FIELD Report No. 21: Understanding Systemic Change in the Vegetable Seed Market

A QUALITATIVE ASSESSMENT

Produced in collaboration with the FIELD-Support LWA

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Understanding Systemic Change in the Vegetable Seed Market

A Qualitative Assessment

August 2014

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Cover photo of homestead farmer by AFE.

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Table of Contents

Figures

Tables

Executive Summary

This paper examines changes in the local market system resulting from the introduction of vegetable seed mini-packets in Bangladesh (facilitated through an Action for Enterprise program), and how those changes affected local farmers and their households. It first presents the findings of a market system assessment based on a review of secondary data and in-depth interviews (IDIs) with market actors. Second, the paper presents findings from IDIs conducted with two groups of farmers: those who purchased the vegetable seed mini-packets and those who did not. Here we give background for the overall project, then summarize the scope and findings of 1) the market system assessment and 2) the subsequent in-depth interviews with farmers.

The inquiry took place as part of a learning initiative under the USAID-funded FIELD-Support LWA project. Entitled "Adding to the Evidence Base: Facilitating Commercial Models for Selling Agricultural Inputs to the Rural Poor," the initiative was designed to document systemic changes in both the marketplace and with key stakeholders in the vegetable seed sector that were influenced by the introduction of the mini-packets. It was conducted from May to August 2013 in Bangladesh through a joint effort of Action for Enterprise (AFE) and FHI 360.

In 2011, AFE and Katalyst[1] supported two national level Bangladeshi seed companies in developing and marketing mini-packets of quality vegetable seed to marginalized farmers and homestead gardeners, particularly those living in remote rural areas. The goal of this program was to increase these producers' access to quality, affordable seed and reduce their dependency on lower quality retained seed. AFE and Katalyst provided technical and financial assistance to the seed companies to: 1) develop strategic business plans; 2) design vegetable seed mini-packets; 3) provide orientation to staff, dealers, and retailers regarding mini-packets; 4) formally launch and promote mini-packets in their distribution channels; 5) develop and distribute promotional materials; and 6) promote mini-packets directly to small marginal and homestead farmers through community meetings and demonstration plots.

Table 1: Projected Outreach and Benefits of Mini-Packets through June 2013[2]

Number of "user" farmers benefitting from mini-packets through season one	201,341
Number of "user" farmers benefitting from mini-packets through season two	321,062
Average estimated increase in per-person income per season[3]	$16.70
Total estimated projected impact through two seasons	$8,723,433

In year one of the program, 285,000 farmers bought mini-seed packets. By the end of year two, more than 450,000 farmers had purchased the new product. The Katalyst project conducted quantitative surveys with mini-packet users and estimated mini-packets generated approximately $8.7 million in increased household income and/or consumption in over 321,000 households of small marginal and homestead producers between December 2011 and November 2012.[4] This amounts to approximately $17 per household per season. Based on the results of the quantitative survey, 20% of these households fall below the lower poverty line of $1.25 per day per person and 75% fall below the upper poverty line of $2.50 per day per person. The quantitative surveys revealed the household economic benefits of the mini-packets. How and why this occurred, the effects the seed packets had on non-economic factors, and how the introduction of the mini-packets influences the larger market system were

[1] Katalyst is a jointly-funded program of the Swiss Agency for Development and Cooperation (SDC), the UK Government, the Canadian International Development Agency (CIDA) and the Embassy of the Kingdom of the Netherlands (EKN) implemented under the Ministry of Commerce (MoC) of the Government of Bangladesh by Swisscontact and GIZ International Services

[2] Katalyst Monitoring and Results Measurement System; audited for compliance with Donor Committee for Enterprise Development Standards for Results Measurement in May 2011 and February 2013 (see http://enterprise-development.org/page/audits)

[3] Calculated using an exchange rate of 78 BDT/USD

[4] Katalyst SE-10 Intervention Report, December 2012

not covered by the surveys. The investigation described in this report was designed to address these gaps in knowledge.

In June and July 2013, FHI 360 and AFE carried out a market system assessment to answer how the AFE/Katalyst support for launching mini-packets of vegetable seed affected non-participating seed companies and the local seed industry in general. IDIs were conducted with 20 different market actors in three different parts of the country to understand trends affecting the vegetable seed market system over time, particularly over the last three years. Following the system assessment, in-depth interview with farmers were conducted. A total of 30 IDIs were done—15 with mini-packet purchasers and 15 with non-purchasers. Key findings from both the market system assessment and in-depth interviews with farmers are presented separately below.

Market System Assessment Findings

Since introducing the seed mini-packets in September 2011, a number of significant systemic changes in the vegetable seed market system were identified. These include:

1. **Brand name companies focusing** on developing and growing markets for vegetable seed and **adopting strategies** to produce, package, and market vegetable seed mini-packets by explicitly targeting homestead gardeners and small marginal farmers;
2. **Increased sales of high quality seeds** (in both mini-packets and regular packets) resulting from the introduction of mini-packets into the market;
3. **Tapping a new market** (small and marginal farmers) for high quality vegetable seed, which had previously not been served by seed companies;
4. **Expansion of seed companies' rural distribution networks** as mobile seed vendors (MSVs) see opportunities to sell mini-packets to their clientele. Seed companies have also begun new initiatives to formally include MSVs in an effort to make further inroads into the new "untapped markets" for high quality vegetable seed (including those in the most remote areas);
5. **Reduced rate of "packet cutting"** (breaking down larger packages) to sell small quantities of seed to small-scale producers;
6. **Crowding in** of new seed companies who have begun to test the commercial marketing of vegetable seed mini-packets without additional donor support; and
7. **Crowding out** (reduced sales) of private sector dealers, retailers, and MSVs caused by development organizations that are now purchasing mini-packets and distributing for free in the market system.

Other observed systemic changes to which the introduction of mini-packets may be a contributing factor include:

1. **Moving towards packaged seed** and away from bulk loose seed continuing and expanding as a result of the introduction of mini-packets;
2. **Printing maximum retail price** (MRP) on seed packets, which, in some cases, minimizes the profit seed vendors can make from the sale while potentially drawing farmers' appeal; and
3. **Other agro inputs** being sold in small packets, which are not being targeted to small marginal and homestead producers.

Farmer In-Depth Interview Findings

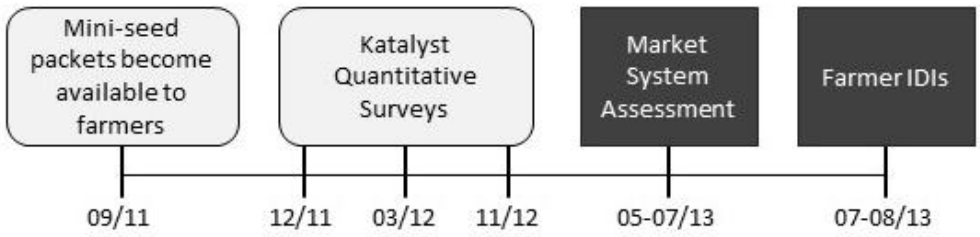
IDIs with farmers were conducted in July and August 2013, subsequent to the market assessment. Findings emerged from IDIs with farmers from separate households that support and provide context to the findings from the market system assessment. Findings from IDIs include:

1. **Quality of seed** was one of the primary considerations influencing farmers who purchased mini-packets. Other reasons given were the perceived suitability of small packets for small-scale farms or gardens; mini-packets' accessibility, both in terms of affordability and availability; and

the potential of mini-packets to provide sufficient vegetables for one's family and to allow for expanded cultivation.

2. **Farmers not purchasing mini-packets cited many of the same considerations** used by purchasing farmers as "motivators" for buying mini-packets (price, suitability to size of land, and availability) as deterrents to purchasing mini-packets. Non-purchasing farmers reported price as the primary reason for not purchasing mini-packets. While purchasers tended to think that mini-packets were reasonably priced, or even inexpensive, and that using them was cost-efficient, several non-purchasing farmers reported mini-packets as being too expensive and said that large packets were less expensive, proportionally, than mini-packets.
3. **Constraints related to availability, accessibility, price, and awareness** of mini-packets were all cited as potential challenges to obtaining mini-packets, primarily by non-purchasing farmers.
4. **No negative effects** as a result of purchasing mini-packets were reported by purchasing farmers.
5. **Changes in sales and production** as a result of using mini-packets were mostly positive. Many farmers said they sold more vegetables than they did prior to using mini-packets, some selling at higher prices because of the increased demand and popularity of their high quality produce. Favorable production changes reported by several farmers who used mini-packets included a reduction in costs, labor, and other agricultural inputs such as fertilizer, pesticides, and water.
6. All purchasing farmers experienced **abundant or increased consumption** of fresh, self-raised vegetables within the household.
7. **Positive economic impacts were experienced by many farmers** using the high quality mini-packet seeds. All farmers sold vegetables—many sold more vegetables, had greater profits, and were able to invest more in cultivation efforts than they had when using lower quality seeds. Almost all farmers reported having a good or better yield—i.e., greater in volume and quality—from using the high quality seeds. A few farmers reported additional benefits of needing fewer agricultural inputs and labor, having plants germinate in less time, and having early or prolonged production.
8. Finally, a few farmers experienced **positive psychological and emotional impacts** from using the mini-packet seeds. They said it brought them happiness, more hope and eagerness, and inspired them to grow more vegetables. More than half of the purchasing farmers gave excess vegetables to others outside their household. A few said it made them feel happy and proud to be able to help others by giving them some of the food they raised. These positive psychological and emotional impacts—in conjunction with the other social and economic impacts mentioned above—carried over into future intent to purchase additional mini-packets.
9. **All purchasing farmers (with the exception of one who did not comment on it) stated that they would indeed purchase mini-packet seeds again in the future**.

Figure 1: Program and Assessment Timeline (this assessment indicated by shaded squares)



Recommendations

After being introduced through national level seed companies, mini-packets experienced commercial success. This commercial success is demonstrated by the sales from one of the national level seed companies who first introduced the packets (*Company 2*)**,** the evidence of other companies launching (or considering the launch of) their own branded mini-packets, positive effects reported at the household-level, and purchasing farmers' intentions to continue using mini-packet seed. However, given the positive effects seen at the household level, it may be desirable to promote increased access and availability of other types of seed as well as other forms of agricultural inputs for small-scale producers. Several recommendations emerged from the market system assessment:

- **Utilize a systems approach:** Development programs should utilize a systems approach in order to improve the quality and availability of seeds and other inputs to farmers and avoid negative impacts. This approach is based on facilitating improved and expanded relationships among market actors (including farmers) in the market system. It also requires formative research, including value chain and systems mapping, before program implementation, to minimize this risk.
- **Development programs should be designed to meet the needs of the target group:** The role of the development program is to challenge, and provide incentives to, private sector market actors to develop and market improved products and services that address the needs and socio-economic context of the targeted farmers (end users).
- **Replicate and expand:** Based on the data from this assessment, the mini-seed packet program benefitted small marginal farmers. Similar approaches should be pursued, and rigorously evaluated, in comparable markets, geographies and environments, and should include other agro-inputs (e.g., fertilizer).
- **Support private sector to address the complexity of innovation at the base of the pyramid:** Development programs can support local companies, and value chain actors, to recognize and overcome logistical complexities involved with marketing mini-packets (e.g., sourcing seed, packing, storage, marketing, distribution), which can be an initial barrier to market development.
- **Monitor, evaluate, and adapt at the system level:** It may take several years to understand the longer-term systemic impact of facilitating the introduction of mini-packets of quality vegetable seed (and other agricultural inputs). We recommend that similar programs set up a monitoring system to understand these longer-term impacts (both positive and negative), and identify lessons learned for future activities and projects.
- **Conduct focused research on the "crowding out" phenomenon:** More systematic and quantitative research on the "crowding out" effect of donor programs that subsidize agricultural inputs would add to the evidence base pertaining to local market systems and how they respond to the introduction of new products. Our qualitative market assessment indicates that crowding out occurred when other development organizations purchased the mini-packets and distributed them for free in the market system. However, the extent to which this occurred and how much it affected market chain actors is unknown.

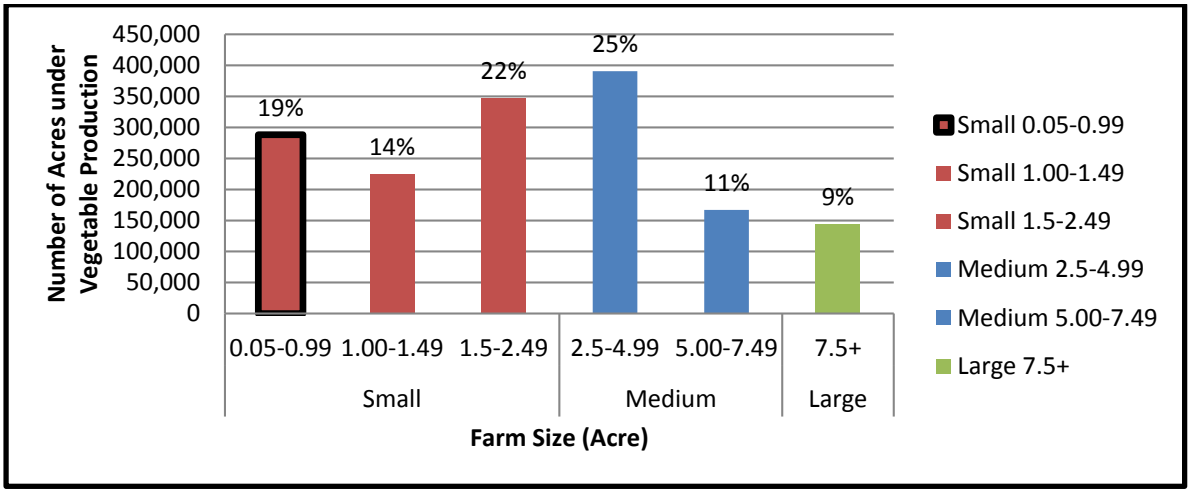
Introduction

This paper was developed as part of a learning initiative under the USAID-funded FIELD-Support LWA project. This initiative (entitled "Adding to the Evidence Base: Facilitating Commercial Models for Selling Agricultural Inputs to the Rural Poor") was designed to carry out socio-economic research in relation to AFE's Katalyst-supported program in Bangladesh to facilitate the production and marketing of vegetable seed mini-packets by private sector input supply companies. The first component of the learning initiative focused on a market system assessment to document systemic changes in the vegetable seed sector. The second component, farmer interviews, focused on the seed packets and if/how the purchase changed farmer practices and income, as well as any household social and economic outcomes. The assessment was conducted from May to August 2013 in Bangladesh through a joint effort of AFE and FHI 360. The paper begins with a discussion of the seed sector before the introduction of mini-packets, followed by a description of the intervention and preliminary results. A description of the methodology of the market system assessment and farmer IDIs is then followed by a discussion of the two components' key findings. Finally, conclusions and recommendations are presented.

Background

Agriculture accounts for nearly one-third of the Gross Domestic Product (GDP) of Bangladesh,[5] and involves over half of the country's labor force.[6] Vegetable production is highly correlated with the quality of seeds, and ensuring farmers' access to high quality seed could increase yields by as much as 10-15%.[7] In recent years, farmers, particularly with vegetables, have shifted away from cultivating local varieties and towards better quality seed with higher yields, including improved hybrid as well as open-pollinated high yielding varieties (HYV). However, the trend towards hybrid and HYV vegetable seed is still in its infancy, and the vast majority of vegetable seed used by farmers, particularly small marginal and homestead farmers, is lower quality retained seed. Farmers face several constraints to using high quality seed, including limited access and availability, limited awareness about which seeds are higher quality, and a potential trade-off of higher yields, but greater vulnerability to shocks such as drought and pestilence.

