

Natural calamities and social safety net programs:

A feasibility assessment of the impact of mobile cash transfers to vulnerable populations in Bangladesh

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1. Introduction

Cash transfers represent an important component of welfare programs that aim at providing financial support to poor populations both in developed and developing countries. Their role becomes even more important when these programs are used to help the poor cope with the consequences of natural disasters. It is indeed well known that, especially in developing countries, resilience capacity is low. As a consequence, natural disasters may worsen social and financial exclusion. In most developing countries, where the outreach of formalised financial institutions may be very limited, cash transfers are often delivered physically, particularly in the remotest areas. This exposes the transfers to high risks of loss, theft and leakage (Muralidharan et al., 2014). The disadvantages of delivering monetary transfers in cash are further amplified when these programs are intended to offer financial relief from natural catastrophes: during these events, the speed and efficiency of intervention is essential. It follows that if transfers' recipients are required to spend time and money to travel to the disbursement point, the program might substantially lose the desired benefits.

A possible solution to increase the readiness of these monetary aids is, thus, to deliver them via *mobile money*. Aker et al. (2014), for instance, show that adopting mobile-based payments to deliver unconditional cash transfers in Niger, after a devastating drought, positively impacts the recipients' consumption. Yet, the authors recognize that an important limitation in the effectiveness of this type of interventions is the lack of penetration of mobile money services providers in the area.

Mobile cash transfers may play an even more crucial role in the wake of *recurrent* natural calamities. When countries (or part of them) are regularly plagued by natural curses, mobile money can be used as a channel to deliver cash in a secure and fast way, along with other social safety net programs already in place. Besides, mobile money can be used as a savings product by these individuals, who often live in areas with very low penetration of formal financial service providers. In this sense, the adoption and usage of mobile money can also help people smooth consumption in contexts where they face large variations in their income.

With this project, we want to assess the feasibility of using mobile money to send unconditional cash transfers to poor populations in Northwest Bangladesh. The reason why Bangladesh represents an ideal setting for this research is twofold: first, the populations living in Northwest Bangladesh (and, in particular, in the districts of greater Rangpur (Gaibandha, Kurigram, Lalmonirhat, Nilphamari, and Rangpur), are recurrently subject to severe natural disasters that heavily undermine the local economy. These consist in seasonal pre-harvest food crises (known as "*monga*") that are further exacerbated by recurrent floods and soil erosion. Second, mobile money is widely spread in the country, thanks to bKash, a mobile money product launched by bKash Limited that is used by more than 22% of the entire population (Chen and Rasmussen, 2014)¹. This figure is remarkably high, if we think that only 15% of the Indian population² and 12% of the Sub-Saharan Africa population (World

¹ According to BRAC, Phone ownership rates among men are 76 per cent, while for women 46 per cent, see <http://blog.brac.net/2015/01/mobile-money-needs-the-support-of-grassroots-organisations-to-reach-its-potential/>.

² <http://www.cgap.org/blog/mobile-payment-systems-what-can-india-adopt-kenya's-success>

Bank, 2014) have a mobile money account.

To this end, between September 2015 and February 2016 we set up a pilot study in Gaibandha, which consisted of both quantitative and qualitative interviews to a sample of 200 low-income people living in this district. Results from our feasibility study show that this population is very much exposed to floods and to a variety of shocks throughout the year, including illnesses and crop losses. Moreover, the set of coping strategies adopted by respondents against these shocks appear very limited and far from being effective. Aside from migration, saving and/or borrowing are not common, revealing an overall low degree of financial inclusion. In addition, government transfers (delivered either through NGOs or Union Parishad) reach only a little share of this population, confirming the limited effective outreach of social safety net programs implemented by the Government of Bangladesh. It follows that most of these subjects only receive help from friends or relatives during shocks. Even worse, they report to significantly reduce consumption when facing shocks.

Against this background, our findings also show that bKash has the potential to be used (in the current form or with increased product diversity) among our target population, especially during natural catastrophes. This potential can be explained by the fact that at present, mobile money is mainly used to receive remittances and most subjects rely on bKash agents' help and very few have their own bKash account. Thus, while bKash is being used widely among our respondents, there is scope for expansion of bKash accounts and for extending its usage for purposes other than sending remittances. We thus believe that a policy that delivers mobile cash transfers is the ideal social safety net program to be implemented in areas recurrently afflicted by natural catastrophes, for at least two reasons: first, it would help these populations to access resources to cope with shocks faster and more securely than they are currently doing; second, mobile money can represent the first step towards financial inclusion for these populations, who are largely excluded from the formal financial sector. Therefore, mobile cash transfers can have a positive impact on a set of development outcomes, including poverty reduction, better ability to cope with shocks, lower decrease in consumption during shocks, but also higher likelihood to save.

2. Literature overview

This study relates to two streams of literature. On the one hand, it contributes to the growing literature on mobile money and its impact on users' capabilities to cope with shocks. On the other hand, it adds to the literature on the impact of interventions that aim at mitigating the consequences of regular pre-harvest seasonal food crises.

