

Finance of Agricultural VC – Potatoes in Bangladesh

Potato in BD

- 12th ranking producer globally;
- Popular crop (profit, yield, intercropping);
- Gr. rate 11.2% 2004-08 (last decade 5.2%);
- Exports: 29.2% gr. Area: 8.3%;
- Cash incentive for exports 20%;
- More recently: prices rose sharply (2009)

- Price Variability: Very High & of acute public policy concern
- Seasonality also considerable: Peaks (March, Oct) and Troughs (Feb, July).
- Potato seasonality and rice price seasonality are inversely correlated – good for food security

Nature of financing:

- Endogenous (within circuit by traders/aratdars)
- Exogenous: from Banks, especially to the cold storage sector and large traders/aratdars
- Contract farming/supermarkets
- Informal finance, remittances, microcredit (2rd exogenous element that has altered the rural financial matrix).

This Study: SCP and VCF Needs

- Pseudo panel data on 16 villages (in four districts) in the North (top potato growing regions): Periods: 2013-14 and 2007-08 – ‘the reference period’;
- Household data on 252 hh (16-17/village) with a lot of detailed information on the hh economy
- Data on 205 traders (located in/near the producing zones) including small and medium traders, wholesalers, and *aratdars*.

THE UPSTREAM CONTEXT: 2007-2013/14

Demographic and Occupational Profile

Population: over 70,000 in 2013-14, recording an increase of 24.5% since 2007. The number of farm households was 9200 (ie. 21.6% increase)

- Non-farm households in 2013-14 was less than 10% of total households but increasing at around the same rate as population;
- Number of households operating 'self-hired businesses' rose sharply by 54.7% – at double the population growth rate.

Human Resources: Feminization of Labor Force

- Labor force participation rose by 34.6%
- Female participation (47% increase);
- Male participation grew by 28.5%.

Human Resources (contd.)

Of the incremental labor force:

- 26% - work within the village
- while 57% work outside
- Sharp rise in the percentage of people, especially females travelling outside the village to work.

Basic Services

- Dramatic rise in adults reporting more than 12 years of schooling (53.6%)
- Schools: increased from 32 to 36 (12.5%);
- Clinics: quantum jump rising from 3 to 7 (133%).
- **tap water** access rose by 72%; electric connections by 45%; **cell phones** by 160%
- 95% of households own a cell-phone.

Infrastructure

Irrigation

- Usage: rose by 26.5% (ownership/renting by 30%)
- Coverage: slower expansion, from 82% to 91%

Social Capital

College students: increased by 57%;

Local associations: doubled (20 to 41);

Land

- Small decline in cropped area but decline in per household land ownership significant;
- Landlessness increased in absolute terms by over 10 %;
- In relative terms this has remained almost same (9.4% in 2013/14 and 10.7% in 2007).

Wages

- Female wage rates grew more sharply (busy season)
- Ratio of female/male wages improved for the busy season but deteriorated a little during the slack season.

	Busy		Off	
	2013/14	2007	2013/14	2007
M	312.5	222.5	236.3	180.6
F	187.8	119.4	141.3	116.3
F/M ratio	0.60	0.54	0.60	0.64
M growth%	40.5		30.8	
F growth %	57.3		21.5	

Land Ownership

- Per household land ownership declined from by -21.5%
- For arable land: it declined by -19.6%

	2013	2007
Landless households %	9.4	10.7
land/hh (ac.)	0.62	0.79
Arable land /hh, ac.	0.49	0.61

Non-Farm Economy

- Non-farm: expanded by 20% in terms of the number of businesses
- Service establishments (rent out machinery and equipment) account for more than a quarter of all establishments – a category that was barely known before 2002.

Storage and Credit

- Cold storage capacity in the sample villages trebled, from over 66000 tons to 190,000 tons over 2007 to 2013/14.
- In 2007 around half (51%) of farmers reported going for cold storage. In 2013/14 this figure went up to 65%.

Price risks remain significant.

Access to Credit

- Number of MFIs rose by 24%;
- Demand for larger loans growing
- Little expansion in formal credit

UPSTREAM: PRODUCER HH

Education

- Two-thirds of all household members reported having an education level of 5 years or more;
- 14% HH reported at least 11 years of schooling. The pattern noted in above table is similar across land-size groups, except for 'large';
- Sample HH are predominantly agricultural households, i.e. in small, family-owned farms.
- More than 70% of the total cultivated land is 'owned' and another 26% is rented in (with cash) while just over 2% is shared-in.
- 318 land lease contracts reported by 252 HH.