Figure 2: Area under Vegetable Production by Farm Size (in Acres)[8]

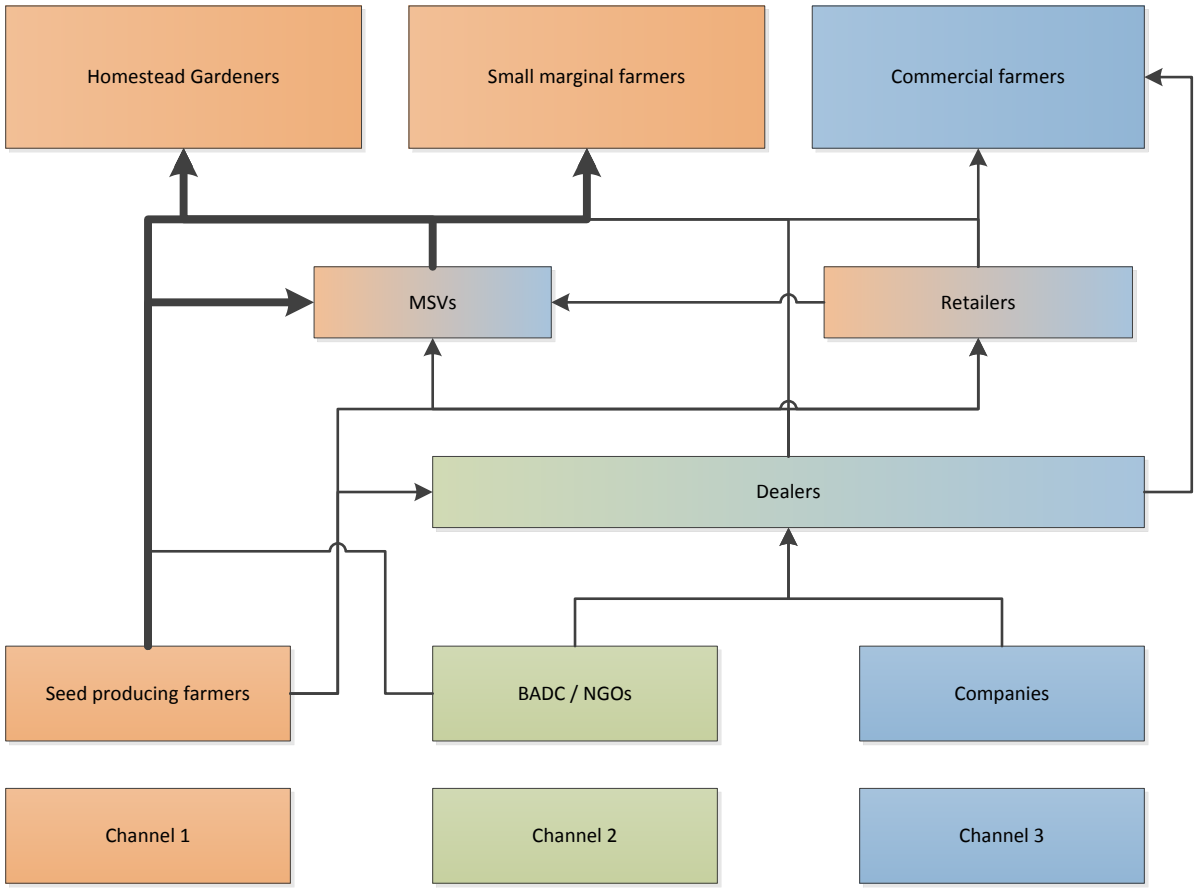


Limited access is often a direct result of the price of seed. High quality seed costs more to produce, store, and package due to the greater need for oversight, technical support, and quality control systems. Although these costs are typically not prohibitive, particularly for large-scale commercial farmers, poor and marginal farmers are often extremely price sensitive and may not understand the potential benefits of using high quality seed. Consequently seed companies have historically focused on packaging and marketing high quality seed for commercial farmers, who require greater quantities of seed than small marginal farmers. Small marginal farmers cultivate using less land than commercial farmers (between 0.5 and 0.99 acres), and they often practice intercropping (i.e., growing two or more crops in close proximity) to make their limited land more productive. Despite their size, small marginal farmers with less than one acre of land represent an important market segment, because cumulatively they cultivate nearly 20% of the total land under cultivation (see Figure 2 above).

MSVs are the primary source of seeds for small marginal farmers.

[5] AVRDC, 2005
[6] Bangladesh Ministry of Agriculture, 2009
[7] Director General of Seed Wing, Ministry of Agriculture, 2009
[8] Census of Agriculture 2008, BBS

Figure 3: Map of Vegetable Seed System before the Introduction of Mini-Packets



A map of the vegetable seed system prior to the introduction of mini-packets can be seen in Figure 3 above. Limited availability of seed for small marginal farmers and homestead gardeners is tied to seed companies' focus on commercial farmers. Seed companies have historically focused on fixed-shop retailers in larger towns or cities as the final point of sale for high quality vegetable seed to farmers. Small marginal farmers tend to be less mobile than commercial farmers, and usually purchase their vegetable seed from a mobile seed vendor (MSV) in a local, weekly *haat* (market). These MSVs typically purchase retained seed from farmers and packaged seed from retailers without much attention to the quality of the seed, and sell in two to three different *haats* each week (the emphasized arrows in Figure 3 indicate the primary channels through which small marginal farmers and homestead gardeners obtained vegetable seed prior to the introduction of mini-packets). Many MSVs are unaware of the benefits of quality seed, and most seed companies do not promote their seed directly to MSVs. Consequently, many MSVs primarily market low cost and low quality retained seed (both loose and in packets) as well as some expired seed packets to farmers. Some MSVs (and retailers) also sell loose seed from larger opened packets of commercial seed. Because these packets are opened, quality can deteriorate due to exposure to atmospheric conditions and there are opportunities for adulteration. As a result, farmers purchasing seed from opened packets cannot be confident regarding the quality of the seed they buy.

Descriptions of Market Actors in Vegetable Seed System

Seed producing farmers are larger farmers who produce seed and retain it for a) their own use in subsequent seasons, and/or b) sale to other market actors, namely dealers, retailers, and MSVs in loose bulk quantities.

Bangladesh Agricultural Development Corporation (BADC) is a government-owned entity which produces and markets seed, including relatively small amounts of vegetable seed, for sale to farmers through a network of licensed dealers and retailers.

Nongovernmental organizations (NGOs) produce seed for distribution and/or sale to farmers directly and/or through networks of dealers and retailers. These operations are often cross-subsidized through other donor-supported activities.

National seed companies import quality seed from abroad and/or produce quality seed through their own outgrowing (contract farming) operations for sale to farmers through their networks of dealers and retailers.

Dealers purchase seed (often on credit) from BADC, NGOs, and companies for sale, primarily to retailers, although some seed is sold directly to MSVs and larger commercial farmers. Some dealers purchase loose retained seed in bulk quantities from farmers for packaging and sale under their own brands.

Retailers purchase seed (often on credit) from dealers for direct sale to commercial farmers and MSVs, although some small marginal farmers and homestead gardeners may purchase directly from retailers. Some retailers also purchase loose retained seed in bulk quantities to resell as loose seed or for packaging and sale under their own brands.

Mobile seed vendors (MSVs) purchase loose retained seed in bulk quantities from farmers for sale to small marginal farmers and homestead gardeners in local markets or *haats*. Some MSVs also purchase packaged seed from retailers or detailers for cash up front, but only rarely receive seed on credit. MSVs sell these seed in local weekly markets or *haats*. MSVs usually do not have fixed retail outlets, but often visit two to three different *haats* each week.

Homestead gardeners cultivate a very small amount of land, less than five decimals (0.05 acres), usually in and around their homestead. While many homestead gardeners may be functionally landless laborers in rural areas, others may be engaged in agricultural production as a hobby. Homestead gardeners usually purchase loose seed from MSVs.

Small marginal farmers cultivate between 5 and 99 decimals (0.05 and 0.99 acres). Agricultural production is an important part of their livelihood, but they produce relatively small quantities and usually purchase loose seed from MSVs.

Commercial farmers cultivate more than one acre, and usually purchase commercial quantities of seed in regular packets from retailers.

To address the constraints described above, and increase access to and availability of quality seed in affordable quantities, AFE and Katalyst facilitated the initiatives of two seed companies to develop and market "mini-packets" of quality seed for sale to small marginal farmers and homestead gardeners, particularly those living in remote rural areas. This support included technical and financial assistance to:

1. Develop strategic plans (March 2011);
2. Design mini-packets (May and July 2011);
3. Select varieties (July 2011);
4. Design promotional materials (August 2011);
5. Orient dealers and retailers (August 2011);
6. Conduct launching workshops (October 2011);
7. Promote mini-packets directly to small marginal and homestead farmers through community meetings and demonstration plots (December 2011 to February 2012); and
8. Redesign the mini-packets (May 2012).

Although some small local companies were marketing low quality seed at lower prices, this was the first time that reputable national seed companies had commercially marketed high quality seed in low quantities at affordable prices.

The seed companies' incentives for implementing these initiatives were based on developing "untapped" markets with small-scale farmers, and in promoting their brands of vegetable seeds. ***Company 1*** created a new brand of HYV vegetable seed, and ***Company 2*** leveraged its existing brand to market mini-packets of hybrid and HYV seed. Both companies initially thought that it would be necessary to organize many dissemination and marketing events and to invest in new, alternative distribution and marketing channels including using lead farmers and female agents to sell in rural areas. These plans changed however, due to strong market demand that developed immediately after they conducted the orientation sessions with dealers and retailers in August 2011. Both companies independently decided in September 2011 that existing market demand was so strong that only a few dissemination events would be needed and that they could market the mini-packets nationwide through their existing distribution channels without the additional expense of establishing new distribution channels. The flexibility of the facilitation strategy between AFE and the seed companies allowed the strategy to be modified in light of market realities.

Both companies experienced initial surges of demand that tested their ability to supply adequate quantities of the high quality vegetable seed mini-packets. Due to internal management issues unrelated to the production and sale of mini-packets, *Company 1* temporarily suspended the sales of its mini-packets after the first season. However, *Company 2* not only continued sales, but significantly expanded their production and marketing of the vegetable seed mini-packets after the first year. In the first 18 months (between September 2011 and February 2013) they sold 2,009,622 mini-packets and *Company 1* sold 205,507 (before suspending sales after the first season).

Mini-packets of quality seed have contributed to increased productivity and earnings for over 325,000 small marginal and homestead producers.

During this period AFE and Katalyst conducted a number of quantitative surveys of mini-packet users in an attempt to understand the impact that the mini-packets were having at the household level. Three different surveys were conducted between December 2011 and November 2012 (see Figure 1). The sample frame for these surveys contained a list of 3,067 farmers who purchased mini-packets. The full list of 3,067 farmers was used by FHI 360 and AFE to randomly select purchasing farmers to participate in the in-depth interviews.

Based on the initial surveys conducted by AFE and Katalyst (together with information provided by the seed companies) it was projected that by July 2013, an estimated 454,838 unique households purchased mini-packets of high quality vegetable seed, and approximately 42% of these households learned about mini-packets from an MSV. Of the total number of households that purchased mini-packets, approximately 75% fell below the upper poverty line of $2.50 per day per person and nearly 20% fell below the lower poverty line of $1.25 per day per person (according to the Grameen Foundation's Progress out of Poverty Index). Approximately 71%, or 321,062 households, benefitted financially from cultivating mini-packet seed. On average, these households generated an additional benefit of $16.70 per person per season due to increased production of vegetables. As shown in Table 2 above, this has generated an estimated cumulative

Table 2: Projected Outreach and Benefits of Mini-Packets through June 2013[9]

Number of "user" farmers benefitting from mini-packets through season one	201,341
Number of "user" farmers benefitting from mini-packets through season two	321,062
Average estimated increase in per-person income per season[10]	$16.70
Total estimated projected impact through two seasons	$8,723,433

[9] Katalyst Monitoring and Results Measurement System; audited for compliance with Donor Committee for Enterprise Development Standards for Results Measurement in May 2011 and February 2013 (see http://enterprise-development.org/page/audits)

[10] Calculated using an exchange rate of 78 BDT/USD

benefit of approximately $8.7 million in increased household income and/or consumption by small marginal and homestead farmers according to Katalyst's monitoring and results measurement system which has been audited by external auditors to ensure compliance with the Donor Committee for Enterprise Development (DCED) standards for results measurement.

Due to the demand for the mini-packets, the seed companies were able to make substantial sales through their existing distribution channels, increase sales by MSVs participating in those channels, and they did not need to invest in new or alternative channels. In the future, investing in new or alternate channels might be useful and needed to grow and maintain market share. According to the small marginal farmers surveyed by AFE and Katalyst, the primary reason for the rapid uptake of mini-packets was because this was the first time that reliable high quality seed from reputable companies was available in appropriately sized quantities at affordable prices, a finding that is explored in the qualitative component.

Methodology – Market System Assessment

The AFE and Katalyst monitoring activities generated quantitative data on the effects that mini-packets of high quality seed were having on seed purchasing habits, cultivation practices, and yields at the household level. However, these monitoring activities did not explicitly focus on identifying "systemic changes" within the seed market system or qualitative changes in household level behavior, since such changes often occur sometime after an initial intervention. Informal discussions with seed market actors in early 2013 by Katalyst, however, revealed indications of systemic changes in the vegetable seed market system, possibly as a result of the introduction of mini-packets. The objective of the market system assessment was to follow up on these initial discussions. The key question was: "How did the introduction of mini-packets of vegetable seed in Bangladesh affect seed companies and the local seed industry in general?"

Table 3: Market Actors Interviewed by Type and Location

Market Actor	Dhaka	Bogra	Barisal	Total
National seed company that participated in initial AFE activities	2	0	0	2
National seed company that did not participate	5	0	0	5
Dealer	0	2	3	5
Retailer	0	1	1	2
Mobile seed vendor (MSV)	0	4	1	5
Seed company field marketing officer	0	0	1	1
TOTAL	7	7	6	20

The market system assessment took place over six weeks in June and July 2013. Prior to the start of the field work, AFE conducted a review of secondary data related to the Bangladesh seed industry to better understand the historical trends in the vegetable seed market system. Following this secondary data analysis, AFE and FHI 360 staff conducted the market system assessment in teams of two (one AFE and one FHI 360 person per team). The assessment comprised in-depth interviews with a total of 20 seed industry actors, detailed in Table 3. The field team employed a multi-stage chain referral sampling approach. Executives from all seven of the national seed companies were interviewed first. After these interviews, participants were asked to refer seed retailers and dealers in the area, seven of whom were

subsequently interviewed. Retailers and dealers, in turn, were asked to refer mobile seed vendors (MSV) in the area. A total of five MSVs were interviewed.

Methodology – Farmer In-Depth Interviews

Selection of Target Areas for Interviews

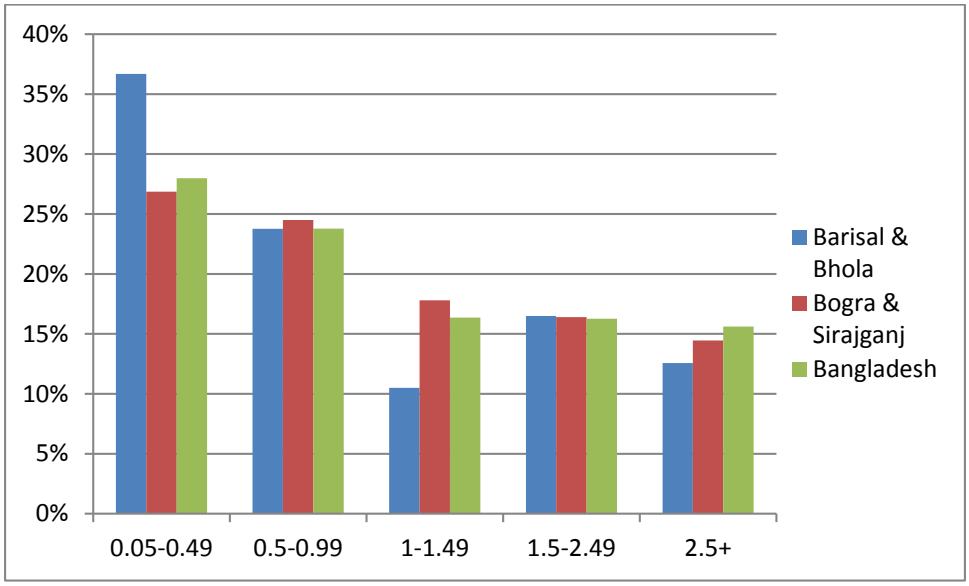
Prior to carrying out the field-based market system assessment and farmer interviews, seed mini-packet sales data were collected from the two companies marketing mini-packets. According to these sales data, two geographic regions were selected for the field work: Bogra (including both Bogra and Sirajganj Districts) in the northwest of the country, and Barisal (including Barisal and Bhola Districts) in the southern part of the country. These two geographic areas were selected for their relatively high level of sales of mini-packets compared to other parts of the country, and because they are in different parts of the country and would therefore allow a comparison of trends between two different geographical conditions.

The primary relevant differences in agricultural production between Bogra and Barisal are related to land type and agro-ecological zones. Approximately 15% of the cultivable land in Bogra and Sirajaganj is classified as "Highland" as opposed to only 5% of cultivable land in Barisal and Bhola.[11] Additionally Bogra and Sirajganj are comprised of four agro-ecological zones (Level Barind Tract, Tista Meander Floodplain, Karatoya-Bangali Floodplain, and Active Brahmaputra-Jamuna Floodplain), which are very different than the three that make up Barisal and Bhola (Ganges Tidal Floodplain, Young Meghna Estuarine Floodplain, and the Old Meghna Estuarine Floodplain).[12] Both land type and agro-ecological zone have implications on the types of crops that can be produced as well as the potential for intensive cropping (i.e., how many different crops are produced on a given piece of land in a given year). According to the latest statistics available from the Bangladesh Bureau of Statistics (BBS), Greater Bogra District has much higher cropping intensity with only 2% of sown land being used for a single crop as opposed to 40% of cultivable land used for single crop in Greater Barisal in 2010-2011.[13]

Another important difference between Barisal and Bogra is the relative size of landholdings in each area, as can be seen in the figure below.[14] Barisal and Bhola have a relatively higher proportion of very small marginal farms (between 0.05 and 0.49 acres) than Bogra and Sirajganj (which have a very similar distribution of farm size to Bangladesh as a whole).[15] The greater proportion of very small and marginal farms has important implications on the types of crops that can be produced and what can be done with production. Given the discrepancy in land size, it is not surprising that Barisal and Bhola have a greater proportion of their population living below the upper and lower poverty lines.[16]

[11] Extent (ha) of Land types by District and Upazila, Bangladesh Agricultural Research Council (BARC)
[12] Agro-Ecological Zones Bangladesh Map, BARC
[13] 2011 Yearbook of Agricultural Statistics of Bangladesh, BBS
[14] Figures from the farmer subsamples, with comparable differences between Bogra and Barisal landholdings size, can be found in Tables 5 & 6 in the "Key Findings – Farmer IDIs" section.
[15] 2011 Yearbook of Agricultural Statistics of Bangladesh, BBS
[16] Bangladesh Proportion of the Population Poor 2005 Map & Proportion of Population Extreme Poor 2005 Map, BBS, The World Bank, & World Food Programme

Figure 4: Percent of Farms by Categories of Farm Size (in Acres)



Interview Sampling and Process

In-depth interviews were conducted with two groups of farmers: those who had bought and used the newly available vegetable seed mini-packets (Purchasing farmers, or P farmers), and those who had not done so (Non-Purchasing farmers, or NP farmers). A total of 30 farmers were interviewed—15 purchasing farmers and 15 non-purchasing farmers—and the interviews took place between July and August 2013. This portion of the assessment was given an exemption from IRB review by FHI 360's Protection for Human Subjects Research Committee.