Mobile money was established in 2007 in Sub-Saharan Africa and has experienced an unprecedented growth in the last few years (Gates Foundation, 2013). In their pioneering work on the impact of M-Pesa on Kenyan poor populations, Jack and Suri (2014) document that, compared to non-users, M-Pesa users are less likely to experience a drop in consumption in case they face a negative shock. At the same time, Dupas and Robinson (2013) show that mobile money also positively affects users' savings. More generally, mobile money represents a first, important step towards financial inclusion for unbanked populations: in Bangladesh, Breza et al. (ongoing) show that by receiving their salary via mobile money, employees in a garment factory are more likely to make use of formal financial services. The large diffusion of mobile money agents in developing countries makes mobile money the ideal financial channel for payments and transfers. Haushofer and Shapiro (2013), for instance, use mobile cash transfers (in the form of lump sum payments) to study rural households' response to

income shocks in Kenya. Although their focus is not to test the role of mobile money in welfare programs delivery, their setting allows one to observe a positive impact of mobile cash transfers on households' consumption and psychological wellbeing.

The closest paper to our focus is the one by Aker et al. (2014), who show that adopting mobile-based payments to deliver unconditional cash transfers in Niger, after a devastating drought, positively impacts on the recipients' consumption. The authors implement a Randomized Controlled Trial where treated subjects receive the transfers through mobile money instead of cash (as for the control group). Additionally, they included a second treatment where subjects still received a (physical) cash transfer, along with a mobile phone. The benefits deriving from electronic transfers are mainly attributed to the timely saving and to improved women's bargaining power. The paper also shows that delivering the transfers through mobile money is more cost-effective than the traditional cash method. All in all, their results suggest that mobile-based payments are utilised better in distress-related situations. With this project, we make a further step in the analysis of mobile cash transfers, as we want to assess the feasibility of establishing a mobile cash transfer program that could work not only as a social safety net on a regular basis, but also as a financial instrument that could further promote financial inclusion and help poor populations smooth consumption across time.

Our project thus wants to contribute to the literature assessing the effectiveness of the interventions the government of Bangladesh has (or might) put in place to promote food security, employment, and better health conditions during the *monga* season³ and immediately after floods hitting char dwellers. In his analysis of income patterns particularly in Northwestern Bangladesh, Khandker (2012) emphasises the seasonal nature of income especially in this region, and highlights the need to provide poor households with coping mechanisms that help them smooth consumption across the year. To this end, in a recent work, Bryan et al. (2014) study the impact of randomly assigning incentives to households to migrate during the lean season. The incentives appear to favour seasonal migration, but also the consumption at the origin. Moreover, their results highlight how risk and costly migration is for these populations, particularly in case of failure.

With this project, we aim at complementing the existing literature on the role of mobile money in natural catastrophes, along three dimensions: First, we want to study how the recipient's gender influences the transfer usage in terms of expenditures and consumption, and whether this has also consequences on health, savings and other development outcomes; second, we want to analyse whether mobile cash transfers can foster financial inclusion, even when subjects have experienced a financial shock; finally, we want to test whether mobile cash represent a cost-effective delivery mechanism of safety net programs, in a country that is recurrently plagued by natural calamities and where mobile money diffusion is relatively high.⁴

³ <http://www.irinnews.org/report/80898/bangladesh-initiatives-to-tackle-monga>

⁴ In order to be eligible for the our intervention, treated households will be asked to own or to become in possession a mobile phone, in case they do not own one. At the baseline survey, if households weren't able to ultimately buy a mobile phone, the research team will provide them with the device.

3. The pilot

Our field team carried out a feasibility study in Northwest Bangladesh, in the district of Gaibandha (Rangpur region). According to many sources (Khandker, 2012; Zug, 2006), the Rangpur region is one of the most afflicted by *monga*, which occurs once or even more than once a year. The consequences of the pre-harvest food crisis are further amplified in the *char* (literally 'small islands') areas, particularly those located in proximity of the Jamuna and Teesta River (Zug, 2006). Based on secondary data sources and discussion with our partner NGO, Gana Unnayan Kendra (GUK), we identified four Union Parishads (or Unions) where we conducted interviews: Fulchari and Gajaria Union in Fulchari Upazilla and Mollar Char and Gideri in Gaibandha Sadar Upazilla. These areas are all *char*, with Gajaria being also partly on mainland.

We conducted two waves of data collection. The first one, performed by our field team between October and November 2015, consisted of structured interviews with a sample of 200 subjects across the four, above-mentioned, Union Parishads (50 subjects in each Union, across 2 villages per union). Additionally, we conducted 8 Focus Group Discussions (FGDs) with individuals (2 in each of the four locations), and held informal discussions with personnel at GUK and with bKash agents in the same areas. The scope of the first wave of data collection and of FGDs with our target population in October and November 2015 was to assess their socio-economic profile (in order to make power calculation for the broad study), their level of financial inclusion, their demand for bKash (and for mobile cash transfers), as well as mobile phone ownership. In a similar spirit, FGDs with GUK aimed at understanding what type of interventions the NGO delivers, especially during the *monga* and floods. Finally, discussions with bKash agents were addressed to understand the challenges bKash access points face, particularly in cashing-in and cashing-out payments, their perception about customers' demand for bKash and confidence and trust in the product. The second wave of data collection took place in February 2016, during the *monga*. In this data round, we re-surveyed 100 individuals across Gideri and Fulchari. The scope for this second data collection was to gather a second data point, even for a small subset of individuals, in order to identify how their socio-economic characteristics may change when they face the *monga*.