Migration

- 7.5% HH reported seasonal migrants and 24.2% reported permanent migrants.
- Highest proportion of migrants from 'small farm' category.
- Significant migration from all categories, including 'large farm'

Remittance

Land Size Group	Mean	N
marginal	1075	18
small_1-2	6153.85	39
medium1_23	10349.56	110
med2_34	13593.75	64
Large	44761.90	21
Total	12610.89	252

- On average, BDT 12,610 was received, ranging from BDT 1075 for marginal to BDT 44,761 for the large farms.
- Actual HH: 24 and remittance BDT 132,000 /HH

USE OF REMM: 'daily expenditure' (42%) followed by agricultural inputs (29.2%) and leasing/renting land (16.7%).

Agriculture

Input Credit

The sources of credit in 2013-14:

- 'Friends and Relations' (>50%);
- MFI - 30 %
- The rest are drawn from informal lenders or banks.
- **Interestingly, wholesalers/ input traders not important.**

Financing Potato Cultivation Costs

1. The manual activities (labor costs) increased to BDT 21062 (29.7%) from 16,234 per farmer, over the reference period. Costs related to land preparation, fertilizer and pesticide application, and irrigation went up relatively faster.

2. Costs due to mechanized activities rose from BDT 8011 to 10,952 (37.7%) per farmer, land preparation being the most important.

Both are indicative of robust expansion in labour demand. Credit for such activities hardly seen.

Ownership of Machinery and Equipment

Significant penetration of capital machinery appears to have taken place. The most common piece of equipment owned is spraying machines for application of pesticides, owned by 243 farmers out of 252.

A poor second is 'tractors/tillers' owned by 65 farm households (26%). In addition, a host of other machinery ownership has been reported .

Apart from capital deepening as seen from above, we also note a clear trend towards a newly developing equipment rental service initiated by some owners. The income from renting out machines can be significant: Data from 32 and 14 persons renting out services shows an average income of BDT 44893 in 2013-14 up from BDT 28700 in 2007-08.

Irrigation Costs

The sample farmers reported owning 11 pumps in 2007, which went up to 25 in 2013-14. Other farmers generally were not interested in buying pumps because they had access to irrigation water from service providers.

Potato Production

Each farmer on average produces around 78 kg. of seed potatoes – the figure has remained static over recent years.

Table potato production grew at just under 8% over the period – again suggesting a fairly stagnant picture. However, looking at the disaggregated picture by land-ownership size groups, we notice that the ‘large’ farmers have in fact registered significant increases in seed and table potato production while other groups show a stagnant situation. Thus, large farms reported an increase of over 17% in seed production and around 37.5% in table potato production over our reference period. This suggests that there may be important financial or resource constraints that have served to keep potato yields repressed amongst smaller farms.

Rented Storage

Most households in the sample reported using modern storage facilities equipped with temperature control systems, on rent. Thus, 182 out of 252 hh (72.2%) reported utilizing the services of private cold storage companies, mostly on the basis of a fixed rate per unit of weight by season or the whole year. Energy costs (electricity) is almost universally included in the rent. The rental quantities are reported below.

Report		
Rental quantity (md.)		
	Mean	Used by %
marginal	283.8	22.0
small_1-2	238.7	66.6
medium1_23	137.2	78.2
med2_34	164.0	73.4
Large	196.4	76.2
Total	167.5	71

It is interesting to note that the small and marginal store higher amounts per household (average of storing households). However, it should be noted that that only 22% of marginal households actually use rented storage space, with the figure crossing 70% for the larger size-groups. Overall, 71% have access to rented storage.

Distribution of Storage, 2007 and 2013-14

The storage of table potato and seed potato registered a sharp increase over time (and across all land size groups, except 'marginal'). On average, both storage of table and seed potato went up by around 150% with the largest group showing increases in the order of 3-4 times over the reference period. This suggests a rapid rise in demand for storage space, especially in modern facilities.

All groups report significant increase in storage, except marginal.

Social Capital

Almost 100% of respondents reported that they could borrow up to BDT 5,000 in any given week if there was an emergency, and 87% reported that they could borrow BDT 10,000 if required in a week.

