000 per member once they have established savings programs and equity positions. There is an opportunity to increase this service to serve smallholder farmers in the program area, increasing their access to credit and enabling them to better manage cash flow and savings. The availability of rural financial services, particularly savings mobilization, linked to a credit facility, has significant potential to improve business operations at local levels of the value chain.

Information technology-enabled solutions also have the potential to increase access to extension and market information for farmers and to link smallholder farmers to alternative marketing channels. An example of this already in practice is ITC’s e-Choupal system, which utilizes internet kiosks to link farmers to buyers and information. Additionally, IFFCO implements Kissan Sanchar, which operates on a very similar model for the delivery of technical messages. ACIDI/VOCA is in the process of expanding this system in collaboration with InfoSys and IFFCO, which may provide further potential to expand this type of service to other major retailers, giving farmers the opportunity to realize higher sales prices and increase their knowledge of farm management.

G. Establishing Grades and Standards

Consistent quality grades and standards in the rice and wheat value chains in Uttar Pradesh could improve significantly. In both the wheat value chain, discounts for poor quality characteristics are applied by both traders and millers. However, traders operate mainly on visual inspection, while millers requiring hiring levels apply more specific tests, such as for moisture content and broken and pest-damaged kernel percentages. These standards are set by individual millers and not communicated throughout the chain to farmers. A clearly understood set of grades and standards that are consistent throughout the chain and based on price signals could significantly enhance efficiencies and could increase the amount of high-quality product flowing through the value chain.

In the rice value chain, there is more quality differentiation and variation, but standards are also inconsistent. End-market price signals from retailers indicate a willingness to pay price premiums for higher-quality grain. However, inability to access capital and the seasonal utilization of rice mills seem to hinder upgrading in response to these signals.

VI. Potential Recommended Activities

PIKA faces formidable challenges in attempting to create competitiveness in two value chains that are inherently tied to food security, food policy, and food politics. Mechanisms such as large-scale subsidies for production and price controls considerably inhibit the ability to implement more market-based intervention strategies. However, PIKA has opportunities to contribute to efficiencies and incentive-driven upgrades within these value chains that could improve producer market positions and increase incomes. The life of the project will limit what PIKA can viably undertake. The recommendations put forth below were formulated taking these constraints into account.

A. Develop the Capacity of Farmers' Clubs

There is a significant opportunity and need to develop the capacity of farmers' clubs in the PIKA operational area to increase commercial capacity and help build industry vision. Through collective activity, the farmers' clubs will become more integral to the value chain as a whole. It is recommended that PIKA staff expand upon existing local capacity building efforts and deliver a Training of Trainers (ToT) program based on ACDI/VOCA's "Farming as a Business" curriculum to existing farmers' clubs and self-help groups (SHGs) as well as with other partner organizations. As mentioned earlier, ACDI/VOCA has successfully conducted this training in various farmer communities. The PIKA program should look into conducting this training as a ToT using an ACDI/VOCA master trainer should budget allow. The ToT program could lead to building community-based extension capacity to deliver improved production and marketing techniques to lead farmers and producer groups. The activity of these groups is currently limited to membership for services such as input supply, land clearing, irrigation, and/or potential credit access. These groups need to go beyond this concept and operate more as marketing cooperatives, absorbing the functions of consolidation and bulking to improve market position and reduce the number of transactions in the chain. In addition, the "Farming as a Business" training will improve producers' understanding of production costs and break even points and of price structure throughout the value chain.

B. Improve Vertical and Horizontal Linkages

There is a critical need to improve vertical and horizontal linkages in both value chains. These types of direct links between producers and buyers can be accomplished by PIKA in two ways: 1) through the continued formation and strengthening of farmer clubs, as recommended above; and 2) by increasing the commercial orientation of farmer clubs through the establishment of ties with input suppliers and local traders. The current market underutilizes end markets as signals for market opportunities and product demand. PIKA should seek to establish transparent, incentives-based relationships through mechanisms such as promotional events, prepaid purchasing schemes, and price premiums tied to aggregation for local traders. For example individual input suppliers, with the help of ADP staff, should organize direct contact with farmer groups. These contacts could then be used to stage input promotional events around the proper application and use of inputs including seed, fertilizer and chemicals. These events could then be directly tied to sales agreements that are tied to timely availability based on cropping calendars.