4. Focus Group Discussions and secondary data

4.1 The role of the Government of Bangladesh in the delivery of Social Safety Net Programs (SSNPs)

In the last few years, the Government of Bangladesh, international institutions and practitioners have been struggling to design and implement effective social safety-net programs that address both the prevention of and relief from natural disasters. During the years, an increasing amount of resources have been allocated by the Government of Bangladesh to implement these programs. As per 2014-2015, the share of SSNPs over the GDP of the country was 2.30%, showing an increase compared to the 2012-2013 and 2013-2014 years (Ahmed et al., 2014).⁵ Among the SSNPs currently in place, the Food for Work (FFW) represents, for instance, a short-term emergency intervention. Conversely, the Employment Generation Program for the Poor (EGPP) or the Vulnerable Group Development (VGD) are long-term programs addressed at reducing seasonal unemployment and structural poverty related to natural calamities. Government has tried channelizing cash transfers through mobile only in case of making welfare payments to the disabled and old-aged people but given the expected challenges

⁵ see also http://www.mof.gov.bd/en/budget/15_16/safety_net/safety_net_en.pdf

associated with mobility and dependence on an agent, the channel has not proved to be very effective. Moreover, notwithstanding the number of programs already in place in Bangladesh to help populations cope with internal shocks and to reduce the deprivation during the *monga* season, their coverage is still inadequate. As noticed by Ahmed et al. (2014), the share of recipients of these programs never exceeds 22%. Moreover, the share of recipients of these programs appears lower in poorer regions than in less poor ones, raising concerns about the delivery mechanisms of these programs and, ultimately, about their effects.

4.2 Focus Group Discussions

Throughout our feasibility study, we conducted 8 Focus Group Discussions with prospective beneficiaries of bKash (2 in each location). The purpose of these FGDs was, first of all, to assess subjects' exposure to natural catastrophes and their ability to cope with them. Questions were addressed at getting a sense of their trust in the welfare schemes currently in place in the area where they live. In addition, we wanted to understand the demand for mobile money from our target population, their comfort level with this technology, along with their current experience in handling digital/ virtual money. Moreover, in order to capture any gender-related differences in the above outcomes, in each location we conducted one female-only and one male-only focus group discussion. The results of these FGDs are summarised in the next paragraph.

4.2.1 Flood and *Monga*

During FGDs, subjects reported that the areas where they live are recurrently exposed to floods. When this happens, they experience a series of damages ranging from crop loss, house damages, death of cattle. In addition, health conditions during floods significantly worsen, also because of bad sanitation facilities and diseases. We then asked subjects about the social safety net programs they receive during these hard times to cope with the shocks. Food aids appear the most predominant transfers, although also cash transfer occur. It appears, however, the distribution system is not very efficient, for many reasons: first, because reaching the distribution point may be very burdensome and, by the time many residents reach the collection point, either the materials have finished or they find that someone else has collected the materials allotted to their families. Second, the amount of relief subjects receive is not enough for them to cope with the floods. When we asked them which transfer program they believe is the most effective to address their needs, subjects had divergent opinions: on the one hand, cash transfers would be better in helping them cope with the floods; on the other hand, they felt that getting food grains instead of cash transfers would be better, as they feared that cash could get spent too easily.

4.2.2. Use of bKash

Subjects appear all well informed about bKash and most of them have accounts with bKash already. They think that bKash is a very safe and convenient way to transfer money. They also feel that using bKash is quite simple and it is easy to operate using their mobile phones. In addition, they feel that their transactions could be safely executed as they knew their bKash agent well and trusted him. They also think that the transaction cost of Tk. 20 for every Tk. 1000 is a quite reasonable price. Even when migrants are travelling back from cities to their villages, they prefer to transfer money through bKash than cash, as they might lose their money due to theft on the way. Other mobile money products available in these areas include mobi-cash, Dutch-Bangla Bank Mobile Banking etc. Even if the transaction charges offered by some of these competitors are slightly lower than those by bKash, subjects mentioned that they prefer bKash as they find its process much simpler. However, during floods, visiting nearby bKash agents to conduct transactions becomes very tough. Respondents also mentioned a few drawbacks of bKash: first, receiving false messages about money being credited to