The first type of farmers were randomly sampled using an existing list of mini-packet seed customers (3,067 households). The non-purchasing farmer sample was obtained through a chain referral technique in which purchasing interviewees referred other farmers they knew. After each interview with purchasing farmers, interviewers asked participants to refer another farmer that was similar to them but who had not purchased the mini-seed packets.

The interviews were conducted with farmers from two different sites in Bangladesh—half from Bogra, and half from Barisal (n=15 for each site).

IDIs lasted about one hour and were conducted in participants' homes, or another convenient location, and were digitally recorded. The IDIs were administered by a Bangla-speaking team of two, with one data collector and one note-taker. Two teams conducted all the IDIs, with two data collectors from FHI 360 and two from AFE. Audio-recordings were used to document the interviews and to ensure accuracy of notes.

Interviews focused on farmers' experiences cultivating vegetables and experiences with purchasing different kinds of seeds. For purchasing farmers, attention was paid to whether the mini-packet seeds had changed farming practices and income levels, as well as any household social and economic outcomes.[17]

The interviews—***for both purchasing and non-purchasing farmers***—explored:

- What kinds of crops farmers raised in the past year, and on how much land;
- What kinds of seeds were purchased, and from what types of vendors;

[17] In-depth interview guides for purchasing and non-purchasing farmers are included in Appendices 3 and 4.

- Experiences and challenges in buying seeds;
- Perceptions of seed quality and packaging;
- If aware of mini-packet seeds, how they learned of them and what they learned;
- Reasons for purchasing or not purchasing mini-packet seeds;
- Thoughts on seed availability, price, quality, variety, and where purchased;
- Experiences of neighbors and community members who used the new seeds; and
- Future plans to purchase, or not to purchase, mini-packet seeds.

For purchasing farmers only, the interviews also focused on investigating any social and economic impacts on individual farmers and their families, including:

- Any benefits of using mini-packets (including for household consumption and income, etc.);
- Any positive or negative effects on daily life;
- Any changes in the sales and/or production practices of vegetables; and
- Whether they talked about the seeds with others and, if so, what they told them.

For non-purchasing farmers only, interviews also included a question about why they did not purchase mini-seed packets.

Once complete, the in-depth interview transcripts were sent to FHI 360 in North Carolina for coding and analysis using NVivo 9 software. Structural codes were developed based on the interview guide questions and applied to the data. Through an iterative process of reading, analyzing, and re-reading, the analyst inductively developed a thematic codebook. Codes based on emergent themes were then applied to the data. Using the coded text segments for the various codes, the analyst developed data reduction tables to aid in identifying sub-themes and frequencies of responses, which are summarized in this report, alongside illustrative quotes**.**

Key Findings – Market System Assessment

Despite the relatively short amount of time between the launch of mini-packets in September 2011 and the market system assessment in June-July 2013, a number of systemic changes were observed in the vegetable seed market system that may be attributable to the introduction of high quality seed being sold in small, affordable quantities. These changes occurred both at the level of the seed companies as well as throughout their distribution networks, and are described in detail below.

Company Adaptation

Company 2 hired numerous new staff to meet the demand for their seeds as a result of their mini-packet initiative.

Company 2 experienced success in their initiative of marketing mini-packets under their primary brand. In a workshop conducted in August 2013 to discuss the preliminary findings of the market system assessment, *Company 2* reported having sold more than 1,000,000 packets in the first 7 months of 2013. To meet this increased and growing demand, the company is expanding production of 32 varieties by up to tenfold, and has hired 36 full-time and 75 part-time staff to support the production, packing, and marketing of mini-packets. *Company 2* is still adapting their mini-packet strategy and will introduce greater differentiation between their mini-packets and regular packets in the near future.

Demand is high enough that the company recently increased the retail price of the mini-packets from 10 BDT per HYV packet to 13 BDT ($.17 to $.26 cents) and from 20 BDT per hybrid packet to 25 BDT ($.26 to $.32 cents). They deemed this increase necessary to cover their costs (as the first packets were being sold either at a loss or break-even as part of a deliberate strategy on the part of the company). Some consumers, however, expressed dissatisfaction at this and in some areas sales have dropped. According to one *Bogra-based dealer,* customers "refuse to pay the increase, and as a result if we continue to sell at the original price we cannot make any profit." Some dealers decided to continue selling the mini-packets at their original price (without a commission) to maintain a good relationship with their customers, and in the expectation of increased future sales of larger-sized seed packets as a result of the mini-packet sales.

Company 1 stopped marketing mini-packets after the first year due to internal management issues unrelated to the production and sale of mini-packets. They are interested in starting sales of mini-packets again in the future, but will probably require a different strategy (they had developed a new brand under which to market mini-packets) and a slower roll out in order to manage the increased complexity of the logistics associated with mini-packets (e.g., sourcing seed, packing, storage, marketing, distribution) while maintaining the quality of the seed necessary to develop and maintain the company's reputation. The increased complexity of the logistics, particularly related to packing and storing of mini-packets, was a surprise to both companies and the source of a number of initial obstacles the companies both had to overcome.

Increased Sales of All Seeds

Company 2 experienced high rates of growth in year-on-year sales of vegetable seed between the 2011-2012 season and the 2012-2013 season, and estimated that their overall sales increased about 10% due to additional sales of mini-packets as well as approximately 10% due to follow-on purchases of larger-sized packets (i.e., farmers who purchased mini-packets the previous year, but then purchased commercial quantities subsequently). One retailer in Barisal reported that his total sales increased by 50% since the introduction of mini-packets.

Historically, many *seed traders* use small sample packets[18] to introduce new varieties and to build demand, but they are still focusing on larger commercial farmers and will therefore increase the packet size as soon as possible. Some commercial farmers reportedly purchased mini-packets to test new varieties of vegetables before engaging in full-scale cultivation. However, *Company 2* attributed a portion of the follow-on purchases of commercial quantities not just to larger commercial farmers who "tested" the new varieties, but also to small marginal farmers who transitioned into cultivating larger tracts of land on a commercial basis.

Trend towards Packaged Seed

According to many of the market actors interviewed in both regions, including dealers, retailers, and MSVs, the introduction of mini-packets of high quality seed is part of a long-term trend of packaged seed (in both commercial and mini-packet sizes) replacing lower quality retained, open-pollinated (OP) seed varieties sold loosely in bulk quantities. However, sales of retained seed being packaged informally by small regional and Dhaka-based traders, dealers, and retailers remains strong and competes directly with the sale of the commercial mini-packets being sold by the larger seed companies. Many of the market actors in Barisal referred to these lower cost packets as "uncontrolled packets," as they are sometimes marketed using misleading techniques (see picture below). To date, there does not seem to be evidence that mini-packets are replacing these "uncontrolled packets."

[18] Because the focus remains on the larger commercial farmers, these small sample packets are considered by the research team to be qualitatively different from mini-packets, which are primarily focused on small marginal farmers and homestead gardeners.

According to seed vendors interviewed, some farmers see all packaged seed as being of higher quality and as they are highly price-sensitive they are unwilling to pay premium prices for reputable brands. In fact, the price of mini-packets was one of the primary areas of concern among some market actors in the companies' distribution networks, particularly those actors engaged in the production and marketing of "uncontrolled packets." Market actors, particularly at the level of the retailers and MSVs, are often able to make higher margins selling "uncontrolled packets" at lower prices due to their lower cost of production, and as a result they prefer selling these packets. In fact, many dealers and retailers actually produce and market their own brands of "uncontrolled packets," creating additional incentives to not proactively sell branded mini-packets from reputable national companies.

Smaller companies often use misleading labeling to confuse farmers, such as the use of "hybrid" in the company name when they are actually selling OP seed varieties.

Despite these incentives, however, many market actors are still interested in selling mini-packets as there is strong demand and they can generate a profit. Two Bogra-based MSVs (father and son) interviewed stated that they are "making an effort to promote [mini-packets] to new buyers" despite the additional time it takes to convince the buyers about the need to pay higher prices to get higher quality seed." These MSVs recognize the benefits of quality seed, and believe that the investment in time and effort to promote the mini-packets will result in increased future sales to repeat customers.

Tapping New Markets

Most market actors interviewed listed homestead gardeners and/or small-scale farmers as the primary market for vegetable seed mini-packets. For many of these gardeners and farmers, this is the first time they have had access to quality seed in small quantities. They stated that company brand and reputation was a key factor for them in deciding to purchase the mini-packets. A number of respondents in the greater Bogra region, however, also mentioned that larger-scale commercial farmers purchase mini-packets for intercropping and/or to test new varieties (particularly new hybrid varieties).

Seed companies are recognizing the usefulness of mini-packets to enter into what one *seed company executive* referred to as "untapped markets" including household level producers and marginal farmers. Untapped markets are new market segments historically not served by the larger commercial companies. In the words of another *seed company executive*, this is "a new market, substantially different from [their] existing commercial market." Company staff also reported a number of geographically isolated areas with underdeveloped seed markets where they are interested in introducing mini-packets as an entry point, including the Chittagong Hill Tracts and remote *chars* (islands).

However, rather than focusing on expanding into new geographic areas, some market actors, including one *Bogra-based retailer*, reported that seed companies should focus on developing their existing markets for mini-packets. In particular, this retailer feels that there should be "differentiation in the marketing strategies for selling regular packets and mini-packets" because the customers are different. Ideas put forward to improve marketing of mini-packets included having companies hold special demonstrations and field days for smaller-scale farmers to promote mini-packets and provide technical assistance and training to MSVs.

Expansion of Rural Distribution Networks

One of the primary mechanisms seed companies mentioned to reach these "untapped markets" (and teach consumers about the benefits of quality seed) was the expansion of their rural distribution networks through increased sales of mini-packets by MSVs. One seed company executive mentioned that "mini-packets are primarily being sold [to producers] through MSVs." This development happened organically

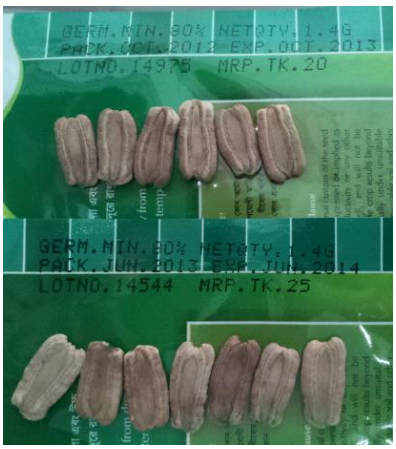
without explicit actions taken by seed companies as MSVs saw the opportunity to sell mini-packets to their clientele. This same executive said that *Company 2*'s "sales staff are [now explicitly] marketing directly to MSVs [for the first time], and this is the best strategy to sell to these farmers." A larger volume of retailers' and dealers' sales going through MSVs will also encourage dealers, retailers, and companies to formally integrate MSVs into their distribution systems. An executive from another leading seed company (*Company 3*) who independently launched their own mini-packet line and was interviewed as part of the market assessment, sees MSVs as critical to its mini-packet strategy because "MSVs have the ability to reach the most rural farmers" and therefore started training MSVs in July 2013 as part of its mini-packet marketing campaign with the goal of formally linking MSVs to its network of dealers and retailers. *Company 2* provided this type of training to selected MSVs a number of years ago with the assistance of a development project. This training was felt to be useful by the one MSV that reported participating; however, the company did not continue with similar trainings once the involvement of the development project ended as there were minimal sales being made by the MSVs (before the introduction of the mini-packets). In contrast, *Company 3* will be conducting MSV training without outside technical or financial support because they believe that the quantity of mini-packets, and ultimately commercial packets sold by MSVs, will justify the additional expenses necessary to train the MSVs.

A number of market actors in both Barisal and Bogra, including MSVs and dealers, reported, in the words of one *Bogra-based dealer,* "difficulties getting the mini-packets on time during the sowing season." This is most likely due to high demand and limited supply during peak sales periods. The prospect of formal inclusion into seed companies' distribution networks excites many MSVs, particularly because, in the words of one *Barisal-based MSV*, they "wouldn't have to pay commission to the dealers and retailers."

Other market actors are more skeptical about the possibility of formally including MSVs into their rural distribution networks. A *Dhaka-based trader* stated that "it is not commercially feasible to work directly with MSVs because the volume [of seed] is too small," and one *Barisal-based dealer* worried that "his business would go down if MSVs were to be [directly linked to companies], as he would lose their business." However, the primary complaint of the dealers and retailers, in the words of one *Barisal-based retailer*, is that MSVs are hard to work with because "they don't have a permanent address," and therefore aren't very credit worthy. A *Bogra-based retailer* agreed saying that "money would get stuck at the MSV level if it is provided on credit." Even a *Company 2 executive* stated that "MSVs are very much corrupted (sic) and do not repay credit," and is therefore exploring other strategies to work with MSVs—including having MSVs act as an "exclusive agent for each dealer."

Printing Maximum Retail Prices (MRP)

Company 2 printed the maximum retail prices (MRPs) onto its mini-packets, a practice it expanded to all seed packets. MRPs are legally required in some countries (such as India) and dealers are not allowed to charge more than this amount. In Bangladesh, although there is currently no legal imperative to print MRPs, the companies felt that this could improve their brand image among consumers and help ensure that exorbitant prices were not charged by dealers. Some vendors, particularly MSVs, were not pleased with the printing of MRPs, however, as selling at that price would not afford them a sufficient margin to cover the additional transportation costs necessary to bring their products to rural *haats* (especially those in remote areas). In the words of one *Barisal-based MSV,* "if the MRP is not printed on the packet, [he] can make a profit." In fact, one *Barisal-based dealer* stated that "vendors are less motivated to sell [*Company 2's*] seed now that they have the MRP printed on the package." In fact, there have been reports of some market actors scratching the MRP off of packets in order to sell the packets at a higher price point. During a workshop



Some MSVs complain that Company 2's new MRP is too low for them to make a profit as they incur high transporation costs to get the seeds to rural areas.

conducted in August 2013 to discuss the preliminary findings of the market system assessment, seed company representatives stated that use of MRP is appropriate for companies with established brands. These same representatives stated that companies with less well-established brands often prefer not to print MRP on the packets because they feel that dealers, retailers, and MSVs will be more likely to proactively market their packets if these market actors are able to earn a higher per-packet margin. However, once the brand is established these same companies will likely introduce printing of MRP onto the packets.

Reduced Rate of Packet Cutting

In addition to changing the type of seed available to producers, the mini-packets have also changed how packaged seed is being sold to producers. Five different market actors in Barisal and Bogra, including MSVs, retailers, and dealers, cited the introduction of mini-packets as a key contributing factor to a reduction in the practice of cutting open regular-sized commercial packets to sell the contents as loose seed. In the words of one *Bogra-based dealer*: "[they don't] have to cut packets anymore to sell seed." Cutting packets exposes seed to humid atmospheric conditions, which has the potential to reduce the quality of seed and germination rates. Many of these same market actors also reported reduced rates of adulteration as a direct result of reduction in cutting of packets.

Crowding In

One of the most important indicators of a successful market development initiative is "crowding in" when other market actors start adopting and/or adapting the strategies introduced by groundbreaking companies (that have received facilitation support from a development organization). In the case of vegetable mini-packets, there are strong indications from the market assessment that crowding-in is taking place, and that the pace of crowding in will increase in the near future. At least four or five national-level seed companies have test-marketed (or plan to test-market) their own mini-packets for the first time. Most of these companies reported mini-packets to be important promotional tools to develop "untapped markets" and to develop marginal farmers into commercial farmers, thereby increasing the total size of the market for quality seed (while increasing their brand recognition and brand loyalty amongst consumers). All of these companies pointed to demand from their dealers and retailers as the reason that they are taking these steps.

Many other companies are looking at "crowding in" to the market for mini-packets.