98% of respondents reported owning a mobile phone, with each having 146 contacts on average in 2013-14 (up from 85 contacts in 2007 – an increase of 72%). Amongst them relatives predominated (46%) and friends accounted for 40%. On average, each respondent reported having contacted around 39 persons per week over the phone (in 2013-14).

Even the 'marginal' group reported significant mobile intensification and expansion with 109 contacts each spread about equally between relatives and friends.

Income-Expenditure

Average income per HH is estimated to have been BDT 186663 (USD 2393 per annum). More than half of the income is derived from cultivation (70 %) – ranging from around 40 % for ‘Marginal’ to over 85% for ‘Large’ land-ownership size groups.

Other significant income sources are Remittance (13%) and Salary and Business (10%).

In terms of the share of total income by different land size groups, the ‘large’ account for 24% of the income while the marginal account for 2.5%. The others range between 7.4% (small) and 33% (for medium1 and medium 2 each).

Productive Expenditure

Per household productive expenditure rose around 18% over the reference period. There were some small changes in the structure of costs over time. Raw materials and labor accounted for the bulk of the costs.

Productive Expenditures		
	2013-14	2007
Exp/hh, BDT	120552	102238
(BDT)	%	%
Raw Materials	51.5	55.9
Machinery and equipment	2.9	3.9
Labor costs	32.2	28.6
Water/energy	6.3	5.6
Other	7.0	5.9

MIDSTREAM: TRADERS

Profile

There are a total of 205 traders in the sample spread across five districts and four categories (Small, Medium, Aratdar, Wholesaler). The overwhelming majority (over 95%) are sole owners with around 85% being officially registered (i.e. have a trade license) at the local (union) level.

Traders Type	Number and percent of Traders				
	Nature of Business				
	Commission	Wholesale	Retail	Total res.	Total sample
Small	2	51	17	70	53
Medium	11	49	2	62	49
Aratdar	50	17	1	68	53
Wholesaler	32	27	4	63	50
Total responses	95	144	24	263	205
Note: Total responses (percent) can be more than 100% due to multiple responses.					

- It is interesting to note that each trader often wears multiple hats. Thus, for example, almost all small traders engage in wholesaling but a significant subset (32%) also does retailing.
- Similarly, more than 94% of aratdars are commission agents although 32% are also wholesalers. Indeed, the categories of wholesalers and Aratdars seem very similar with 64% reporting engaging in commission work .
- Thus, trader categories depend largely on 'self-reporting' and not just simply on their key area of specialization. Another way of saying this is that specialization remains incomplete.
- More than 76% of sample traders own a wholesale stall in the local market (77% for 'small' ones). Around 12% reported investing in a cold store while just under 9% own a retail outlet. This suggests considerable investment in fixed assets.
- Many traders also retain significant interest in agriculture, betraying their rural origins. Over 15% of traders reported having both agricultural and non-agricultural interests with this being as high as 20% for wholesalers.

There is significant involvement of the extended family in trade as well. Around half of all traders said their relations sold potatoes, and around 39% reported supplying them.

For Investments:

Source of Borrowing/Credit	BDT	
(Mean of all traders)	Total	%
Commercial Banks	140829	37.18
NGO	26229	6.90
Relatives and friends	24146	6.40
Agricultural development bank	16537	4.30
cold storage operators/ owners	154341	40.70
Other	16732	4.40
Total	378815	100.00

The importance of cold storage owners/operators is clearly borne out (41%) with commercial banks not far behind, at 37%. Interestingly, in terms of the number of loans, NGOs were the most popular source (31%), followed by cold stores (29%) and commercial banks (14.4%).

On average, each trader took 1.18 loans with 'Small' taking 1.04, 'Medium' 2.71, 'Aratdars' 0.47 and 'Wholesalers' 0.6 each. It will be recalled that compared to producers, traders have much better access to formal sector credit.

Human Capital

There are four types of labor used by traders, namely family labor, employed workers on salary, permanent workers and temporary workers. Family workers are almost never paid a wage.

- Slight overall increase in the number of employees (from 1.4 per trader to 1.7); Nominal wage up by 88.6%.
- Significant increases in the number of both permanent and temporary workers but much slower rise in wages.
- Sharp increase of permanent (40%) and temporary workers (120%)

Wholesale Business

Procurement

Much of the procurement was channeled from small farmers (15-30%) depending on the season, big farmers (24-30%), cold storages (18-38%) and other wholesalers (17-20%). The place of procurement was the same union or upazila with other districts providing less than 13% of procured amounts.