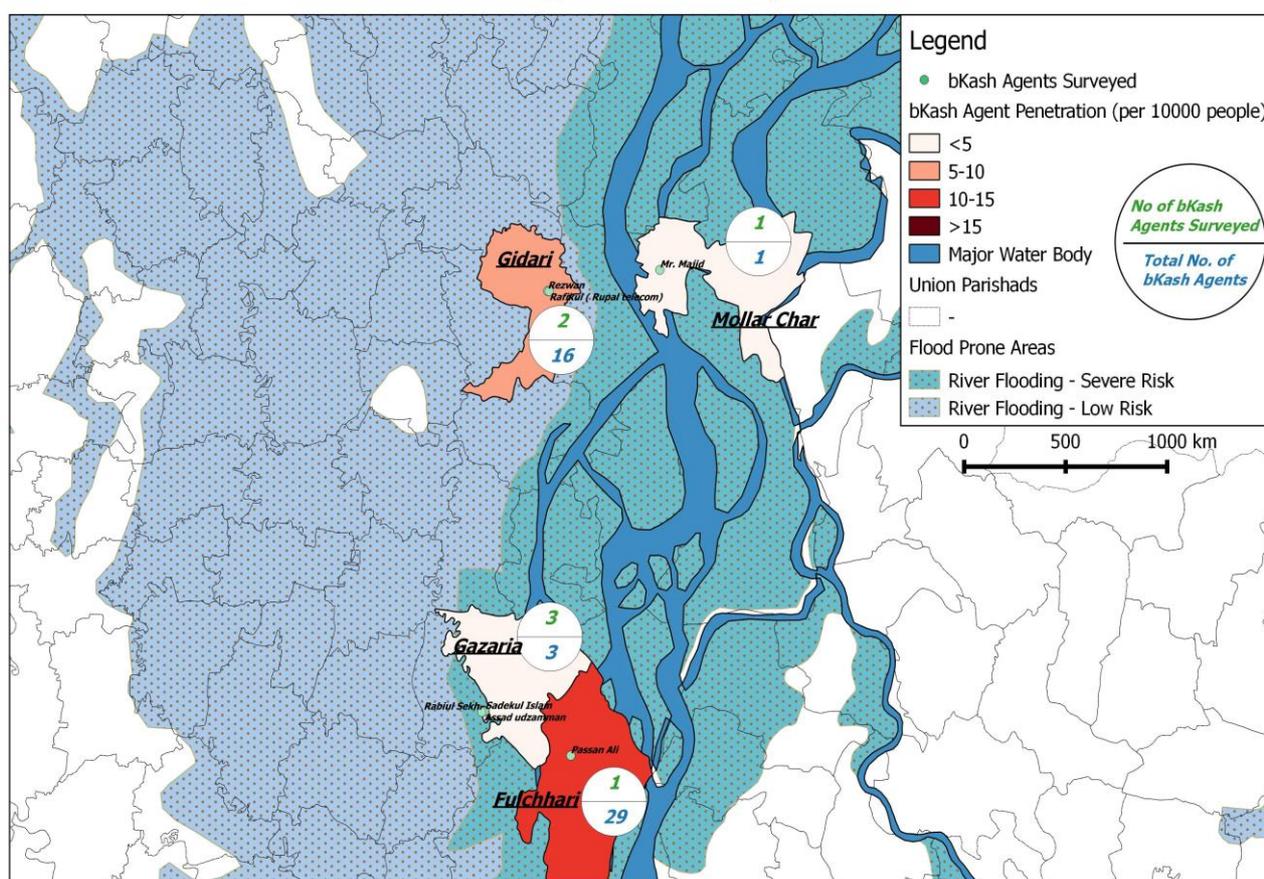
their accounts; second, not being able to withdraw large sums of money sometimes due to unavailability of funds. These are the issues that bKash is working on though.

4.3 Informal interviews with bKash agent

As already mentioned, we also visited the bKash points in the villages where we conducted interviews, to understand the operational challenges they face in their activity. Figure 1 below shows the areas where we conducted our pilot. The four unions are highlighted in different colours, indicating bKash agents' penetration (over 10,000 people). Moreover, the green dots indicate the location of bKash agents that we interviewed during the pilot. The map also reports the total number of bKash agents in each union. While Fulchhari displays a relative high agents' penetration, the number of bKash agents over 10,000 people is lower in Gideri, and even lower in Gajaria and Mollarchar.

Figure 1

bKash Agents in Study Areas



Informal discussions with the bKash agents highlighted in the map have revealed that, on average, each bKash agent manages transactions for about 1000 customers across 2-3 villages. In what follows, we summarise the main challenges they said they face both on the operational side and on the customers' side in conducting transactions.

4.3.1 Operations

One of the main problems bKash agents encounter while carrying out their activity is the risk of receiving fake credit messages which report that a certain amount has been transferred to the customer's account. Unfortunately, the agent ends up losing money because he pays the customer an amount which he didn't actually receive. Some of the agents declare they try to check their account to

see if the amount has actually been credited to their account before handing over the same to the customer. However, this is not always possible, especially, when there are many customers in the agent's shop at the same time. This appears to be a widespread problem. We believe that this issue may become particularly relevant if a mobile cash transfer program is implemented. In this case, it would be necessary to design a particular text that both the bKash agent and the household receive and cannot be counterfeit (for instance, by introducing a two-step pin verification process). Another problem agents point out is that commuting to their district headquarter on a regular basis in order to get more cash sometimes becomes problematic. This is another point to take onboard especially for the program we have in mind, where liquidity issues can become serious and for a large period. Finally, most agents frequently face connectivity and link failure while conducting transactions, mainly because the volume of operations is too high for the system. However, it appears that there are no technology interruptions during floods.