One successful example of crowding in is *Company 3*, which plans to formally launch their mini-packets of seed for 50 varieties of 30-35 vegetable crops nationwide in 2013. These mini-packets will follow the model of *Company 2* in that they will be marketed under *Company 3*'s existing brand; however, the mini-packets will be a different size so that consumers can easily distinguish between mini-packets and regular packets. The company has already invested in new machinery to produce these new sized packets. Interestingly, as mentioned above, this is a strategy that *Company 2* is also thinking of adopting. According to the Ministry of Agriculture only 18% of the total requirement for seeds for 2008-2009 was supplied by the public and private sector.[19] The remaining 82% are seeds of unknown quality retained by farmers. This suggests that there is plenty of room for new entrants to grow the market for quality vegetable seeds by serving farmers and homestead gardeners who previously were not growing vegetables, as well as those that have been using loose seed.

Success by these new entrants could spur still other companies to sell high quality vegetable seed in small packages and could increase sales by all market actors including dealers, retailers, and MSVs. It is expected

[19] Director General Seed Wing, Ministry of Agriculture 2009

that companies will compete within the market on a wide range of factors including: the quality of their seed, the productivity of their proprietary varieties, and the prices they charge. This competition will help keep prices low and serve consumers through increased access and availability to a wide range of varieties of high quality vegetable seed, which will increase their productivity and ultimately their incomes through increased sale and/or consumption of vegetables.

Crowding Out

Many local NGOs are already involved in the production, sale, or distribution of OP seed to farmers in commercial-sized packets (sometimes using donor funds to support "asset transfer" programs) and are effectively in direct competition with private companies. Many of these NGOs have now also begun to purchase seed mini-packets from the seed companies for their programs.

Company 2 reported that they are exploring a number of additional alternative distribution systems for mini-packets including local NGOs, "social businesses" such as Jita Bangladesh,[20] and other donor-funded development projects including a number of USAID Feed the Future (FtF) projects. Another *seed company's field-level marketing staff member in Barisal* mentioned the importance that one international NGO is having on his sales. This international NGO is purchasing large quantities of mini-packets and then providing them free of charge to farmers as part of an asset transfer scheme using vouchers for seed. The value of these vouchers is greater than what most of the target population requires, providing the opportunity for leakage and arbitrage. Additionally, these vouchers are redeemable at the retailer and dealer level, as opposed to the MSVs which traditionally serves this population. This is a potentially distortionary practice which could have negative long-term ramifications for producers as the seed companies, dealers, retailers, and MSVs have few incentives to invest in developing rural distribution networks and direct relationships with the farmers. Also, because development funds are being used to promote a particular company's brand of seed, it is potentially creating barriers to entry for new seed companies who cannot compete with subsidized competition. In the end this may crowd out new competitors with better products from entering into the market, resulting in lesser choice for producers and ultimately lower productivity and income for the very population that the development projects are trying to help.

This subsidization practice has become so widespread, that during a workshop conducted in August 2013 to discuss the preliminary findings of the market system assessment, seed company representatives stated that development organizations are now one of the primary markets for mini-packets. When seed companies view development organizations as the client (rather than farmers), they may begin adapting their products to the needs of the development organizations rather than to the needs of farmers. Furthermore, whether development organizations are directly distributing seed to farmers, or using voucher schemes at the retailer level, this direct intervention in the vegetable seed value chain weakens incentives for companies to invest in developing and strengthening their commercial distribution networks. This can lead to a crowding out of existing market actors in the distribution channel, particularly the MSVs who are most likely to be the market actors directly serving small marginal farmers and homestead gardeners on a sustainable commercial basis. This is because these market actors cannot compete with the subsidies provided by the development organizations.

Other Agro-Inputs

In general, market actors have responded favorably to the introduction of vegetable seed mini-packets, and some retailers and dealers reported potential for producing and/or marketing other types of seed and agricultural inputs, particularly pesticides and micronutrients, in small packets for small marginal farmers. One retailer reported marketing small packages of pesticides for at least 15-20 years, and two others

[20] Jita Bangladesh is a "social business" focused on providing generating income and employment opportunities for the rural poor by creating a rural sales-force comprising of destitute women, which has been spun off from a development project (Rural Sales Program) implemented by CARE. Jita Bangladesh still receives donor funding from CARE and other development and donor agencies.

reported marketing mini-packets of pesticide since the seed mini-packets were introduced. Despite some sales of this nature, small-scale marginal farmers and homestead gardeners remain a large untapped market.

Key Findings – Farmer In-Depth Interviews

IDIs were conducted with 30 farmers who cultivated vegetables on a small-scale—15 who had purchased mini-packet seeds, and 15 who did not. The data collected provide insight into the different farmers' decisions about, experiences with, and perceptions of mini-packet seeds compared to other seeds (lower quality retained seeds, commercial-sized packages, etc.).

First we provide descriptive background information about the farmers and their farming practices, followed by data related to farmers' opinions of, and experiences with, mini-packet seeds. We then address seed purchasing, specifically the types of seeds farmers use (hybrid or OP), vendor types, brands purchased, and how farmers assess seed quality.

In the subsequent sections we examine the reasons purchasing farmers gave for buying mini-packet seeds as well as reasons non-purchasing farmers provided for not doing so. The data indicate that among purchasing farmers, perceived quality of seeds was the foremost consideration in the buying decision. Price was an important consideration for both kinds of farmers. We next explore challenges and constraints encountered by farmers in purchasing seeds. Primary issues both types of farmers discussed were availability, awareness, and affordability—or lack thereof—of purchasing high quality seeds, as well as for non-purchasing farmers, a lack of trust in shopkeepers.

We also examine farmers perceptions of changes in sales and production practices associated with mini-packet seed usage. These most commonly included greater yields, increased profits, having family help sell and cultivate vegetables, and needing fewer agricultural inputs.

Increased production and profits were not the only benefits associated with the seed packets. Some aspects of farmers' daily lives also changed, including increased household consumption of fresh vegetables, strengthened social ties through sharing vegetables with others in the community, and greater yields leading to more profits that could be reinvested in cultivation. Overall, purchasing farmers reported having positive experiences using mini-packet seeds for vegetable cultivation and planned to purchase more in the future.

Below we present more detailed data pertaining to the above topics. For ease of reading, we have combined tables and matrices with narratives. In this manner, the large amounts of qualitative data are summarized, but at the same time richness is maintained through verbatim quotes.

Farming Practices

Crops Grown

All 30 farmers grew vegetables; in total, they reported cultivating 42 vegetable varieties. On average, purchasing (P) and non-purchasing (NP) farmers raised 7.4 different varieties of vegetables each. The

average varied slightly by site, with farmers from Bogra raising roughly 8 vegetable varieties per farmer to 7 from Barisal. Some of the most commonly raised vegetables were bitter gourd (n=19), bottle gourd (n=17), cucumber (n=14), chili pepper (n=13), yard long bean (n=12), radish (n=12), potato (n=12), snake gourd (n=11), and Indian spinach (n=10).

All 30 of the farmers grew non-vegetable crops, most often rice (from paddy fields; n=28) and jute (n=13), and occasionally other crops, such as bananas (n=6), and wheat (n=3). Both purchasing and non-purchasing farmers grew an average of 2 non-vegetable crops. Those farmers from Bogra grew more non-vegetable crops than farmers from Barisal, on average: 2 versus 1. A summary of crop types and frequencies for both vegetable and non-vegetables are presented in Appendix 2. Note that vegetable crops are the main emphasis of this report.

Types of Land Access & Amount of Land Farmed

Table 4: Type of Land Access

	NP Farmer (n=15)	P Farmer (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Owned all land	12 *80%*	7 *47%*	11 *73%*	8 *53%*	19 *63%*
Combination of Owned & Leased	3 *20%*	5 *33%*	3 *20%*	5 *33%*	8 *27%*
Combination of Owned & Sharecropped	0 *0%*	2 *12%*	1 *7%*	1 *7%*	2 *7%*
Leased all land	0 *0%*	1 *7%*	0 *0%*	1 *7%*	1 *3%*

Nearly two-thirds of farmers owned all the land they farmed and all but one farmer owned at least a portion of the land farmed. The types of land access differed in frequency fairly substantially between non-purchasing and purchasing farmers. A greater percentage of non-purchasing farmers than purchasing farmers owned all of their land (80% to 47%). Likewise, more farmers from Bogra than Barisal exclusively owned their farm land (approximately three-quarters to one-half). Over half of purchasing farmers leased or sharecropped some land or all of their farmed land, while just 20% of non-purchasing farmers did so. There are too many unknown variables to know if there is any association between land access and use of mini-packets.

Table 5: Amount of Land Farmed - in Decimals[21]

	NP Farmer (n=15)	P Farmer (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Range of Decimals Farmed	50-540	25-400	25-400	30-540	25-540
Average of Decimals Farmed	196	182	191	187	189
Total Decimals **Owned**	2,094	2,006	2,739	1,361	4,100
Total Decimals **Leased**	849	549	113	1,285	1,398
Total Decimals **Sharecropped**	0	183	20	163	183
Total Decimals **Farmed**	2,943	2,738	2,872	2,809	5,681
Total Decimals **Farmed: Non-Vegetables**	2,119	2,075	1,784	2,410	4,194
Total Decimals **Farmed: Vegetables**	824	663	1,088	399	1,487

[21] One-hundred decimals is approximately equal to one acre. Figures are based on farmer reports, which while quite extensive, were not always complete or exact for the decimals given for each individual crop.

The above table displays the range and average (arithmetic mean) of decimals farmed, as well as the total number of decimals farmed, broken down by land access type (e.g., owned or leased), for each subsample. It also shows the total amount of land farmed overall, and totals separated by vegetable and non-vegetable crop. The greatest differences are between sites, with Bogra farmers owning a much larger proportion of land, and leasing far fewer decimals, than those from Barisal. Barisal farmers also farmed far fewer decimals of vegetables than Bogra farmers. The site differences observed here for size of landholdings are consistent with national statistics.[22]

Non-purchasing farmers on average had slightly more decimals of land overall to farm than purchasing farmers (196 to 183, respectively), and somewhat more land on which they farmed vegetables (55 decimals to 44 decimals). Comparing type of farmer, the total number of decimals farmed was fairly comparable, suggesting that the goal of our chain referral technique—to identify and interview non-purchasing farmers with characteristics similar to the purchasing farmers—was successful.

Type of Vegetable Farmer/Market Actor

Below is a table that breaks down our sample of farmers by scale of their vegetable gardening or farming operations. Based on the amount of land that each farmer reported using for vegetable cultivation,[23] farmers were categorized according to the criteria laid out on page 7 of this report, in the "Descriptions of Market Actors in Vegetable Seed System."

Table 6: Type of Farmer / Market Actor in Vegetable Seed System

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Homestead gardeners	2	3	1	4	5
Cultivate less than 5 decimals	*13%*	*20%*	*7%*	*27%*	*17%*
Small marginal farmers	10	11	10	11	21
Cultivate between 5 and 99 decimals	*67%*	*73%*	*67%*	*73%*	*70%*
Commercial farmers	3	1	4	0	4
Cultivate more than 100 decimals	*20%*	*7%*	*27%*	*0%*	*13%*

*One acre is equal to 100 decimals.

The distribution of types of market actors was rather similar for the two types of farmers. Small marginal farmers comprised most (70%) of the farmers in this sample (and frequencies were quite similar by both farmer type and site). Non-purchasing farmers had two more larger-scale "commercial" farmer and one fewer smaller-scale actors, known as "homestead gardeners," than in the purchasing farmers' sample. These smaller-scale growers, particularly the homestead gardeners and small marginal farmers, are the market actors most targeted by these mini-packet vegetable seed initiatives.

In Barisal, there is a greater proportion of smaller landholdings—more homestead gardeners and small marginal farmers, and fewer commercial farmers—than in Bogra. This relative difference (although modest and based on a small subsample) is similar to overall site differences between Bogra and Barisal according to Bangladesh agricultural statistics presented in Figure 4.

[22] 2011 Yearbook of Agricultural Statistics of Bangladesh, BBS

[23] Land used for legumes and non-vegetable crops are not included in these land acreage/decimal counts. Legumes (e.g., grass pea, pigeon pea) were often grown in large plots on the same land used for paddy or jute. Likewise, potatoes are excluded as, unlike other vegetables targeted for mini-packets that are examined here, they were typically grown in very large plots (i.e., 100-264 decimals).

Seed Purchasing

Type of Seeds Purchased/Obtained – Hybrid or Open-Pollinated

Displayed in the following two tables are figures on the types of seeds—specifically hybrid and OP[24]—cultivated by all the farmers in our sample, first by number of farmers, and in the second table, by total number of crops. Sometimes interviewees did not clearly specify type for each variety of crop they grew, but these data are included here to give an approximation of the kinds of seeds used by our interviewees.

Table 7: Type of Seeds Used by Farmers – Hybrid or Open-Pollinated (H or OP) (n=30 farmers)

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Used Hybrid seeds only	0	7	3	4	7
Used combination of H & OP seeds	9	8	9	8	17
Used Open-Pollinated seeds only	6	0	3	3	6

Table 8: Type of Seeds used in Crop Cultivation – Hybrid or Open-Pollinated (H or OP) (n=222 crops)

	NP	P	Bogra	Barisal	Total (n=222)
Hybrid	19	57	38	38	76
Open-Pollinated	67	23	46	44	90
No answer	*25*	*31*	*32*	*24*	*56*
Total Crops	*111*	*111*	*116*	*106*	*222*

Over half of the total farmers cultivated some combination of hybrid and OP seeds, and the number was similar for non-purchasing and purchasing farmers (at 9 and 8, respectively). Unsurprisingly, there were substantial differences by type of farmer in the respect that only purchasing farmers used hybrid seeds exclusively (n=6), and only non-purchasing farmers used open-pollinated seeds exclusively (n=6). This was to be expected because of the sampling criteria; mini-packets promoted by the seed initiative and adopted by purchasers are often hybrid varieties, while traditionally, farmers used more local varieties of retained, OP seeds.

The second table shows how many individual crops were specified as coming from hybrid and OP seeds. Of the crops for which we know seed type, overall the split was fairly even with 46% hybrid and 54% open-pollinated. But for non-purchasing farmers, 22% of seeds used were hybrid, and 78% were OP, while conversely for purchasing farmers, 71% of seeds were hybrid, and 29% OP.

[24] OP seeds come from a range of different sources including high quality improved HYVs purchased in commercial packets and mini-packets and lower quality retained local varieties.

Type of Vendor – Where Purchased Seeds

Table 9: Type of Vendor Where Farmers Purchased Seeds

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Retailer	11 *73%*	6 *40%*	9 *60%*	8 *53%*	17 *56%*
Dealer	3 *20%*	11 *73%*	9 *60%*	5 *33%*	14 *47%*
Mobile Seed Vendor (MSV)	0 *0%*	1 *7%*	1 *7%*	0 *0%*	1 *3%*
Agriculture Office	1 *7%*	0 *0%*	0 *0%*	1 *7%*	1 *3%*

* Several farmers purchased seeds at both retailers and dealers, and a few NP farmers did not purchase seeds at all. Therefore, row and column totals may not equal 100%

Though small marginal farmers and homestead gardeners typically get seeds from MSVs, the vast majority of seeds in our sample were purchased from either retailers or dealers. Just one farmer obtained seeds at an agriculture office and another from an MSV. Farmers in our sample more often obtained seeds through dealers and retailers, who were also targeted by seed companies for promotion and distribution of the mini-packets. These numbers, however, are based on a very small sample and need to be considered in this light.

There are noticeable differences in where non-purchasing and purchasing farmers tended to buy their seeds; non-purchasing farmers favored retailers, while purchasing farmers favored dealers. This may not be surprising as dealers likely have a more direct connection to seed companies than retailers.

How farmers learned of mini-packet seeds:

Shopkeepers and company personnel were most often the people from whom purchasing and non-purchasing farmers learned about mini-packet seeds (n=6 for each), followed by dealers (n=3) and people in the markets (n=3), and one farmer learned from an agricultural trainer. A Barisal purchasing farmer said his regular shopkeeper informed him of the mini-packets, *"…he always tells me all about seed."* Likewise, a non-purchasing farmer from Bogra said, *"I have heard it by shopkeeper: Company 2 packet is available containing 50 gram and 20 gram of packets with seeds."*

Several—like a purchasing farmer from Bogra—mentioned that they had learned about the seeds from company marketing efforts. "*I have to communicate with personnel of companies. If they have new arrivals they inform us and inspire [us] to buy it—in this way I know it… They use posters, leaflets, wall writing and so… Festoons, bill board remain here and there are arranged for celebrating 'Field Day.'"*

Brands of Seeds Most Commonly Purchased

Table 10: Brands of Seeds Most Commonly Purchased (includes mini-packets and other packaged seeds)

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Company 2	7	15	12	10	22
Company 4	3	4	4	3	7
Company 3	3	1	4	0	4

Of those who reported purchasing reputable name-brand seeds (either of mini-packets or other packaged seeds), *[Company 2]* was the most commonly reported brand purchased by both types of farmers (n=22).

Numerous farmers expressed great praise for the brand, stating that it was their favorite or only brand. "*I have more confidence in it… I don't buy [any brands] besides [Company 2],"* said one purchasing farmer from Barisal.