Profitability

- If we assume seasonal arbitrage, a profit of BDT 343 per bag is estimated;
- If we assume simultaneous trade (in the low season), the rate of profit is only BDT 20 per bag. This figure declines to less than BDT 4 if transactions (purchase and sale) both take place during the high season.

DOWNSTREAM 1: TRADITIONAL RETAIL

- This section is based on the findings from 61 traditional potato retailers from the capital and four major potato growing districts of the country, namely Rangpur, Rajshahi, Bogra and Munshiganj.

Structure of Traditional Potato Retail

- 98% of the retailers reported that the retailing business was their own. The average start-up year for the retailers in the sample was in the early 2000s with an initial investment of about \$304.
- All the retailers reported selling other food products and vegetables besides potato and on average potatoes made about 42% of their total retail sales. 42% of the retailers reported that they grew potatoes.

Characteristics of Traditional Potato Retailers

Characteristics	
Gender (% male)	100
Age(mean) (years)	41
Education (%)	
No schooling	6.56
Primary (1–5 years) only	54.1
More than 5 years but not more than 9	26.23
More than 9 years	13.11
Year started potato retail business	2001
Also sold other food products (%)	100
Share of potato in his/her total retail sales (%)	42.4

Labor-Capital Usage

- Most supplied their own labor;
- Those who hired labor had on an average only one permanent worker;
- The average amount paid per month to hired permanent workers in 2013-14 was about \$ 39. The working capital requirements of the average potato retailer in 2013-14 peak season was \$ 341 while it was \$ 299 in the lean season.
- In 2013-14, 33% of the retailers used electronic scale and a mobile phone while only 15% had a vehicle for business use. Although still low, these figures are significantly higher compared to the starting year.

Conduct of Potato Retail

Procurement Methods of Traditional Potato Retailers

- In 2013-14, secondary or semi-wholesalers (i.e. wholesalers who get the potato from other wholesalers) were the major source of potatoes;
- In 2013-14 peak season farmers were also large suppliers of potato but their supply dwindled in the lean season as cold storage operators began to supply more.
- Compared to the 2007-08 period the composition of the suppliers in 2013-14 has changed only slightly.

Traditional Potato Retailers and Value-Chain Finance

- None of the retailers report having contract with their suppliers for purchasing potatoes. Only 4% of them paid advances to their suppliers while about 12% of the retailers made delayed payments. In the latter case about 78% of the total payable amount to the supplier was received as credit by the retailers (delayed payment).
- During sales none of the retailers had contract with their customers. None report receiving advance payment or providing credit (in the form of delayed payment) to their customers. Additionally none of the retailers made home deliveries.

Performance of Traditional Potato Retail

Costs of Traditional Potato Retailers

- Transportation costs (to bring in the potatoes from the supplier to the retailer's location) constitute the largest element (60.2%) of the variable costs.
- The next largest item of variable cost is the expense for potato packaging, 24.2% (price of package and labor used in packaging), but only about 30% of the retailers reported incurring this expense.
- Fees and other miscellaneous expenses made up the rest of variable costs. The variable cost per ton of potato was calculated as \$10.3 for the 2013-14 period.
- Operating expenses was \$ 443/annum and includes expenses in the avenues of electricity bills, communication, maintenance, market fees and loading/unloading expenses.

Seasonal Price Margins

- Price margins in peak and lean seasons have increased
- Highest increase was for the common and low quality potatoes.

DOWNSTREAM 2: MODERN RETAIL (SUPERMARKETS)

- Supermarkets in Bangladesh - (2% of total retail sales in 2012 - but it is growing fast.
- Dominated by 3 players: Meena Bazar (operated by Gemcon Group), Agora (operated by Rahimafrooz Superstores Ltd.) and Swapno (operated by ACI Logistics Limited). The superstore owners of the country also have an association titled 'Bangladesh Supermarket Owners' Association (BSOA)'.
- This study relies on the findings from 14 modern supermarket outlets located in the capital.