4.3.2 Clients

Agents report that most of their customers are not familiar with the process of conducting transactions using bKash. For instance, many bKash users do not own a bKash account, but entirely rely on their bKash agents for the operations. This represents a major problem for bKash agents, who have to spend time to do operations that could be partly performed by customers themselves. We then asked agents what type of mobile money product could further help customers cope with shocks. Most of them suggested that bKash should develop a savings product that requires clients to maintain a minimum balance which cannot be withdrawn except during times of flood and *monga*. From their experience, they felt that customers end up spending cash during normal times and are left with no cash or very little cash when they are in need of it during flood or *monga*. This may consist in a product that does not allow them to withdraw more than a certain amount during normal times, but allows free withdrawal during floods or *monga*. Such a product could be very useful, as customers would be able to transfer their savings from normal times to times of need during flood or *monga*. In addition, this product could also offer some interest, in order to give customers even more incentives to transfer their savings to bKash. However, bKash does offer interest on the deposits people have but the features are not favourable to the population we surveyed. For instance, the current product offers an interest rate of upto 4% but only if a balance of Tk. 1000 is maintained in the bKash account for two months. But these conditions are difficult to be met by the population with low income and savings. Finally, agents also indicated that bKash should also increase awareness about its usage among potential customers.

5. Results

5.1 Overview of the pilot study

For the first wave of data collection our surveyors, along with a supervisor, repeatedly visit the four locations to identify our target population. Eligibility criteria included being financially marginalized, being extremely poor and permanently residing in the areas exposed to the *monga* (char or non-char areas). We first identified a total of 400 households across the four areas that matched the above criteria. Then, using a strategy of selecting every alternate household, we selected 100 male respondents and 100 female respondents for a total sample of 200 households. The baseline was conducted with 200 subjects across four Union Parishads. We interviewed 50 people in each area: Fulchari and Gajaria Union, Mollar Char and Gideri. Additionally, we conducted a follow-up survey for 100 subjects in Fulchari and Gideri. In the following sub-paragraphs, we provide descriptive statistics for the variables collected in the different sections of the survey instrument.

5.2 Socio-Demographic characteristics

Table 1 shows descriptive statistics for the entire sample.

Table 1: Descriptive Statistics – Socio-Demographic characteristics

Variable	Mean	Median	Std. Dev.	Min.	Max.
Age (in years)	41.7	40	12.60	21	75
Gender of HH head	0.96	1	0.196	0	1
Education	2.2	2	2.882	0	11
Household size	4.3	4	1.33	1	8
Annual income	65,546.49	57,475	38334.44	0	257,400
Asset Index ¹	4.55	5	1.33	2	8
Primary occupation of HH head (=1 if agriculture)	0.565	1	0.497	0	1
Distance to the closest bKash point (in km)	1	1	0.991	0	14

¹ Asset Index has been compiled using assets such as Residential land, Agricultural land, Fallow land, Radio/TV, Bicycle, Van, Motor cycle, Electric Fan, Almira, VCR, Sewing Machine, Tube Well, Mobile Phone and Jewellery.

Our target population consisted of 200 subjects, mostly men, who on average were 41.7 years. The average annual income reported is about Tk. 65,000 (around 800\$). More than 56% of respondents are employed in agriculture as their primary business activity. We also asked subjects to indicate how far they live from the closest bKash point. Households live on average 1 km far from the closest bKash point. Further, 96% of the subjects we interviewed were currently married, 3% were widowed, 0.5% were never married and 0.5% were divorced. The average household size is 4.3 members. In addition, the survey instrument included the following sections:

5.3 Households' Conditions and Access to Facilities

We asked subjects a number of questions to study the conditions of their house, which we also use as an indicator for poverty. Figure 2 shows statistics for households' conditions: most of the subjects we interviewed (95%) report their house is made of corrugated iron; for 98% of them the floor is of mud, and 63% of the sample uses leaves/straw/thatch to cook, while the remaining subjects mostly use cow-dung. Finally, we asked subjects how many rooms their house consists of. Results show that a large majority of houses consists of one room. In the following analysis, we will use this information as an indicator of poverty.

5.4 Income Sources, Assets and Savings, Borrowing

Our survey instrument included a detailed section on both wage and business income. By summing up each respondent's income sources, we obtained a measure of yearly income. The distribution of subjects' annual incomes is displayed in Figure 3.