Company 2 is one of the two major national seed companies that first marketed high quality mini-packet seeds at affordable prices to these farmers over the past few years. A fourth company, *Company 4* was the next most frequently reported brand (n=7, or roughly one-third as many as who reported using *Company 2*), and it was reported at similar rates for sites and types of farmers. Thirdly, *Company 3* was named by four Bogra farmers, three of whom were non-purchasing farmers. Several other brands were named by one farmer each. We see very little difference between sites regarding brand preference.

Some of the reasons people liked and trusted brand-name packaged seeds (in particular *Company 2*) were the seeds' reliability, familiarity, proven results and the prevalent good reputation mentioned above. A couple farmers said *Company 2's* reputation surpassed that of other brands, "*I heard that the seeds of [Company 2] are good. Really the [Company 2] seeds are familiar in our surrounding markets… I hear rarely of other companies."* (Non-Purchasing farmer, Barisal) Another did not specify which brand, only that brand was an important factor he considered when purchasing seeds: *"In case of vegetable seeds, at first if I go to the market, then the seeds are of which brand, I select the brand."*

A few farmers reported not liking the unpredictability of open market seeds: *"We know [Company 2] has a quality and yield is known. We have very little idea about seeds of open market."* (Purchasing farmer, Barisal) Others cited a range of other positive aspects of *Company 2* seeds versus other brands:

> **Interviewer:** *What is the difference between [Company 2] and other company's seeds?*
> **Respondent***: [Company 2] seeds are looking good, early yielding, and yield is big size, sprouted all seeds but other company's sprouted about 50%.* (Purchasing farmer, Bogra)

However, not every farmer felt favorably about *Company 2*. One non-purchasing farmer from Barisal said that he used *Company 2* seeds once with poor results, and subsequently he did not care to purchase that brand again.

Seed Quality – How Assessed when Purchasing Seeds

Here we briefly explore how both kinds of farmers assessed seed quality. They were asked to list the different aspects of quality they considered before making decisions about what kinds of seeds to use. The table below lists several of the most prevalent aspects of quality named by farmers, along with some descriptive words and quotes (in the left-hand column) about seed quality given by farmers.

Table 11: How Seed Quality is Assessed (NP & P farmers; n=30)

Aspects of Quality Assessed by Farmers *with Illustrative quotes and descriptors given by farmers*	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
Appearance of seed General appearance – usually described as *good or healthy-looking; or shiny, bright and not broken or hollow.* (Color, size/weight separate.) *"Quality can be judged by looking at the seeds.. I understand by looking …by opening the packet, I see if the seeds are sound and fresh." (P-BL)*[25]	6	9	8	7	15
Packaging High quality packaging keeps seeds *good, dry, bright, intact; these seeds yield large vegetables; protected from being destroyed, wasted.* *Packet seeds do not get "destroyed by light and wet wind." (P-BL)* *"Packet seed is remaining good, because the packet is tight, protected, and moreover good in all side." (P-BG)*	8	7	9	6	15
Color of seed Some said color should be *good, bright, fresh, not discolored, faded, or "waste" color.* Ideal color may depend on seed type. Poor quality, unpackaged seeds (e.g., open seeds) are *"discolored as they remain in light and air and are found different" (P-BL)*	7	7	8	6	14
Brand of seed Many saw brand as a key indicator of quality; most favored [*Company 2*]. *"[Company 2] is better than other companies' seeds." (P-BG)* *"I always buy [Company 2] because it gives good yield." (P-BL)*	1	12	5	8	13
Size/Weight of seed Assess weight, density and shape; usually thought to be better if *fat, thick, good-sized, large. Small* often thought to be not as good. *"The small ones I throw them out..." (NP-BG)*	9	3	6	6	12
Rate of germination How many seeds sprout out of all planted; how fully/well they sprout. *"All of them sprout, we think this is good. Highest 1 or 2 missed." (P-BL)*	3	6	4	5	9
Age/Expiration Date Date on package should not be expired; age affects quality; few said only good for 1 season. *"If date is good, it's good condition." (NP-BG)*	2	3	4	1	5
Shopkeeper's recommendation or perception of quality *"I am not expert to choose seeds, fully depends on shopkeeper. I believe him blindly. Which he tells good, I buy those." (NP-BG)*	3	2	3	2	5
Price *Some felt that good or better seeds must have a higher price. "It is high price, to get good seed you should pay good price." (NP-BG)*	2	1	2	1	3
Freshness *"I see if the seeds are sound and fresh." (P-BL) "Seeds in the packets are secure, It remains good, It does not go waste… it remain fresh." (NP-BL)*	2	1	1	2	3
Firmness *"After pressing on seeds, if feels tight then it consider as good." (NP-BL) "It's better to be hard." (NP-BL) "Kernel will be solid & sound." (NP-BG)*	3	0	1	2	3

In the above table, many categories had fairly comparable frequencies by farmer type and site, but a few were quite different. Purchasing farmers used brands to assess quality much more often than non-purchasing farmers. Several non-purchasing farmers said they only used their own preserved seeds—i.e., they did not purchase *any* company seeds—while others said they mostly or sometimes used their own seeds, but also purchased brand-named seeds. A few farmers said they did not know the names of some seeds that they had purchased, showing that brand was not very important for all farmers (especially for non-purchasing farmers).

[25] P-BL refers to purchasing farmers from Barisal; P-BG refers to purchasing farmers from Bogra; NP-BL refers to non-purchasing farmers from Barisal; and NP-BG refers to non-purchasing farmers from Bogra.

Additionally, more non-purchasing farmers used size and/or weight as an indicator of quality than did purchasing farmers (n=9 and 3, respectively), and somewhat fewer non-purchasing farmers listed rate of germination than purchasing farmers (n=3 and 6, respectively). For quality, a few non-purchasing farmers considered seed firmness while no purchasing farmers listed this.

Most of the above are desired qualities expressed by several farmers but a couple opinions differ; first is one farmer's observation that appearance is not a reliable gauge of quality, followed by a similar opinion about seed size.

> *In our surrounding two farmers have cultivated the [mini] packet seeds, they also have better results… My seeds were good-looking but all were not sprouted. Though their seeds were not good-looking, but all seeds were sprouted...* (Non-Purchasing farmer, Barisal)

> **Interviewer:** *Did you not look at the size and color of seeds?*
> **Respondent:** *No, I look never. Suppose, pumpkin seeds, bitter gourd seeds are big in size. Some are small and some are big, both may sprout or not.* (Non-Purchasing Farmer, Barisal)

Quality of Packaged Seeds:

Several farmers (n=24) commented specifically on the quality of packaged seeds (including, but not limited to, mini-packet seeds) available for purchase, either in the market or elsewhere. Most (n=22) who commented on this—said that the quality of packaged seeds available to them was good or very good, while a couple felt that they were generally of mixed quality (and a few did not comment directly on packaged seeds). Several purchasing farmers (n=13) felt that they were good compared to fewer non-purchasing farmers (n=9). Two farmers gave mixed opinions about the quality of packet seeds, and none gave an exclusively negative view. Additionally, a few felt that their own retained seeds were good, but that seeds found in the market were not reliably high quality.

Two NP farmers described why seeds in packets are preferred over local and unpackaged seeds.

> **Interviewer:** *What are your views about the seeds available in the market?*
> **Respondent:** *Local seeds are not generally good. Other packets are good, because they protect them – and local seeds are sold by farmers like me...* (Non-Purchasing farmer, Bogra)

> *These packets are good and intact and nothing bad happen with them… No leakage and airtight. If packet lacks then it is no more air tight and then seeds get damage.* (Non-Purchasing farmer, Barisal)

Others had more negative views of packaged seeds. One non-purchasing farmer from Bogra said he did not understand why packet seeds often looked good, but had poor results. "*I want to know something – that is many times the production of packet seeds is not good… Yes, seeds are not bad, seeds [appear] alright but crops do not grow."* A different Bogra non-purchasing farmer thought the quality of packets was mixed.

> **Interviewer:** *But what is the quality of them [packaged seeds]?*
> **Respondent:** *The seeds are good. But there are some packets which are not good.*
> **Interviewer:** *Well. Are those understandable by seeing packets?*
> **Respondent:** *It can be understood by seeing. Seeds which are small size. And some of them are broken. Those are to be changed.*
> **Interviewer:** *Are those seeds of any company or besides any company?*
> **Respondent:** *No. They are seeds of company.* (Non-Purchasing farmer, Bogra)

Reasons for Buying or Not Buying Mini-Packet Seeds

Reasons for Buying Mini-Packet Seeds (Purchasing Farmers only)

The following reasons were given in response to a question about why farmers bought mini-packet seeds. They highlight the importance farmers placed on obtaining high quality seeds and other issues such as the perceived suitability, cost-efficiency, and availability of mini-packet seeds.

Table 12: Reasons for Buying Mini-Packet Seeds, Purchasing Farmers (n=15)

	Bogra *(n=7)*	Barisal *(n=8)*	Total *(n=15)*
REASONS RELATED TO HIGH QUALITY SEEDS:			
Seeds are high quality	7	8	15
Yield is good / increased	5	8	13
Profit from sales is good / better	1	3	4
Germination rate is high / higher	1	3	4
Reliability of seeds	0	3	3
Early yielding	1	1	2
Larger, more attractive vegetables	1	1	2
Packaging is better, keeps seeds fresh	0	1	1
OTHER REASONS:			
Smaller seek quantities needed for land size	6	7	13
Affordable price / cheaper than other seeds	5	4	9
Shopkeeper / dealer recommended	0	5	5
Can test seeds, try out new crops on small scale	1	4	5
Availability – easy to get	3	1	4
Can expand area of cultivation	0	1	1
No longer have to buy vegetables for family	0	1	1

All purchasing farmers expressed in varying ways the opinion that mini-packet seeds were high quality, and often talked about a number of characteristics that made them so. Half of the reasons displayed in Table 12 relate to the perception of mini-packet seeds as high quality. The other half are varied reasons such as the suitability of mini-packet seeds for small-scale farms or gardens; being accessible, both in terms of affordability and availability; allowing farmers the chance to cultivate more land and provide sufficient vegetables for one's family. Furthermore, a handful of farmers from Barisal followed their shopkeeper or dealer's recommendations to buy the mini-packets.

A number of farmers cited both types of reasons, for example, one purchasing farmer from Bogra said, *"Mini-packs are better than large packs. It is easy to get. The quality is good. It is cheaper than large packs and good beyond open seeds."*

Reasons Related To The High Quality Of Mini-Packet Seeds:

The themes of quality listed in the above table are interrelated; when farmers have an abundant yield, they are able to sell more and receive additional profits. Farmers reported valuing reliability in purchasing seeds, and feel packaged seeds provide reliability—packaging that protects the freshness of seeds and produces consistently high rates of germination.

Almost all purchasing farmers cited ***an expected abundant and/or increased yield*** as an important reason for buying mini-packet seeds. Many purchasing farmers used terms like "bumper crops" to describe their harvests from mini-packet seeds, and some compared them with other seeds' harvests or said it surpassed their expectations: "*The harvests of local seeds are minimal… the harvest of it [mini-packets] are huge."* (Purchasing farmer, Bogra) A couple farmers mentioned that the vegetables from the mini-packets were ***bigger and more attractive***.

> *Vegetable looks good. At market no one can bring string beans like mine, perfect length and huge feet... Each time I took my string beans to market… I always showed the shopkeeper brother, he says very nice, appreciating.* (Purchasing farmer, Barisal)

A few users felt the high quality of the vegetables helped them either ***obtain a profit or increase their profit.*** As one Barisal respondent stated, *"I have good vegetables and have sold them in good price."* Another farmer from Barisal reported, *"The profit is good after what is spent… On average of two to six thousand Taka."*

In addition to profitability and larger yields, farmers reported ***high germination rates and seed reliability*** after using the mini-packet seeds. *"After sown we saw all seeds were spouted fully."* (Purchasing farmer, Barisal) One farmer described benefits of the mini-packet seed ***packaging*** over unpackaged seeds. "*Fertilization of open seeds in the market is less, besides yield is less as the seeds are not packet and get destroyed by light and wet wind."* (Purchasing farmer, Barisal)

Other Reasons:

Other reasons range from the suitability, cost-efficiency, affordability, and availability of mini-packets, to the recommendations given by shopkeepers to purchase them. Numerous purchasing farmers liked that mini-packets met the particular needs of small-scale vegetable production, and the potential they offered to help them maximize and possibly expand their area of cultivation and try out new crops.

All but two purchasing farmers stated that they believed mini-packets' size was ***well-suited to the scale of production*** of their farms and gardens because of their smaller land size. As described by one Barisal farmer: "*I bought big packet usually, though I cultivate varieties in small scale so mini-packet is suitable for me."*

Relatedly, a few farmers mentioned not wanting to waste leftover seeds from larger seed packs, as seeds would not remain fresh and viable in the next year.

> *Land is limited for big one… If I buy big one, the seeds may remain unused, so the dealer suggested for me to take mini-packet. If seeds remain unused this year, it will not have the power to germinate the next year.* (Purchasing farmer, Barisal)

More than half of the purchasing farmers also said that ***mini-packet seeds were affordable or cheaper*** than other seeds, particularly given their need. Or, as one Bogra farmer stated, "*I need little amount of seeds. If I buy large pack, it is over what I use. So I buy mini-packets that save my expenditure." "There is economy in using it,"* as another Bogra farmer explained.

Another issue related to the small-scale suitability is that purchasing farmers ***can test seeds and try out new crops*** on a small scale: "*When I came to know that the yield of hybrid is good I bought mini-packets, I bought experimentally. And because of small area, I bought mini-packets."* (Purchasing farmer, Barisal)

Other reasons given by farmers for purchasing mini-packet seeds related more directly to the purchasing process—that is, the ***availability and ease*** and ***recommendations*** by shopkeepers or dealers. "*It is opened that mini-packs are available… It is easy to buy."* (Purchasing farmer, Bogra) Several Barisal farmers, though none from Bogra, took their shopkeepers' advice to purchase mini-packets.

I buy from this shopkeeper brother, he always tells me all about seed. Which company what seeds are better I know from him, whatever he says about seed that's final. (Purchasing farmer, Barisal)

It means, shopkeeper told me that the packet is good… In fewer price this seeds will give good result, I found it as so... Shopkeeper knows the packet is good or bad. I believe him, what he suggests I buy it. (Purchasing farmer, Barisal)

One farmer mentioned that he **no longer had to buy vegetables for his family to consume**. *"We may not buy anything that are needed for the family consumption… May not buy from the market. Moreover, have relatives that I could give."* (Purchasing farmer, Barisal) While only one farmer mentioned not having to purchase vegetables in the context of this question, as a reason to purchase the mini-packet seeds, it was mentioned by multiple purchasing farmers as a benefit.

Reasons for Not Buying Mini-Packet Seeds (Non-Purchasing Farmers only)

Reasons non-purchasing farmers gave for not purchasing and using mini-packet seeds were given in response to a particular question on factors that impacted these farmers' decisions about seed use.

Table 13: Reasons for Not Buying Mini-Packet Seeds, Non-Purchasing Farmers (n=15)

	Bogra *(n=8)*	Barisal *(n=7)*	Total *(n=15)*
Price: Big packs proportionally less expensive	3	2	5
Not enough seeds to cover large amount of land	4	0	4
Unnecessary: Already had own seeds	0	2	2
Unaware or not informed about mini-packets	1	1	2
Not available	0	1	1
Heard mini-packets did not have a good yield	0	1	1
Got poor yield when used mini-packet brand	0	1	1
Thinks mini-packet seeds requires more inputs: fertilizer, pesticides, and care	0	1	1
Shared a big packet with others	0	1	1
Cultivated only a small amount of land, vegetables	0	1	1

A number of the same factors considered as motivators for buying mini-packets by purchasing farmers were also considered as deterrents for non-purchasers: price, suitability to size of land, and availability. Several non-purchasing farmers reported that mini-packet seeds were too expensive, with some commenting that they would miss out on the economies of scale of large packs. Some non-purchasing farmers felt that mini-packets did not have enough seeds to suit their purposes, so more packets would be necessary, which would then cost more than large packets.