C. Expand Private-Sector Extension Services

Both value chains are input-driven, with fertilizer being critical to industry expansion. Agro-input entities, such as IFFCO, Chambal Fertilizers, and Tata Chemicals, and their linkages to district-, block- and village-level wholesalers and retailers are essential to the efficient operation of these value chains. PIKA should collaborate with these chemical companies to establish a cadre of village youth within the program operational areas who are trained to a certain competency level to supply soil-testing services to the community. This integration of large chemical companies and village youth will expand the extension services such as soil testing to reach the village level. To make this service sustainable beyond the life of the project, this should be done on a commercial fee-for-service basis to provide an incentive to the youth. Negotiations with these companies, IFFCO, Tata, Chambal, should begin immediately to begin to discuss the structure of this program. Assistance with the organization of smallholder seed multipliers and linkages to agro-input suppliers can be also achieved in the short-term.

D. Upgrade Business Capacity at the Farm Level

The value chain analysis team received several estimates of the cost of production from various farmer groups and individuals. PIKA needs to monitor actual costs in a detailed way this production season to establish a database to be able to make production recommendations for next year's season. This type of information should be obtained and understood for all other actors in the value chain. One way this can be accomplished is by training farmers in record-keeping that would feed into a PIKA database. Close collaboration with a sample survey of other actors, traders, millers, transporters, mandi agents in each ADP should also feed into this data base. PIKA should utilize this database in collaboration with other PIKA partners such as AFPRO and the Rice-Wheat Consortium to formulate production recommendations for the coming season.

E. Improve Market Linkages

Current marketing involves supporting multiple stages of middlemen from farm to processor. Further, without the establishment of proper grades and standards grain will often have moisture content levels and other quality determinants exceeding processor quality requirements. Linkages between farmer clubs and processors like ITC or Cargill will encourage the better understanding of product quality control requirements that can be standardized within the value chain at all levels. This will create efficiencies in which higher percentages of quality grain are being marketed, resulting in higher returns throughout the chain. During the coming buying season (April-June), ADP staff should investigate the costs and benefits of sales to buying centers, initiate and facilitate trail sales to ITC and/or Cargill. During an interview, the ITC manager in Lucknow agreed that before the start of the season ADP staff should approach their buying center to determine the projected price and quality requirements. The buying center is located approximately 16km from several farmer groups in Unnao, and ADP staff could facilitate direct sales from farmer groups of tractor-trolley shipments of 50 quintals.