Brand and Non-brand Potatoes

- In 2014, 4 of the supermarkets sold brand potatoes, 8 sold without brand (i.e. loose potatoes) while 2 sold potatoes of both type (in equal proportions).
- Most of the supermarkets were selling 'chemical free' potatoes of both brand and non-brand type;
- It is interesting to note that price of brand potatoes sold at supermarkets is lower than the non-brand potatoes (branded comes in 5-10 kg bags) while non-brand is available in small quantities.

Conduct

Conduct: Potato Suppliers of the Supermarkets

Location/Supplier	Share in 2014
Karwan Bazar (wholesale market)	38%
Agro Company/Supplier	24%
Tongi (wholesale market)	19%
Other wholesale markets	19%

Performance of the Supermarket Segment

Price margins of the Supermarkets

- In 2014 the margin was highest for chemical free brand potatoes;
- The margins increased over time with the highest increase for the normal (non-brand) potatoes (133%). The price margin for the non-brand potatoes have stayed the same at Tk 2/kg between 2007 and 2014.

Performance (cont.)

- Eleven supermarkets reported that they directly procured potatoes from the wholesale markets.
- Two of the supermarkets had contracts with traders and cold storages for their potato supply.
- 10 of the supermarkets relied on the wholesale market price
- The majority of the supermarkets paid the potato price immediately after transaction; none of them reported using storage facilities.
- Only two supermarkets were found to ask their suppliers to deliver the potatoes. One supermarket required the potato bags to have the mark/logo of the supermarket.

Value Chain Financing: Role of the Supermarkets

- None of the supermarkets reported making any advance payments to their suppliers nor were they found to made delayed payments.
- Sales - the supermarkets do not receive either advance or delayed payments from their customers.

Last transaction

- The average supermarket procured 183 kg of potatoes for about Tk. 20.3 per kilogram in its last purchased lot with the primary suppliers being wholesalers (78%) and agro companies (22%).
- Only 3 of the supermarkets had contract with suppliers
- The supermarkets either provided transport or paid for it; average distance transported was 25.9 km.

Case Studies

- Potato processors
- Supermarket VC: Rice
- Supermarket VC: Potato
- VC for Organic Rice
- VC for an Exporter (GARI)
- Contract Farming for Potatoes (EJAB Group)
- Contract Farming for Cassava (PRAN Group)
- United Finance and IDE Rural Credit Programme
- BRAC Bank-USAID DCA (potato not included)

Policy Implications

- Government attention to the potato sector is weak (export incentive of 5% and direction by CB to lend to Ag Sector/Farmers);
- Sector starved of finance - at the upstream level access to finance still largely informal with MFIs exposure rising;
- Availability of formal finance weak and channelled to large, mid-stream entities – especially cold storages, wholesalers but not to retailers.
- Moreover, endogenous credit (within the value chain) has declined and is mainly available from cold stores for farmers or from farmers to traders (in the form of delayed payment). Thus, financing cold stores could in fact result in larger credit volumes to both farmers and traders.

Policy..

- The case studies reveal a growing private sector presence in agri-business
- Given suitable incentives, private sector can channel finance to farmers. However, the really small or marginal farmers are usually avoided to reduce transactions costs.
- The most promising approach to reach farmers is for private sector entities to establish a partnership with a development organization that has grassroots outreach.
- Risk of potato considered high.
- In a macro sense, these (Agri-biz) approaches are relatively small scale and cover a minuscule part of farms. However, these do seem to have considerable potential for future development.

Policy...

- Downstream: entities most interested in potatoes are financial institutions (like BRAC Bank, United Leasing), agri-businesses (e.g. PRAN), exporters (e.g. GARI) and supermarkets (e.g. Meena Bazar).
- At the midstream level, the most crucial are the cold stores that have grown rapidly in the face of demand expansion.

Policy..

- The main requirement of farmers is to cover risk and to improve their ability to store potatoes for sale when prices are better: need to cover risk
- For cold stores, the problem of price volatility remains a big concern along with an erratic power supply.
- For exporters, the struggle is to ensure sufficient qty of the right kind of varieties and quality – hence their need to invest in contract farming as seen from the case studies.

Policy..

- A risk guarantee scheme can work, serving to stimulate investment (e.g. seen from the BRAC Bank-USAID case study).
- For supermarkets, the choice seems to be between use of traditional supply chains vs developing an alternative, “better” and independent supply chain.
- The ultimate test of policy for the potato sector would be whether price risks have been contained for each segment in the chain.