The top reason given for not buying the mini-packets was ***price.*** That is, large packs proportionally are less expensive than mini-packets**:**

Yes, I heard that they are of super quality but no cost saving to me… Big packets contain more seeds and small packets contain less seeds, so small packets are need more in number and pricing amount is higher. On the other hand big packets contain more seeds, used to need in less number. Comparing price, rate, ratio, big packet are cost saving. (Non-Purchasing farmer, Bogra)

Think that, if I bring seed of Tk.20, it does not cover 5 decimals of land so we do not buy little seeds. For that we buy that one. More gain in less cost. (Non-Purchasing farmer, Bogra)

Besides cost considerations, some non-purchasing farmers cited the ***suitability*** of larger packs (and the unsuitability of mini-packets) to their land size. They expressed concern that the mini-packets did not have enough seeds to cover their land: "*My land is large; Mini-packets do not serve my needs… Because of more land, my purpose is not served with mini-packets."* (Non-Purchasing farmer, Bogra) Similarly, another farmer from Bogra stated, "*No, nobody use it [mini-packets]… They all have big size of land, mini-packet does not cover."* For purchasing farmers, we saw the converse. And while some farmers mentioned their land was too large for the mini-packets, one farmer from Barisal stated, *"I didn't buy them because I didn't cultivate that much."*

One farmer with a small amount of land mentioned that, instead of using mini-packets, he ***shared*** a larger packet of seeds with other farmers. "*I bought a big packet, and distributed among others besides my house, we all have small size of land cultivate.* (Non-Purchasing farmer, Barisal)

A couple farmers from Barisal ***had their own seeds*** already, and did not see a need to purchase the mini-packets. One Barisal farmer, who was interested in purchasing the mini-packet seeds, could not find any available. *"I asked for Karalla (Bitter Gourd) seed, they told that it is not available... That seed is sold out in the wholesale market. No supply then. Since the seeds are in high quality, supply is less."*

A few of the reasons given by farmers for not purchasing the mini-packets were related to negative experiences or information. One Barisal farmer reported that he heard ***mini-packets did not offer a good yield:*** "*I wish to buy packet. But… the seed. I heard from many that it did not give good yield. For that, I did not buy."* Another farmer from Barisal ***previously experienced poor yield*** from the company's seed: "*Actually I have used [Company 2] seeds in a single time. But I didn't get good results. So I didn't precede my aspiration to use it for the next time [for mini-packets]."*

Finally, one Barisal farmer thought that ***mini-packet seeds require more care, fertilizer and pesticides*** than other seeds, a belief that deterred him from buying them: "*People who are using mini-pack having bumper production, more income, but need more caring and fertilizer… As they cultivate for selling so they are cultivating huge as a result they need more [pesticides]. Also for better production they need it."* Despite this farmer's opinion that more agricultural inputs are needed with mini-packets, he intended to try using mini-packet seeds because he heard they yield *"bumper production"* and generate more income.

Challenges and Constraints in Purchasing Seeds

First, we discuss a question posed to all farmers about their main challenges encountered in purchasing any seeds, high quality or low, mini-packet or not. Next, some potential barriers to purchasing mini-packet seeds—availability, access, price, and awareness of mini-packets—are examined. Finally, we look at non-purchasing farmers' awareness about mini-packet seeds.

Main Challenges in Purchasing Vegetable Seeds—*Mini-Packet & Other Seeds*

The table below displays the main challenges faced by farmers in buying vegetable seed. Both purchasing and non-purchasing farmers were asked "What are the main challenges you face in buying vegetable seed?" We discuss "Problems related to non-mini-packet seed/poor quality," which covers experiences from both purchasing and non-purchasing farmers (i.e., using their own, retained seeds and other packaged seeds, some of which didn't produce high yields). The second main type of problem below is "Lack of availability and/or access to quality seeds," and it refers to efforts to get mini-packet seeds (and to a lesser extent, other certain brand seeds considered to be of quality).

Table 14: Main Challenges in Purchasing Vegetable Seeds (NP & P farmers; n=30)

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
1. CHALLENGES Related to POOR QUALITY SEEDS *(E.g., Non-Mini-Packet Seeds)*					
a. Untrustworthy shopkeeper or dealer gives poor quality seeds • *Sometimes the dealers are not interested to give good seeds due to their tendency to get much profit. Company personnel are cheating farmers.* ***(P-BG)*** • *Many farmers bought seeds of [Brand X]' but it appeared that the seeds were mixed seeds… There are seeds which are supplied in the market by many companies. The sellers sell them in the market after copying the name of the brand. There is problem in it.* ***(P-BG)*** • *Some bad businessman are doing it. Suppose there is shortage of 100gm. Maybe he is giving me 100gm of seed from an opened packet.* ***(NP-BG)*** • *They often give us seeds of year before.* ***(P-BG)***	5	3	7	1	**8**
b. Quality of open/unpackaged seeds is unpredictable • *Sometimes undesirable and bad quality seeds have remained in the market. In this regard some problems are made… It is tough to say that the quality is sound overall… Really it is difficult to identify what is good.* ***(P-BG)***	0	3	2	1	**3**
c. Germination rate is low, had to return to shop • *The problem is the seeds of cabbage were from open market and plants did not germinate. No [not a single one], plants did not germinate. Then I returned the seeds… He was saying that seeds were alright… he ask me to try again, I said no.* ***(NP-BG)***	1	1	2	0	**2**
2. LACK of AVAILABILITY and/or ACCESS to HIGH QUALITY SEEDS					
a. Lack of availability of seeds/Delay in access • *Yes, [I do face difficulty in buying vegetable seeds]… If I go to buy seeds, I do not get them in time. Many times we fall in crisis; no seed is available in the market. Then the crop is in late.* ***(P-BG)*** • *Since the seeds are high quality, supply is less.* ***(NP-BL)*** • *Yes, it happens [that seeds we need are not available]. We do not buy seeds that day. We do not take seeds if there are not good… The reasons could be that the shop is not getting good seeds supply from the company. They may be available after a day or two, next week.* ***(NP-BG)***	3	5	6	2	**8**
b. Not having enough money/Seeds cost too much • *Sometimes we have made up land to sow… we need to buy seed for about 500 or 600 taka. Then we need to go on credit, also we need to loan money sometimes.* ***(P-BL)*** • *The price yet was high.* ***(NP-BL)***	1	2	2	1	**3**
No Problems Reported	*6*	*6*	*3*	*10*	*13*

Challenges related to Non-Mini-Packet/Poor Quality Seeds

A sizeable number of farmers (n=8) in Table 14 reported having ***problems trusting shopkeepers or dealers*** to be honest and fair when purchasing seeds, including replacing or mixing high quality name brand seeds with lesser quality seeds (a "copy" or "duplicate"), giving too few seeds, or otherwise cheating them. While that number was fairly consistent across farmer type, all but one of the eight complaints about untrustworthy vendors were from the Bogra site. On the other hand, the dealers and shopkeepers that purchasing farmers trusted to give recommendations were all from Barisal (Table 12).

A second challenge in purchasing non-mini-packets was that it could be difficult ***to identify or predict which open seeds were high quality***. Additionally, a couple farmers experienced difficulty with ***low-germinating seeds***.

Constraints in Purchasing Mini-Packet Seeds – Availability, Access, Price & Awareness

Potential barriers and constraints reported by farmers limiting their purchases and usage of mini-packet seeds—availability of desired and needed seeds and financial barriers to accessing seeds—are also listed in Table 14.

Availability and Access to High Quality Seeds

Lack of availability or delays in availability were challenges for a number of farmers (n=8). One issue discussed in the market system assessment portion of this report is the potential for shortage of high quality seeds during the sowing season, and the subsequent delay in getting them. Below, a couple farmers describe how seed availability during peak sowing season can be challenging:

> **Interviewer:** *During last one year, the seeds you needed, did you get all of them?*
> **Respondent:** *No. I did not get… Demand for packets is more than the supply. All farmers were giving emphasis on it. The price was high and everybody was trying to cultivate it. They were going to dealer to make their demand but dealer could not supply according to demand. Then there was shortage. Then I was not able to get.* (Purchasing farmer, Bogra)

> *That is in seed season, when I go to buy seeds, people say… take this and this seeds. But as my necessity and demand I don't find exact seed that I am expecting. Seeds are not available as per demand.* (Non-Purchasing farmer, Bogra)

When asked about the availability of seeds generally in the market in the past year (not just mini-packets), two-thirds stated that seeds were easy to get. In fact, one-third of those said that seeds were easier to get than in the past—and that they were offered from more vendors. Farmers did not report having ***other accessibility problems such as a shortage of vendors or a lengthy distance to vendors***—indeed some said that those issues had improved in the past couple of years. Farmers' perceptions of the range of different kinds of vegetable seeds available for purchase are briefly examined below.

Table 15: Perceptions of the Variety of Seeds Available for Purchase (P & NP farmers)

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
MANY or ALL types available	5	11	7	9	16
SOME, but NOT ALL types available	3	1	1	3	4
NOT ENOUGH types available	2	0	1	1	2
No Answer	*5*	*3*	*6*	*2*	*8*

Just over half of the farmers interviewed felt that most or "all types" of different seeds—both crop types and brands—were readily available for them to purchase. One said 40-50 were available, another said, "*All types are there, bottle gourd, bean, grass pea, yard long bean, cabbage, cauliflower, red amaranth, Bengal spinach…"* (NP Bogra farmer) A few farmers noted that although all crop types were available in open seeds, not all were available as packets.

Price

One of several potential barriers or constraints that may limit farmers' use of high quality seed is price, or perceptions about price. Table 16 provides an overview of how farmers felt about the price of mini-packet seeds.

Table 16: Perceptions of the Price of Mini-Packet Vegetable Seeds (P & NP farmers)

	NP (n=15)	P (n=15)	Bogra (n=15)	Barisal (n=15)	Total (n=30)
POSITIVE – Said price was good or acceptable *"We get good seeds expending little money." Also described as reasonable or cheap. "Pricewise it's really good."*	1	13	7	7	14
NEGATIVE – Said price was high, unacceptable *"We think it very high." Many described price as "too high."*	9	0	5	4	9
Did not say how felt about price; just described it	*5*	*2*	*3*	*4*	*7*

While there is little difference between sites in perceptions of price, there is a marked difference between the perceptions of purchasing and non-purchasing farmers. Purchasing farmers were much more accepting of the price, while non-purchasing farmers were largely critical, and felt that they cost too much.

Almost all purchasing farmers thought that the price of mini-packet seeds was acceptable or good, while only one non-purchaser did. Two purchasing farmers from Barisal shared their favorable opinions:

> *Price is good. I can get them in fewer prices. So I never have to hesitate with the price. I never have to buy seeds on credits any more. I can get them in 20 tk.* (Purchasing farmer, Barisal)

> **Interviewer:** *Do you think that price of a packet of seeds of 'Karalla' is only Tk.20, what about this price?*
> **Respondent:** *This price is admissible for all, the poor can use and the each can use it and those who grew in small amount here and there, they can also use these with quality seeds.* (Purchasing farmer, Barisal)

Conversely, more than half of non-purchasing farmers had negative perceptions of mini-packet seed price—saying that their price was "high" or "too high"—while no purchasing farmers shared such criticisms. When asked, one non-purchasing farmer from Bogra commented, "*We think it [the price] very high,*" and gave the example that a 10 gram packet of ridge gourd seed cost 100 Taka. A different non-purchasing farmer from Bogra explained that mini-packets provided no cost savings to him, a belief shared by other non-purchasing farmers:

> **Respondent:** *Yes, I heard that they are of super quality but no cost saving to me.*
> **Interviewer:** *Not cost saving, how?*
> **Respondent:** *Big packets contain more seeds and small packets contain less seeds, so small packets are need more in number and pricing amount is higher. On the other hand big packets contain more seeds, used to need in less number. Comparing price rate, ratio big packet are cost saving... [In mini-packets] seeds are less, rates are high.* (Non-Purchasing farmer, Bogra)

Other Opinions on Price—Maximum Retail Price:

The practice of printing a standard Maximum Retail Price, or MRP, on seed packets was mentioned previously in the market system assessment. From our interviews, we saw both types of farmers viewing this practice positively. No farmers critiqued the practice. Many farmers reported that printing a price would help make purchasing easier, more consistent, and cheaper.

> *There is no problem [purchasing seeds]. They are sold at market price. They take that price. They cannot take more.* (Purchasing farmer, Barisal)

> *Sometimes, prices are more, sometimes less. It depends on the demands. When MRP is available, the price is less. And when MRP is in short supply price is very high. Say, price seeds of Tk.15 become Tk.30. We*

are forced to pay it, pay extra. And, those which have MRP we can test them and buy. (Purchasing farmer, Bogra)

Awareness of Mini-Packet Seeds & What Heard from Others (Non-Purchasing Farmers Only)

Table 17 addresses the level of awareness and knowledge non-purchasing farmers had about mini-packet seeds. This includes any knowledge or information heard from other farmers, neighbors, shopkeepers, or the wider community.

Table 17: Awareness of Mini-Packet Seeds & What Heard About Them, Non-Purchasing Farmers (n=15)

	Bogra *(n=8)*	Barisal *(n=7)*	Total *(n=15)*
Whether aware of mini-packet seeds:			
Aware	8	6	14
Not Aware	0	1	1
Know of others who purchased mini-packets:			
Knew others who used mini-packets	3	6	9
Did **not** know others who used mini-packets	5	1	6
What heard about others' experiences using mini-packets:			
Positive information only	2	1	3
Mixed positive and negative information	0	3	3
Negative experiences only	0	0	0
Did not hear anything specific or did not say	6	3	9

Almost all non-purchasing farmers were aware mini-packet seeds existed. While most did not specify where or how they learned about the seeds, some individuals reported learning from dealers, shopkeepers, company personnel, or others. Slightly more than one-third of the non-purchasing farmers did not personally know of other farmers using mini-packet seeds. Of those non-using farmers who heard any specific information about mini-packet seeds, half heard positive information, while the other half heard mixed reviews about the seeds.

A typical response about others' positive experiences with mini-packets is given by this non-purchasing farmer from Bogra who comments on his neighbors' experiences: "*Experience is good. Seeds are generating very good. Plants are growing well."* Three other non-purchasing farmers from Barisal heard both positive and negative things about the mini-packets, one saying, "*Some of them have [good] yield from time to time, [others] they did not have yield for some time, they did not get good yield."* Another said that while he heard that hybrid mini-packet seeds had the disadvantage of requiring more care, pesticides, and fertilizer, he also heard that *"They have got very high production. They always get twice as much as me. All good… Honestly, that is excellent."* Likewise, this farmer heard mixed things:

> *I heard from other people at market who are buying [mini-packets]… People speak to each other; they say this one is cheap, that seed not good. Other hand some people mention some seed they have used, that is not bad but need to use more fertilizer with that seed. Some other seed does not require this much fertilizer.* (Non-Purchasing farmer, Barisal)

It is interesting that although overwhelmingly purchasing farmers had positive things to say about their mini-packet seed usage, it seems from the above results that positive experiences were not universally spoken about or universally experienced. One purchasing farmer from Barisal who himself had good experiences with the seeds, said this: *"Surrounding me, many people doing it, they told me that do not get good result."*

Finally, several did not seem to have a very clear or a complete understanding of mini-packet seeds or to have spoken directly to others about their mini-packet seed experiences. One simply said, "*I am inattentive about what others doing,"* while another explained that he did not know anything about them because, *"Nobody in the village has bought it…"* (Both Non-Purchasing farmers, Barisal) A similar quote follows.

> **Interviewer:** *How far is your knowledge, is there any farmer told you to use mini-packet?*
> **Respondent:** *No, we all use big packet… No, nobody use it, so no question, [nothing] to tell. They all have big size of land, mini-packet does not cover.* (Non-Purchasing farmer, Bogra)

Another non-purchasing farmer from Bogra felt he needed more seeds than were provided in mini-packets, but admitted he did not know much about mini-packets: *"Small amount seeds cannot be used in large land. For that we do not buy then. We do not know much about them."* Although this farmer had some plots that were around 5 decimals or less, he seemed to be unaware that mini-packets could meet his needs for some of his crops.

Changes in Sales & Production Practices Attributed to Mini-Packets *(Purchasing Farmers Only)*

This section focuses on responses to two similar questions asked of purchasing farmers about their sales and production practices. The first question is, "Have you changed any sales practices as a result of purchasing these packets? If so, please explain."

Changes in Sales Practices as a Result of Using Mini-packets

Table 18: Changes in Sales, Purchasing Farmers

	Bogra (n=7)	Barisal (n=8)	Total (n=15)
YES, Change	6	6	12
NO, No Change	0	0	0
No answer	*1*	*2*	*3*

Most purchasing farmers experienced changes in their sales and sales practices; all of those who answered the question directly reported a change, and, as seen below, most referred to an increase in production, sales or profits.

Table 19: Types of Changes in Sales & Sales Practices, Purchasing Farmers

	Bogra (n=7)	Barisal (n=8)	Total (n=15)
Sell more	2	3	**5**
Greater Yield, Enough to sell after eating	1	3	**4**
More Profits	2	2	**4**
Family helps to sell crops	1	2	**3**
Wholesalers & Others come to house to buy	1	2	**3**
Higher Prices	2	0	**2**
Customer likes produce better	2	0	**2**
High Demand	1	1	**2**
Can invest more profits in plants	0	1	**1**
Change, No detail given	*1*	*1*	**2**

The majority of changes seemed positive in nature, while a couple were neutral (i.e., family members selling vegetables, and selling directly to wholesalers from one's house). None of the reported changes were expressed negatively. Several farmers[26] in Table 19 again reported experiencing greater yields which enabled them to sell more—in quantity and often at higher prices—after meeting their family's consumption needs. Therefore, they made higher profits, and were able to invest more in additional plants, for example, which are both positive changes.