Figure 2: Household Conditions

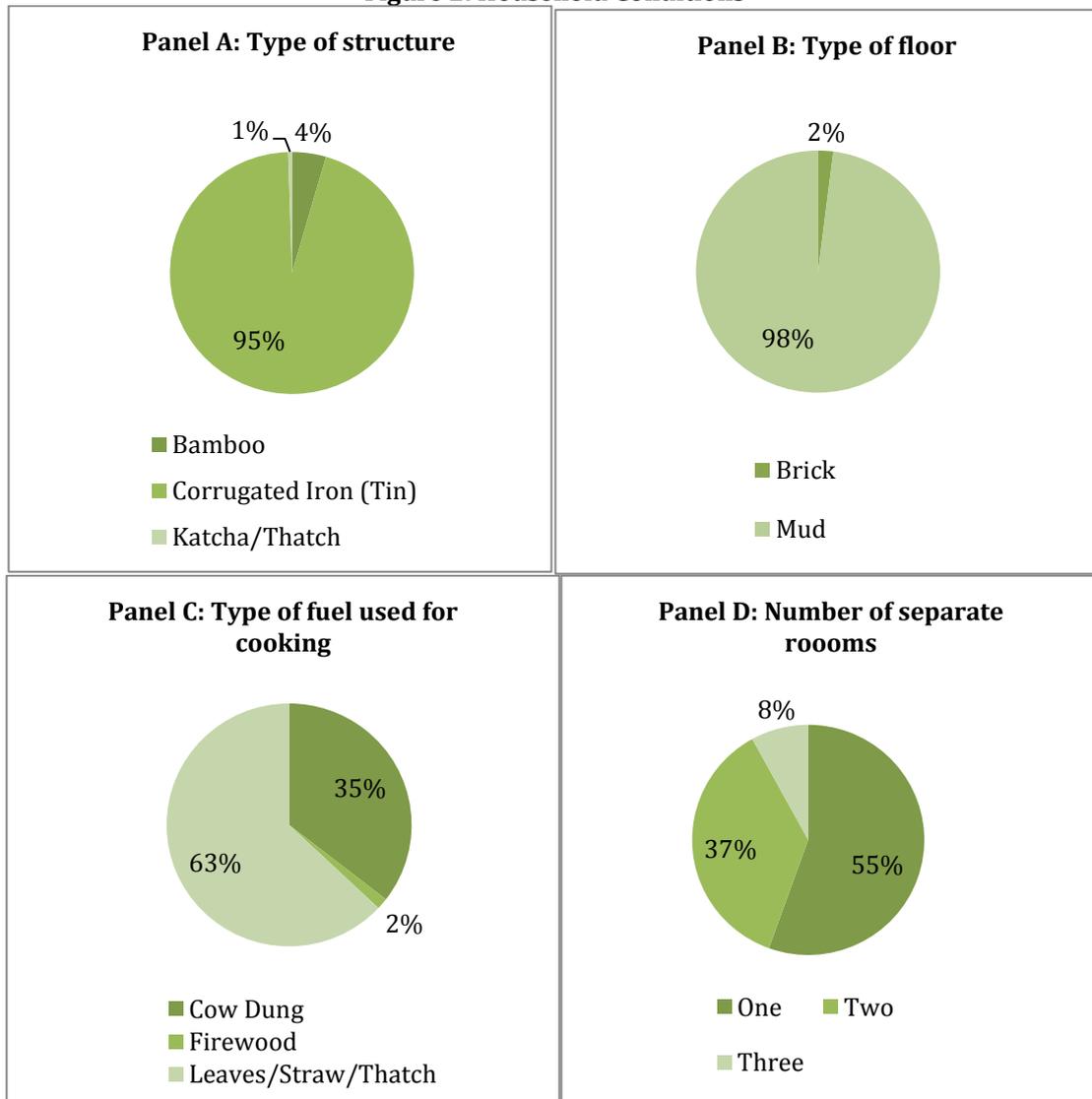
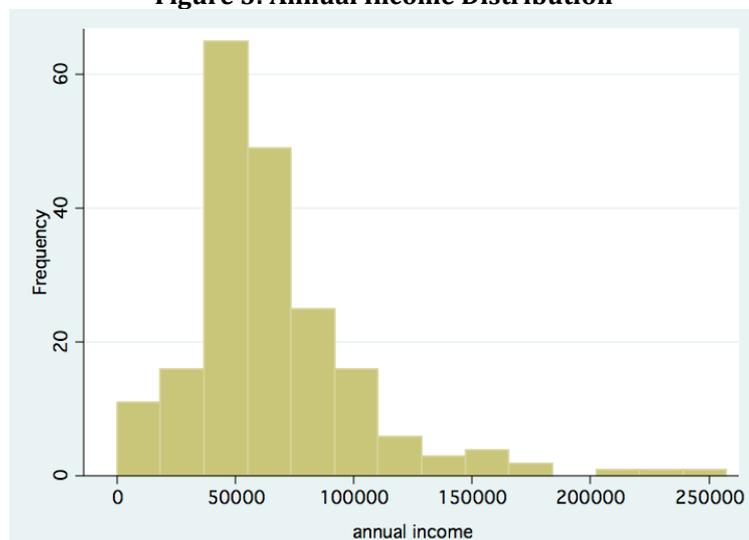


Figure 3: Annual Income Distribution



Moreover, we also investigate which business activities respondent carry out other than agricultural labor. Table 2 shows the list of non-farm activities:

Table 2: Non-farm activities

Non-farm activity	Frequency	Percentage
Rickshaw/van pulling	7	15.22%
Cobbler	1	2.17%
Hair cutter	1	2.17%
Small trader (roadside stand or stall)	12	26.09%
Medium trader (show or small store)	2	4.35%
Large trader (large shop or wholesale)	1	2.17%
Fish Trader	13	28.26%
Milk collector	1	2.17%
Fisherman	8	17.39%
Total	46	100%

45% of respondents who are not engaged in agriculture are fish traders (28.26%) or fishermen (17.39%), while 26% are small traders. Besides, we collected information on subjects' savings and borrowing behaviour. Not surprisingly, we find that the shares of respondents that do not save and do not borrow are, respectively, 41% and 61.50%. This already reveals that the level of financial inclusion among our target population is very low. Indeed, mostly because unavailable, formal financial services are very poorly utilised. At the same time, 48.50% and 30% of our respondents, respectively, save and borrow from MFIs. Table 3a and 3b show, respectively, a break-down of the savings and the borrowing strategies adopted by subjects in our pilot:

Table 3a: Savings Strategies

Savings	Frequency	Percentage
Does not save	82	41%
Saves at home	19	9.50%
Saves with a NGO/MFI	97	48.50%
Saves with a formalized bank account	2	1%
Total	200	100%

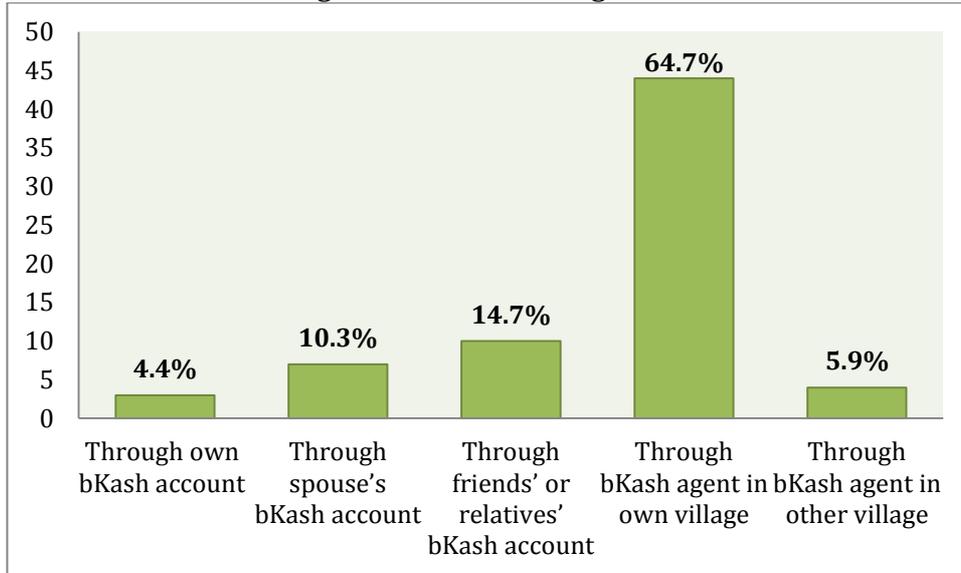
Table 3b: Borrowing Strategies

Borrowing	Frequency	Percentage
Does not borrow	123	61.50%
Borrows from relatives/friends	17	8.50%
Borrows from MFI	60	30%
Total	200	100%

5.5 Mobile Phone Ownership, Usage and the role of bKash

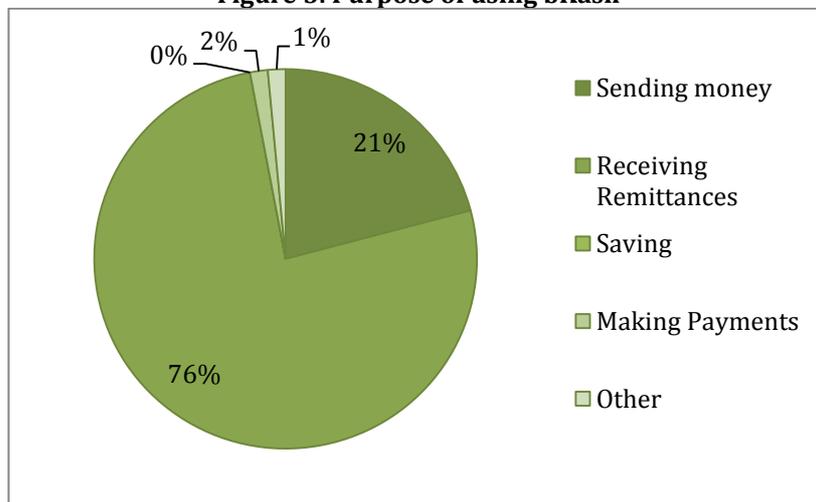
Among the 200 households we interviewed, 178 (89% the sample) report owning a mobile phone. Mobile phones are mostly used to make calls, while only a small share of respondents use them to send texts or for internet. We then asked a full set of questions about bKash. Questions were aimed at understanding whether subjects know about bKash, whether they use it and how they use it. Interestingly, we find that everybody knows about bKash. Despite this, only 34% of our target population uses this service.