F. Improve On-Farm Storage

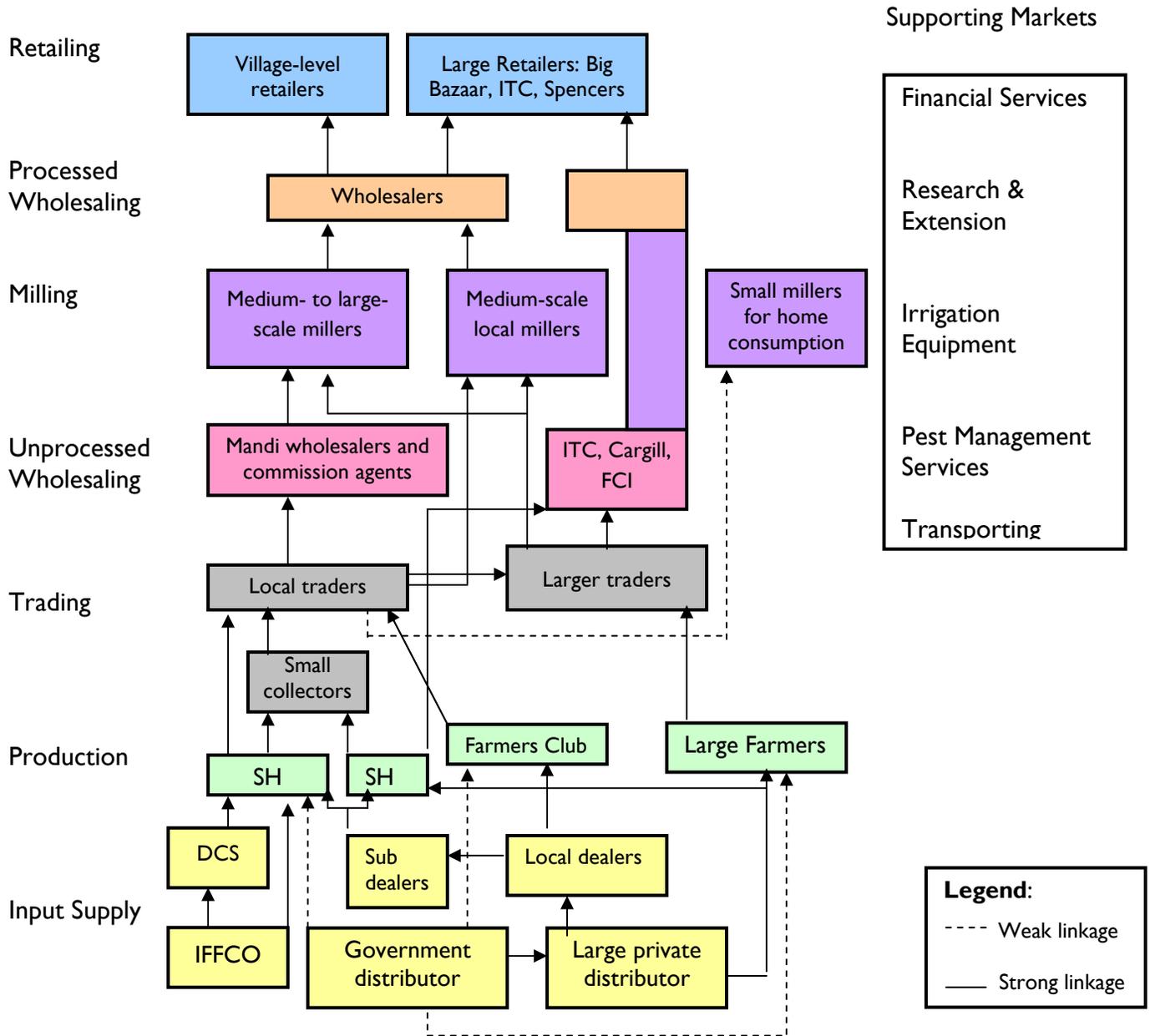
The introduction of improved on-farm storage capacity will lead to reduction in losses from levels that may be as high as 30 percent to manageable loss levels of 5 percent or below. This will have a direct impact over farmer household income as well as increased ability to be a more active participant within the value chain. Over the next six months, PIKA should thoroughly investigate local storage regimes at the farm level including establishing the true range and types of losses that can be addressed over the life of the project. In collaboration with partners such as the Rice-Wheat Consortium, PIKA should develop a list of recommendations for improved on-farm storage that incorporate local remedies and appropriate technologies as well as the proper use and application of storage chemicals. PIKA should collaborate with input suppliers and pest control service providers in this effort.

G. Establish Grades and Standards

Market information and prices are currently controlled by traders. There is a need for greater market transparency with learning and benefits transferring to producers. The establishment of floor prices with the intent of artificially keeping the price of wheat and paddy low creates market distortions throughout the chain. Rather than acting as a holder of strategic reserve and a buyer and seller of last resort, the FCI floor-setting mechanism is effectively a price control that defines the trading band. The identification of win-win partnerships between producers and other value chain actors will facilitate the off-setting of this constraint. As an example, there is a critical need for quality-based price incentives if current prices and demand for these products will support these price differentiations. PIKA should introduce a basic set of industry-accepted grades and standards throughout the value chain, including at lower levels.

Annex I: Value Chain Map

MAP OF UTTAR PRADESH WHEAT AND RICE VALUE CHAINS



Annex II: List of Constraints and Opportunities by Actor

INPUT SUPPLIER

- **Constraints**
 - Lack of supply of fertilizer
 - Poor quality fertilizer on the market
 - Lack of access to credit
 - Difficulty in transferring knowledge of how to use inputs to farmers
 - Lack of knowledge of pesticide handling throughout the pesticide supply chain
 - Lack of improved agricultural techniques and knowledge among farmers
 - Lack of knowledge for advising on-farm storage solutions for smallholder farmers
 - IFFCO prohibition on selling other brands while selling IFFCO fertilizer

- **Opportunities**
 - Input suppliers have good relationships with farmers and can act as conduits for information
 - Demand for varieties and higher quality seed
 - Establish linkages with chemical company reps. for technical outreach
 - Potential for promotional events to disseminate knowledge and increase sales
 - Potential for prepaid purchase schemes to increase sales and ensure supply to farmers
 - Inputs packaging oriented toward smallholders