Many quotes below exemplify more than one of the interrelated ways in which using mini-packet seeds changed sales practices and sales for purchasing farmers. First, many farmers said that they ***sold more vegetables than in the past*,** and a similar theme reported was that mini-packet farmers often enjoyed ***greater yields, and had enough excess to sell after eating:***

> **Interviewer:** *How much have you sold after covering your family? …comparatively more or less than before?*
> **Respondent:** *More than past… It will be like 95 percent more.* (Purchasing farmer, Barisal)

> **Interviewer:** *What types of changes were being done in the last year?*
> **Respondent***: In past we got little crops. Now we get more crops. We can take and sell it… because of mini-packets. Now what I grow it is good enough for my own family and also I can sell some. It's because I am using [Company 2] seed.* (Purchasing farmer, Barisal)

Other positive changes reported were receiving ***more profits*** and ***higher prices for vegetables*.** One Barisal farmer said, *"You know, in last season we lost our capital and this season it's been cover by first time selling. It [profit] was like ten thousand."* Several purchasing farmers attributed their ability to sell mini-packet vegetables at higher prices to the ***higher relative demand for their vegetables*** which resulted from the fact that ***customers liked their produce better*.** *"Customer like my yield [better] than local yield. Yes, [I am] getting higher price."* (Purchasing farmer, Bogra) Another farmer in Bogra said sales were expected to be good *"due to bumper harvest. Its taste is good. And it is easy to get more money than local products."* Another Bogra farmer summed up the changes by saying, *"It is high price, high demand, and huge sales."*

A final positive change was ***being able to invest more profits in plants***, a possibility resulting from the increased profit.

[26] Elsewhere (in "Reasons for buying mini-packets") we have seen that 13 purchasing farmers actually reported having higher yields; just four reported this result in the context of the question about changes in sales.

> **Interviewer:** *Earlier when you have used own seed, is there any opportunity to sell, did you sell?*
> **Respondent:** *No, very little, it can be said that I did not sell. Now, since the result of hybrid is good, yield is good, after meeting need of our family the surplus that remains, I sell there and try to invest in the plants to get return.* (Purchasing farmer, Barisal)

A couple changes, as described before, are somewhat more neutral in nature. First, because there was both a greater demand for and supply of their vegetables, ***wholesalers and other buyers started coming directly to the homes*** of a few farmers to buy produce from them.

> *There is change in case of selling… For example, in own area, we need to take vegetable to the market. But if the yield is more, then the paikers (wholesaler) come straight to our home and transports also come straight to our home.* (Purchasing farmer, Bogra)

The second neutral change, ***family members helping to sell the vegetables*** more often, is described by a Barisal farmer. "*They [family members] give more time… I am not in my home, the purchasers have come to collect vegetables or a man has come to take vegetable, my wife or my mother help them or sell to them and keep money with them.*"

Changes in Production Practices as a Result of Using Mini-Seed Packs

Responses to the question "Have you changed any production practices as a result of purchasing these packets? If so, please explain." are presented in Tables 20 and 21:

Table 20: Changes in Production, Purchasing Farmers

	Bogra (n=7)	Barisal (n=8)	**Total (n=15)**
YES, Change	6	4	10
NO, No Change	1	3	4
No Answer	*0*	*1*	*1*

Table 21: Types of Changes in Production, Purchasing Farmers

	Bogra (n=7)	Barisal (n=8)	Total (n=15)
Less Fertilizer needed	2	1	3
Less Pesticide needed	2	1	3
Less Time/Less Labor needed	2	0	2
Different Technique/Method	0	2	2
Fewer seeds required	1	0	1
Less Cost	1	0	1
Less Water needed	0	1	1
Family helps more	1	0	1

Two-thirds of purchasing farmers reported experiencing changes in production practices (a few reported more than one change), while just under one-third said they did not undergo any such changes. (Note that in Table 21, "increased production" is not counted as a change; although many, if not most purchasing farmers at some point mentioned this change, references were often not specifically made in the context of this question.) As seen with sales changes, changes in production reported here appear to be mainly positive in nature—with the possible exception of two that seem to be neutral changes.

Several farmers commented on favorable changes, including a ***reduction in costs, labor, and other agricultural inputs such as fertilizer, pesticides, and water***. In total, 12 such responses were given. A few farmers mentioned multiple responses, as shown below.

> **Interviewer:** *Is there any change in cultivation process during using mini-packet than before?*
> **Respondent:** *Yes there is, less time, cost saving, fertilizer, pesticides need less, etc.* (Purchasing farmer, Bogra)

> *Yes, fertilizer requirement is less. Earlier the requirement has two handfuls, now there the need is one handful… Water requirement is also less, nothing more is required.* (Purchasing farmer, Barisal)

Another farmer from Bogra mentioned that he could get fewer seeds now, according to his precise needs. *"There is change in cultivation… Say, for example, in case of seeds, there was need for more seeds now it needs less, I require now according to necessity."*

Farmers reported two other changes in production practices. The first is ***using a different cultivating technique or method.*** It is not clear, however, if these changes in method are directly related to mini-packet usage.

> **Interviewer:** *Did you made any changes in cultivation?*
> **Respondent:** *Basically the changes in method are just having made up small hillock for the plants… I did it the high land. [So that it does not get flooded], yes.* (Purchasing farmer, Barisal)

> *I have to change a little of the technique of cultivation… At first I have to dig a hole, if I put 'Jaiba' (organic) fertilizer and sow seed after a week, then Hybrid plant became more fresh and good compared to local seed.* (Purchasing farmer, Barisal)

A final reported change that was brought on by mini-packet vegetable seed usage is ***increased family assistance with production.*** Getting more help from family is associated with the benefit of having a greater production (and is analogous to the greater involvement of families in sales, as mentioned above). But the requirement for more labor may also potentially have a negative effect on some household members, although this was not expressed in our interviews.

> **Interviewer:** *Have been any changes to the cultivation method using mini-packs?*
> **Respondent:** *Of course production is increased. But the cultivation process or expanse module is not changed...*
> **Interviewer:** *In the last year, have you made any changes regarding family assistance in cultivation?*
> **Respondent:** *Yes. They help me more than previous.* (Purchasing farmer, Bogra)

Effects of Mini-Packets on Daily Life *(Purchasing Farmers Only)*

None of the participating farmers who were asked whether they had experienced any negative daily impacts due to mini-packet usage reported experiencing negative impacts. Moreover, all 15 participating farmers reported that using mini-packets had positively impacted their lives, often in multiple ways (Table 22).

Table 22: Impacts of Mini-Packets, Purchasing Farmers

	Bogra (n=7)	Barisal (n=8)	Total (n=15)
Consumption of More Vegetables & Associated Social Impacts			
Consumed more self-raised vegetables within household	7	8	**15**
Gave vegetables to others (beyond household) to eat	2	6	**8**
Economic Impacts			
Income – earned profits / more profits	7	8	**15**
Sold more vegetables	2	2	**4**
Able to invest money in more cultivation	1	1	**2**
Better Production with Fewer Inputs & Associated Economic Impacts			
Good or better yield - greater in volume and quality *(e.g., bigger and better-tasting vegetables, etc.)*	5	8	**13**
Germinates in a shorter amount of time, yields early and/or for a longer period of time	3	1	**3**
Year-round vegetable production	1	0	**1**
Less labor, yet greater yield	0	1	**1**
Able to cultivate more in smaller plots	0	1	**1**
Positive Psychological and Emotional Impacts			
Brings happiness, more eagerness	0	2	**2**

As already noted, purchasing farmers experienced higher yields, increased efficiency, and greater sales. A few other important benefits not previously mentioned include increased vegetable consumption and associated positive social and psychological impacts.

Consumption of More Vegetables & Associated Social Impacts

All farmers who used mini-packet seeds were able to provide and consume more vegetables for themselves and their household members. Just over half of these farmers indicated that they were able to share excess produce with others in their community (e.g., with those in poverty), thereby strengthening social bonds, after meeting their families' needs: "*In eating there is more extra, if there is any excess that are given to the poor in the area.*" A different purchasing farmer from Barisal explained, *"We consumed and gave to our relatives and neighbors also… After consuming as we need, something was sold as bundle."*

A few farmers indicated that prior to using mini-packets, they were not able to meet the need for vegetables in their households, but since using them, they had an abundant daily supply. "*Yes, before I can't fulfill my own demand. Now, consume as we need and sold about 2,000 taka. I also give my relatives."* Another said, *"Yes. I get fresh and insect-free vegetables every day."* (Both Purchasing farmers, Bogra) Besides the convenience of having vegetables readily available near their homes, several remarked about the economic benefits of no longer having to buy vegetables.

> *Family's [garden] project is that they can eat vegetables regularly… Nothing is required to be bought from market.* (Purchasing farmer, Barisal)

> **Interviewer:** *Do you take vegetables more in the daily life?*
> **Respondent:** *Yes. In past I bought it. Now I take it by myself.* (Purchasing farmer, Bogra)

A purchasing farmer from Barisal sums it up thusly: "*Income has increased… good price is ordained when it is sold… They [vegetables] can be collected from the garden any time and eaten....We cooperate with them by giving vegetable."*

Economic Impacts

Here, we include quotes from mini-packets farmers describing positive economic impacts. All purchasing farmers experienced positive economic gains and many reported increased sales and profits. Farmers described varying levels of income, with some farmers' profiting more than others. One Barisal farmer said that his profits "*slightly increased*" while others described more substantial increases, or said generally, "*The production and profit is high."* One said his average profits were 2,000–6,000 Taka, and another reported 6,000-7,000 Taka. Some farmers talked about wanting to invest such profits in further production:

> *We want to cultivate other vegetables, then the money will be spent in it.* (Purchasing farmer, Bogra)

> *Now, since the result of Hybrid is good, yield is good, after meeting need of our family the surplus that remains, I sell there and try to invest in the plants to get return.* (Purchasing farmer, Barisal)

Better Yield/Production with Fewer Inputs (and associated Economic impacts)

Almost all purchasing farmers specifically said that their mini-packet seeds produced a ***better yield*** than other seeds (two did not make direct comparisons about this, although they had positive things to say about the seeds' production). Beyond producing ***bigger vegetables***, a few expressed the view that they had ***better-tasting vegetables, healthier plants, and fewer insects.*** One Barisal farmer said, "*It may be found that my plot is beautiful and there are no insects and is green but theirs is of mad color and of various looks.*" Another simply said, "*It looks nice, green."* A purchasing farmer from Bogra said that his customers' preference for his produce translated to higher prices. *"Customer like my yield than local yield… Yes, [I am] getting higher price."*

A farmer from Barisal described his increased yield: *"Say compared to earlier, what is given by local seed per plant is 7-8-10, it gives 15-20… It doubled."* Another Barisal farmer summed up his view on mini-packet seed production: "*Better quality, very good production… getting benefit by the sum total of quality of seeds, and there is no deficiency…"*

A related issue a purchasing farmer from Barisal brought up was that, when using mini-packets, he was able to ***produce a greater yield with less labor.***

> **Respondent:** *Yes, In past I have to work hard but I had less crops.*
> **Interviewer:** *Worked hard more than now?*
> **Respondent:** *But now comparatively I get more crops.*

An additional advantage of the mini-packet seeds mentioned by a few farmers was that they ***germinate in a shorter amount of time, yield early and/or for a longer period of time.***

> *Since a long time till now it's giving spinach… We can have production in between 20 to 40 days... Yes [in short time].* (Purchasing farmer, Barisal)

> *We take more vegetables than previous. It is continued in whole year. Income is at good position.* (Purchasing farmer, Bogra)

Farmers reported that having crops produce early and/or in a shorter amount of time relative to other seeds could be financially advantageous in more than one way: 1) farmers can potentially grow more crops

throughout the year, thus earning more, and 2) when farmers were able to harvest certain crops early in the season (earlier than was typical), they could sometimes charge more money for them.

Positive Psychological and Emotional Impacts

Beyond positive economic and social impacts, mini-packet seed use also promoted increased psychological and emotional well-being for some farmers—pride, happiness, and greater motivation. These positive psychological impacts resulted in a positive outlook on their future vegetable farming plans and prospects. When asked whether they would use mini-seed packs in the future, two farmers said yes and described positive emotional and psychological effects:

> **Interviewer:** *Do you want to buy more quantity of seeds now than before?*
> **Respondent:** *I am hopeful. I hope to buy more than what I now buy. I am taking up another project… I can give [vegetables]. Someone wanted something and I would give. It gives us lot of happiness.* (Purchasing farmer, Barisal)
>
> *Definitely, because I have got good production. It's an inspiration so I must use them in future.* (Purchasing farmer, Barisal)

Future Purchases

All purchasing farmers (except one who did not address the issue) stated that they would indeed purchase mini-seed packs again in the future. In at least the two cases above, the positive impacts of mini-packet seeds were linked with this intent to purchase again. Over half of the farmers (n=8, 4 from each site) indicated that they would buy more packets in the future. Some farmers planned to expand the area of land they cultivated: "*I shall buy more and bring my whole land under mini-pack,"* said one purchasing farmer from Bogra. Another purchasing farmer from Bogra explained it thusly: *"Yes. I will buy more because the production and profit is high."*

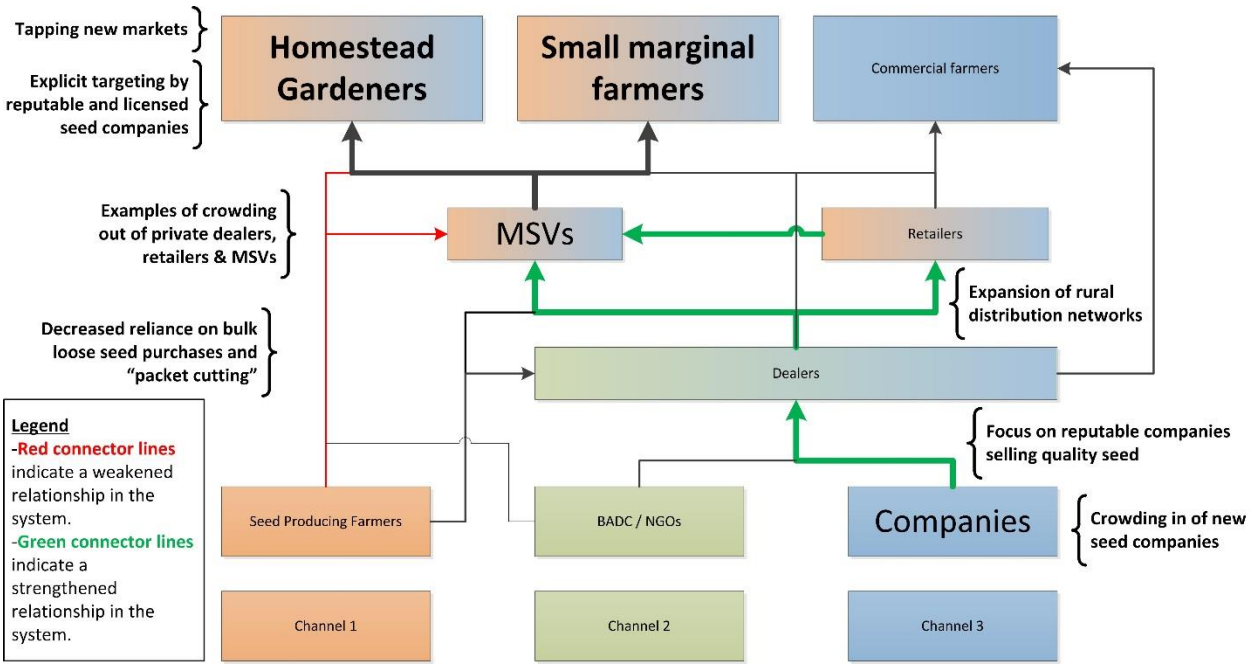
While one farmer said he would buy ten packets, another reported he would buy two more packets than previously. One Barisal farmer stated that he would not buy more than previously because it would be difficult for him: "*I shall buy whatever is required by me, I have no profit in buying more, not even for cultivation. This [would] put me in difficulty."*

Another farmer felt that by using mini-packet seeds, he maximized usage of his small plot of land, thereby increasing his yield and profits. He would therefore buy more in the future because, *"I have got bumper crops in the mini-packs. I have also got regarding my need using my minimum lands. And profit is expected."* (Purchasing farmer, Bogra)

Conclusions and Lessons Learned

This market system assessment showed that a number of systemic changes took place in the vegetable seed market, both at the company level and within their distribution networks, that can likely be attributed to the introduction two years ago of high quality seed being sold in small, affordable quantities.

Figure 5: Map of Vegetable Seed System after the Introduction of Mini-Packets



Market actors have reported the introduction of mini-packets as successful, evidenced in part by *Company 2*'s adaptation of its strategy and the crowding in of other seed companies. These successes helped continue and expand an ongoing trend in which packaged seed is replacing lower quality retained OP seed in Bangladesh by increasing sales of commercial packets as well as serving previously "untapped markets" through extending access and availability of high quality vegetable seed to smaller-scale farmers and homestead gardeners. With a focus on further expanding reach into "untapped markets" many of the seed companies are exploring ways to expand their rural distribution networks to reach even more producers living in remote rural areas.