SMALLHOLDER PRODUCERS

- **Constraints**
 - Lack of irrigation equipment, available and low-saline water (clean water at depths of 200 feet and below), and land leveling
 - Fertilizer shortages and lack of understanding of proper use and application of inputs to maximize returns
 - Input application rates are calculated in acres; farmers work in bighas
 - Farmer inability to take maximum advantage of market fluctuations over time
 - Lack of credit
 - Poor land and soil fertility management and over-reliance on cereal mono-cropping (rice-wheat-rice-wheat rotation)
 - Lack of independent standard technical extension service and confusing, overlapping private sector-based extension messages
 - High storage losses (estimated at 20-30%) due to pests and moisture damage
 - Difficulty in obtaining accounts in government cooperative society
 - Lack of economies of scale and market bargaining power due to nascent farmer clubs and associations
 - Infrastructure constraints (farm-to-market access roads, electricity)

- **Opportunities**
 - Large local and regional demand for rice and wheat, the staple crops of India
 - Many farmers are open to new ideas and willing to change their agronomic practices to increase productivity
 - Collective acquisition and use of land management and irrigation equipment
 - Increased knowledge of soil fertility and crop rotation leading to greater productivity (e.g, improved linkages with input suppliers, soil testing, etc.)
 - Increased knowledge of post-harvest storage techniques to reduce loss
 - Strengthen farmers' clubs to increase benefits, for example coordinated input purchase, crop aggregating and direct delivery and establishing collective savings
 - Application of Farming as a Business training

SMALL- AND MEDIUM-SCALE TRADERS

- **Constraints**
 - Lack of available operating capital
 - Transportation and road infrastructure (capacity, rented tractors/trucks, road conditions)
 - Small quantities and high transaction costs
 - Inconsistent quality
 - Differences in scales result in lack of trust and transparent method of verifying weights
 - Overly bureaucratic, inefficient and corrupt shipment registration process and delays in payment
 - Seasonal business and high concentration and competition during a short period
 - Lack of communication, transparency and trust among traders and producers
 - Large numbers of small traders supplying mandi traders (excessive market fragmentation)
 - Government-set prices limit market efficiency
- **Opportunities**
 - Establishment of consistent grades and standards to improve efficiency
 - Potential to act as conduits of market information to farmers
 - Potential to encourage farmer club bulking for price incentives and reduced transaction costs

MANDI WHOLESALERS

- **Constraints**
 - Lack of infrastructure (roads, procurement platform, proper storage to reduce quality loss)
 - Lack of insurance facility for produce
 - Bureaucratic procedures, payment delays and corruption
 - Large number of suppliers (e.g, 400-500 in Unnao alone)
 - Large number of mandi traders (commission agents) (e.g. 650 in Unnao)
 - Limited grades and standards

- **Opportunities**
 - Improve relationships with network of traders and producers
 - Improve vertical integration
 - Potential for information technology to be used at all levels of chain for increased efficiency

SMALL- AND MEDIUM-SCALE MILLERS

- **Constraints**
 - Inconsistent electricity supply
 - Lack of most efficient milling technology
 - Lack of labor
 - Seasonal business (for medium-scale)
 - Inefficient dealings with FCI (long waiting queues for delivery, quotas, and taxes)
- **Opportunities**
 - Potential to increase efficiency with better technology
 - With better supply and storage, mills could run at full capacity all year (for medium-scale only)
 - Potential for improved business management and service diversification

LARGE-SCALE MILLERS

- **Constraints**
 - Lack of consistent supply of quality product
- **Opportunities**
 - Able to provide credit to other actors
 - Well-functioning equipment
 - Good relationships with other actors in the chain (smaller millers, traders)
 - Potential for growth with increased supply
 - Ability to deal in diverse value chains (potato, rice, wheat, etc)
 - Potential to take advantage of market differentiation and changes in demand

RETAILERS

- **Constraints**
 - Limited operating capital
 - Direct buying from farmers and mandi traders requires license
 - Price structure overly regulated by set support price
 - No incentives for quality differentiation
- **Opportunities**
 - High demand for rice, wheat and flour
 - Potential for alternative marketing channels to allow direct procurement

SUPPORT MARKETS

(Financial Services, Packaging, Transporting, Research and Extension Services)

- **Constraints**
 - Lack of finance outreach to rural areas
 - Low organizational capacity of farmer clubs
 - Low utilization of support services (soil testing, storage capacity)

- **Opportunities**
 - High demand for wheat and rice
 - Increase number of banking branches with use of branchless (mobile) banking
 - Appropriate technology solutions to storage capacity and chemical use
 - Smallholder-appropriate input packaging and associated technical advice to increase sales

Annex III: Stakeholders' Workshop Agenda

Workshop on Value Chain Assessment *For* Wheat and Paddy in Uttar Pradesh

Sponsored by World Vision

*Hotel Gomti
Lucknow, Uttar Pradesh
November 21, 2008*

Workshop Agenda

9:30	Participant Registration
10:00 – 10:15	Welcome and Introductions Steve McCarthy, ACDI/VOCA
10:15 – 11:00	Overview of Value Chain Framework: Use of VC Map, Competitiveness Factors, Information needs, Field Methodology (Session Facilitator: S. McCarthy, ACDI/VOCA)
11:00 – 11:45	Review of Value Chain Maps for Wheat and Paddy With discussion of major findings: Opportunities and Constraints (Session Facilitators: James Varghese World Vision, Hannah Schiff, ACDI/VOCA)
11:45 – 12:00	Coffee Break
12:00 – 1:00	Participant discussions of findings that identify and agree upon, Map & Constraints and Opportunities
1:00 – 2:00	Summarize Opportunities and Constraints with a view to developing the Value Chain Working groups (Session Facilitators: Team)
2:00 – 2:15	Workshop Wrap-up
2:15 – 3:30	Lunch

Annex IV: List of Interview Contacts

Date	Interview Details	Place
08/Nov/2008	Farmers Club	Village: Sultanpur Aant, Sikandarpur Sarosi Block, District Unnao
	Farmer's Club	Village: Sathra, Sikandarpur Sarosi Block, District Unnao
	Input Supplier, Village Level, Mr. Shailendar Singh Chauhan	District Unnao
	Input Supplier: Janta Beej Bhandar, Mr. Lalit Kumar	District Unnao
	Farmers Club	Village : Singtara District : Barabanki
	Local Collector, Amar Singh	Barabanki
	Local Collector, Rinkoo Jaiswal	Barabanki
	Input Supplier (Kapil)	Tikait Ganj, Barabanki
11/Nov/2008	Miller, Vijay Kumar	Barabanki
	Retailer/wholesaler	Barabanki
	Retailer	Barabanki
12/Nov/2008	Trader	Barabanki
	Large miller, Bhupender Singh	Barabanki
	Transporter	Barabanki
13/Nov/2008	Small Trader (Local Collector): Mr. Zaleel	Village: Hafeezabad, Sikandarpur Sarosi Block, District Unnao
	Farmer's Club	Village: Sathra, Sikandarpur Sarosi Block, District Unnao
	Large Farmer	Village: Sathra, Sikandarpur Sarosi Block, District Unnao
	Input Supplier, Unnao Krishi Sewa Kendra, Mr. Vineet Tripathi	Unnao
	Farmer	Barabanki
	Input Supplier	Barabanki

	Input Supply Wholesaler	Barabanki
14/Nov/2008	ITC, Mr. Sachin Sharma (Branch Manager), Mr. Anurag Sinha, Manager - Trading	Lucknow
	Pest Mortem, Mr. B. S. Chandel	Lucknow
15/Nov/2008	Food Corporation of India, Mr. Ashish Singh (General Manager)	Lucknow
	Mr. Indresh Gupta, Madhyanchal Organic Farmer's Association	Lucknow
17/Nov/2008	IFFCO Store, Mr. Athar Singh	Unnao
	Retailers of wheat and rice	Unnao
	Big Bazaar	Lucknow
18/Nov/2008	Local Mandi	Unnao
	Rice Farmers	Villages: Rajaramkheda, Lalakheda, Sikandarpur Sarosi Block, District Unnao
	Farmer group	Village: Mohadinpur District: Unnao
	Retailer	Unnao
	Retailer	Unnao
	Wholesaler	Unnao
19/Nov/2008	National Seed Corporation, RP Singh	Lucknow