The primary change in the vegetable seed marketing system that occurred as a result of the introduction of mini-packets is the focus of reputable and licensed companies on developing and growing markets for vegetable seed by explicitly targeting homestead gardeners and small marginal farmers (see emphasized arrows and boxes in Figure 5 above). The particular systemic changes associated with this renewed emphasis include:

1. **Focus of reputable companies** on developing and growing markets for vegetable seed and **adoption of strategies** to produce, package, and market vegetable seed mini-packets by explicitly targeting homestead gardeners and small marginal farmers;

2. **Increased sales of high quality seeds** (in both mini-packets and regular packets) resulting from the introduction of mini-packets into the market;
3. **Tapping a new market** (small and marginal farmers) for high quality vegetable seed, which had previously not been served by seed companies;
4. **Expansion of seed companies' rural distribution networks** which is happening on its own as MSVs see the opportunity to sell mini-packets to their clientele. Seed companies have also begun new initiatives to formally include MSVs in an effort to make further inroads into the new "untapped markets" for high quality vegetable seed (including those in the most remote areas);
5. **Reduced rate of "packet cutting"** (breaking down larger packages) to sell small quantities of seed to small-scale producers;
6. **Crowding in** of new seed companies who have begun to test the commercial marketing of vegetable seed mini-packets without additional donor support; and
7. **Crowding out** (reduced sales) of private sector dealers, retailers, and MSVs caused by development organizations that are now purchasing mini-packets and distributing for free in the market system.

Other observed systemic changes to which the introduction of mini-packets may be a contributing factor, but not a driving force, include:

1. **Trend towards packaged seed** and away from bulk loose seed continuing and expanding as a result of the introduction of mini-packets;
2. **Printing maximum retail price** (MRP) on seed packets, which has stimulated interest of farmers and created problems within the companies' distribution networks; and
3. **Other agro inputs** being sold in small packets, which are not being targeted to small marginal and homestead producers.

Change is often difficult. Not all systemic changes described above have been welcomed by all actors, and not all mini-packet related initiatives have been successful. *Company 1* suspended sales of mini-packets due to internal management issues unrelated to its mini-packet initiative; however, before restarting its mini-packet activities it recognizes the need to put into place systems able to cope with the increased logistical challenges involved with producing, packaging, storing, and marketing mini-packets.

While mini-packets are replacing low quality loose seed, they are not replacing lower quality packaged retained seed for two primary reasons: 1) some farmers see all packaged seed as being of higher quality and as they are highly price-sensitive they are unwilling to pay premium prices for reputable brands, and; 2) some dealers, retailers, and MSVs are able to earn a higher margin on these "uncontrolled packets." Similarly the plans of some seed companies to formally include MSVs into their distribution networks is controversial among some dealers and retailers who see it as an effort of the seed companies to cut them out of the distribution channel.

The findings from the in-depth interviews support, and give context to, the findings from the market system analysis, by illuminating the social and economic outcomes for farmers, their families, and communities. These outcomes are summarized below.

1. **Quality of seed** was one of the primary considerations influencing farmers who purchased mini-packets. Other reasons given were the perceived suitability of small packets for small-scale farms or gardens; mini-packets' accessibility, both in terms of affordability and availability; and the potential of mini-packets to provide sufficient vegetables for one's family and to allow for expanded cultivation.
2. **Farmers not purchasing mini-packets cited many of the same considerations** used by purchasing farmers as "motivators" for buying mini-packets (price, suitability to size of land, and availability) as deterrents to purchasing mini-packets. For instance price was an important consideration for both purchasing and non-purchasing farmers, but purchasers tended to think that mini-packets were reasonably priced, or even inexpensive, and that using them was cost-

efficient. Conversely, several non-purchasing farmers had the perception that mini-packets were too expensive, and said that large packets were less expensive, proportionally, than mini-packets.

3. **Constraints related to availability, accessibility, price, and awareness** of mini-packets were all cited as potential barriers to access.
4. **Changes in sales and production** as a result of using mini-packets were mostly quite positive. Many farmers said they sold more vegetables than they did prior to using mini-packets, some selling at higher prices because of a premium for higher quality. Favorable production changes reported by several farmers included a reduction in costs, labor, and other agricultural inputs such as fertilizer, pesticides, and water.
5. **No negative effects** as a result of purchasing mini-packets were reported by purchasing farmers.
6. **All purchasing farmers experienced abundant or increased consumption of fresh, self-raised vegetables within the household**. Beyond the significant nutritional advantages of eating an abundant supply of fresh vegetables and the financial benefit of not having to pay for them is the beneficial social impact of being able to give extra vegetables to other people who needed them, including neighbors, extended family members, poor people, and others in the community, creating positive spillover effects. More than half of the purchasing farmers gave excess vegetables to others outside their household. **Improved yields** were the driver of other positive outcomes for those who used high quality mini-packet seeds. All farmers sold vegetables—many sold more vegetables, had greater profits, and were able to invest more in cultivation efforts than they had when using lower quality seeds. The positive economic effects of using the seeds were connected to seed quality, and almost all farmers reported having a good or better yield (i.e., greater in volume and quality of plants and vegetables). A few reported the additional benefits of needing fewer agricultural inputs and labor, having plants germinate in less time, and having early or prolonged production.
7. Finally, a few farmers experienced **positive psychological and emotional impacts** from using the mini-packet seeds. They said it brought them happiness, more hope and eagerness, and inspired them to grow more vegetables and to help others by giving them food that they had personally raised. These positive psychological and emotional impacts—in conjunction with the other social and economic impacts mentioned above—carried over into future intent to purchase additional mini-packets.
8. **All purchasing farmers stated that they would indeed purchase mini-packet seeds again in the future**, with the lone exception of one farmer who did not respond.

Recommendations

After being introduced through national level seed companies, mini-packets experienced commercial success. This commercial success is demonstrated by the sales from one of the national level seed companies who first introduced the packets (*Company 2*)**,** the evidence of other companies launching (or considering the launch of) their own branded mini-packets, positive effects reported at the household-level, and purchasing farmers' intentions to continue using mini-packet seed. However, given the positive effects seen at the household level, it may be desirable to promote increased access and availability of other types of seed as well as other forms of agricultural inputs for small-scale producers. Several recommendations emerged from the market system assessment:

1. Utilize a systems approach

Development programs should utilize a systems approach in order to improve the quality and availability of seeds and other inputs to farmers and avoid negative impacts. This approach is based on facilitating improved and expanded relationships among market actors (including farmers) in the market system. It also requires formative research, including value chain and systems mapping, before program implementation, to minimize this risk.

2. **Development programs should be designed to meet the needs of the target group**
   The role of the development program is to challenge, and provide incentives to, private sector market actors to develop and market improved products and services that address the needs and socio-economic context of the targeted farmers (end users).
3. **Replicate and expand**
   Based on the data from this assessment, the mini-seed packet program benefitted small marginal farmers. Similar approaches should be pursued, and rigorously evaluated, in comparable markets, geographies and environments, and should include other agro-inputs (e.g., fertilizer).
4. **Support private sector to address the complexity of innovation at the base of the pyramid**
   Development programs can support local companies, and value chain actors, to recognize and overcome logistical complexities involved with marketing mini-packets (e.g., sourcing seed, packing, storage, marketing, distribution), which can be an initial barrier to market development.
5. **Monitor, evaluate, and adapt at the system level**
   It may take several years to understand the longer-term systemic impact of facilitating the introduction of mini-packets of quality vegetable seed (and other agricultural inputs). We recommend that similar programs set up a monitoring system to understand these longer-term impacts (both positive and negative), and identify lessons learned for future activities and projects.
6. **Conduct focused research on the "crowding out" phenomenon**
   More systematic and quantitative research on the "crowding out" effect of donor programs that subsidize agricultural inputs would add to the evidence base pertaining to local market systems and how they respond to the introduction of new products. Our qualitative market assessment indicates that crowding out occurred when other development organizations purchased the mini-packets and distributed them for free in the market system. However, the extent to which this occurred and how much it affected market chain actors is unknown.

Appendix 1: Market System Assessment Question Guide

Respondent:	Type of Market Actor:
Contact Information	Position/Title:
Location:	How long in Business:
Interviewed by:	Date/Time:

Introduction

We represent a development organization that is conducting research on the seed industry in Bangladesh. In particular we are trying to understand the effect that small affordable packets of quality seed (i.e., "mini-packets") have had on the seed sector in Bangladesh. We are hoping that you can help us by providing your perspective.

Mini-Packets

1. Are you familiar with companies selling mini-packets of vegetable seed? If so, which companies?
2. What are your perceptions about quality/cost/quantity of the mini-packets?
3. Who is purchasing mini-packets, and how are they different from producers who purchase "regular" packets?
4. Why are producers purchasing mini-packets?
5. How do producers learn about the "mini-packets"?

Distribution Networks

1. Do you see any changes in how quality seed is reaching producers?
2. Are more mobile seed vendors (MSVs) being integrated into the distribution networks of seed companies? If so:
   a. Why?
   b. What is the potential benefit of including MSVs to seed companies? Retailers? Producers?
   c. What are obstacles to integrating MSVs into formal distribution networks?
   d. What are ways to increase the integration of MSVs into formal distribution networks?
3. Have you faced difficulties in obtaining/selling mini-packets? If so, what types of difficulties?

Business Model

1. Are more companies starting to market mini-packets of quality vegetable seed? Which ones?
2. Why are companies introducing mini-packets?
3. What are companies' challenges in introducing mini-packets?
4. What are the differences (in terms of sales volume/value, outreach, branding, marketing strategies, etc.) between selling mini-packets and regular packets?
5. How do companies benefit from introducing mini-packets?
6. What is the benefit for the distribution network (distributors, retailers, MSVs)?
7. What is the benefit for producers?
8. How profitable is it for you to sell mini-packets?
9. Can this type of model be replicated with other agricultural inputs (e.g., other types of seed, fertilizers, pesticides, etc.)? If so, how?

Market Practices

1. Has the introduction of mini-packets changed how vegetable seed is being marketed/sold? If so, how?
   a. Do mini-packets complement or substitute traditional types of seed sales (i.e., retained OP seed varieties, commercial packets of HYV or hybrid varieties, etc.)?
   b. Have you seen any changes in levels of adulteration in the last two years?
2. Have you adjusted the way you do business since mini-packets were introduced?
3. Are sales of mini-packets higher in areas where there is more competition in the local marketplace?

Appendix 2:Vegetable & Non-Vegetable Crops – Farmer IDIs

VEGETABLE CROPS					
	NP *(n=15)*	P *(n=15)*	Bogra *(n=15)*	Barisal *(n=15)*	TOTAL *(n=30)*
Amaranth – Red	1	3	3	1	4
Amaranth – Stem	1	0	0	1	1
Beans - Yard Long Bean	7	5	7	5	12
Beans - String	3	2	2	3	5
Cabbage	2	1	3	0	3
Cauliflower	2	1	3	0	3
Chili	7	6	9	4	13
Coriander	0	1	1	0	1
Cucumber	6	8	5	9	14
Data Shak	1	1	0	2	2
Eggplant – Brinjal	2	3	5	0	5
Garlic	1	0	1	0	1
GOURDS	*33 crops*	*35 crops*	*33 crops*	*35 crops*	*68 crops*
Ash Gourd	1	0	1	0	1
Bitter Gourd *(Karalla)*	9	10	7	12	19
Bottle Gourd *(Laou)*	6	11	10	7	17
Dhundal Gourd	1	0	1	0	1
Pointed Gourd	1	1	2	0	2
Ridge Gourd (Ribbed)	5	4	4	5	9
Snake Gourd	5	6	2	9	11
Sweet Gourd	3	3	5	1	6
Teasel Gourd	2	0	1	1	2
Green Pepper	1	0	0	1	1
Keshar	1	0	1	0	1
Maize (Corn)	1	1	1	1	2
Okra (Lady's Finger)	2	6	1	7	8
Onion	2	2	4	0	4
Papaya	1	1	1	1	2
Potato	6	6	12	0	12
Pumpkin	3	5	4	4	8
Radish	7	5	10	2	12
Spinach – Bengal	0	3	3	0	3
Spinach – Indian *(Puishak)*	3	7	2	8	10
Spinach – Water	1	0	0	1	1
Tomato	0	1	0	1	1
Yam	1	0	1	0	1

LEGUMES / PULSES	*9 crops*	*5 crops*	*4 crops*	*10 crops*	*14 crops*
Chick Pea	1	0	1	0	1
Grass pea	4	2	2	4	6
Hyacinth	0	1	0	1	1
Lentil	4	2	1	5	6
Mung Bean (*Mug dal*)	4	2	0	6	6
Peanut	0	1	0	1	1
Pigeon pea	3	0	0	3	3
Subsample Counts (Vegetables incl. legumes)	111	111	116	106	222

NON-VEGETABLE CROPS					
	NP *(n=15)*	P *(n=15)*	Bogra *(n=15)*	Barisal *(n=15)*	Total (n=30)
Paddy (Rice)	15	13	14	14	28
Jute	6	7	10	3	13
Bananas	3	3	5	1	6
Wheat	3	0	2	1	3
Subsample Counts (Non-Vegetables)	27	23	31	19	50

Appendix 3: Interview Question Guide for Purchasing Farmers

Bangladesh Seed Assessment
Interview Guide for Purchasing Farmers

Participant ID#_____
Date of Interview_____ District_____
Interviewer _____

Eligibility Confirmation Questions
Are you currently in a salaried position?
Yes > not eligible
No > go on to next question
Have you ever purchased mini-seed packets for vegetables?
Yes > proceed to interview
No > not eligible

OBTAIN ORAL CONSENT

1. In the past 12 months, describe all of the crops that have you cultivated?

   INTERVIEWER: WORK WITH THE PARTICIPANT TO FILL OUT TABLE WITH FOLLOWING INFORMATION: Crop Type, Decimals, Where Cultivated, Season, Type of Seed (Hybrid or Open-Pollinated)

2. Over the past 12 months, how much arable land did you have access to?
   Probe for Number of Decimals for each type: Owned, Sharecropped, Leased, Borrowed, Other

3. Where do you normally obtain vegetable seeds?

4. What brands of seeds do you normally purchase?

5. How is the seed packaged?

6. What are your perceptions about quality of the vegetable seed available on the market?

7. How do you assess vegetable seed quality?

8. What are the main challenges you face in buying vegetable seed?

9. You have purchased mini-seed packets in the past. How did you first become aware of these seed packets?

10. Please tell me about all of your mini-seed packet purchases in the last year.

INTERVIEWER: WORK WITH PARTICIPANT TO FILL OUT TABLE ABOUT MINI-SEED PACK PURCHASES: Type of Vegetable, Type of Seed (H or O-P), Number of Mini-Packets, Brand of Seed, Type of Vendor

11. Why did you buy these mini-seed packets?

12. What are your perceptions about the mini-packets you purchased, in comparison with other seeds on the market?

13. What benefits, if any, have you experienced from purchasing the mini-packets?

14. Have you changed any production practices as a result of purchasing these packets? If so, please explain

15. Have you changed any sales practices as a result of purchasing these packets? If so, please explain

16. Have you purchased the packets again, or do you plan to do so? Why or why not?
    16a. If so, how did/would your purchase differ, if at all?

17. Among your neighbors and other community members, who purchase (d) mini-packets, are there any differences between them and farmers who purchase "regular" packets?

18. Have you talked about the mini-seed packets with other community members and farmers? If so, please explain.

19. What changes, if any, have you seen in the availability of vegetable seed in general in your area in the past year (where they are sold, variety of options, pricing, quality)?

20. What, if any, have been the positive effects of the mini-packets on your daily life?

21. What, if any, have been the negative effects of the mini-packets on your daily life?

22. What is the role of different household members in the cultivation, sale, and consumption of vegetables?

23. Have there been any changes in roles in the last 1-2 years? If so, please explain.
    23a. If so, what caused these changes?

THANK YOU FOR YOUR RESPONSES AND TAKING THE TIME TO TALK TO US.

BEFORE WE FINISH, IS THERE ANYTHING THAT YOU'D LIKE TO SAY THAT YOU DIDN'T HAVE A CHANCE TO SAY DURING THE INTERVIEW?

Appendix 4: Interview Question Guide for Non-Purchasing Farmers

Bangladesh Seed Assessment
Interview Guide for Non-Purchasing Farmers

Participant ID#_____ District_____
Date of Interview_____ Interviewer _____

Eligibility Confirmation Questions
Are you currently in a salaried position?
Yes > not eligible
No > go on to next question

Have you ever purchased mini-seed packets for vegetables?
No > proceed to interview
Yes > not eligible

OBTAIN ORAL CONSENT

1. In the past 12 months, describe all of the crops that have you cultivated?
   (Probe for Crop Type, Decimals, Where Cultivated, Season, Type of Seed – Hybrid or Open-Pollinated)
2. Over the past 12 months, how much arable land did you have access to?
   (Owned, Sharecropped, Leased, Borrowed, Other – specify. Probe for Number of Decimals for each.)
3. Where do you normally obtain vegetable seeds?
4. What brands of seeds do you normally purchase?
5. How is the seed packaged?
6. What are your perceptions about quality of the vegetable seed available on the market?
7. How do you assess vegetable seed quality?
8. What are the main challenges you face in buying vegetable seed?
9. Are you aware of mini-packets of high quality seed in your area?
10. Are they available from the vendors you normally purchase seed from?
11. What are the main reasons for not purchasing mini-seed packets?
12. Do you know of neighbors and other community members who are purchasing mini-packets? If so, what do you hear about their experiences with the mini-packets?
13. What changes, if any, have you seen in the availability of vegetable seed in general in your area in the past year *(where they are sold, variety of options, pricing, quality)*?

14. What is the role of different household members in the cultivation, sale, and consumption of vegetables?

15. Have there been any changes in roles in the last 1-2 years? If so, please explain.
    15a. If so, what caused these changes?