Figure 4: Method of using bKash



What appears very interesting from Figure 4 is that subjects seem not to use bKash through their bKash account. Instead, about 70% of subjects reporting using bKash do so through a bKash agent, either in their own village (64.71%) or in another village (5.88%). Together with the findings from the informal discussions we had with bKash agents, these findings reveal that any intervention delivered through bKash needs to be accompanied by a thorough training to bKash potential customers about how to use it through their mobile phone. Moreover, we asked subjects which purpose they use bKash for. Figure 5 shows findings.

Figure 5: Purpose of using bKash



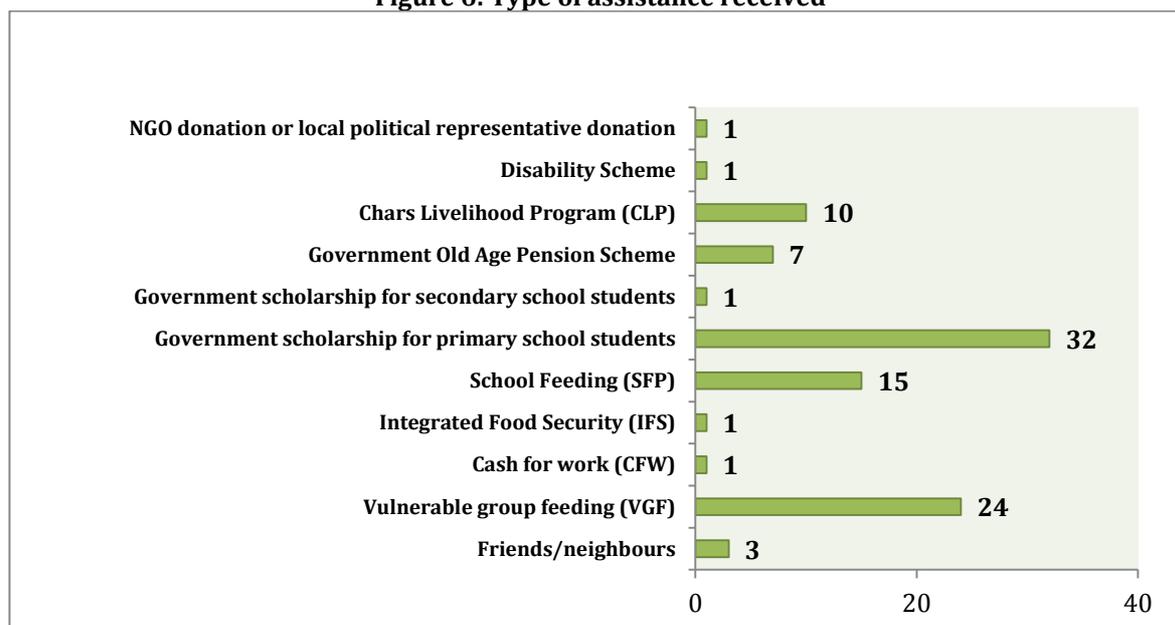
There are two main striking results to be noticed from the above figure: first, more than 76% of our respondents use bKash to receive remittances. Second, nobody uses bKash for saving purposes. This is really interesting as it reveals that the potentials of bKash among our target population are largely underestimated. A recent study by BRAC looking at the impact of distributing emergency relief through mobile money found that recipients enjoyed the convenience of receiving money by mobile as collecting money from a relief distribution centre after a flood or a disaster was difficult and time

consuming. Additionally, the study found that many recipients continued to use mobile money even after the one time transfer by BRAC implying the existence of latent demand for mobile money.⁶

5.6 Assistance and Aids

We also asked subjects what type of help and/or assistance they have received in the past 12 months from different sources. Figure 6 below shows the frequency of the provided answers. Most of the aids our respondents receive are related to primary school education. To a lower extent, respondents also receive assistance related to vulnerable group development and feeding, as well as school feeding. Finally, 10 of our subjects also report to be recipient of the Chars Livelihood Program.⁷

Figure 6: Type of assistance received



5.7 Information on unexpected events experienced

We asked subjects to report which events/shocks their household has been subject to in the past 12 months. Figure 7 shows the events subjects have experienced the most. By looking at Figure 7, we must bear in mind that the areas where we conducted our pilot are not drought-prone areas. This explains why in Figure 7 we do find that droughts do not represent a major natural shock that households in the region under study are likely experience. Instead, almost 90% of the respondents have experienced a flood in the last 12 months. Floods, along with diseases and serious illnesses appear the main events subjects have been exposed to in the last year. We then asked respondents what type of damages they have experienced as a consequence of the events listed before. This is shown in Figure 8. It appears that almost all households have experienced some sort of loss. This reveals that our target population is subject to a number of damages ranging from crop loss to income loss to health loss.

⁶ <http://blog.brac.net/2016/03/no-lines-no-relief-camp-4-lessons-on-using-mobile-money-for-post-flood-relief/>

⁷ Subjects could give more than one answer. So, the sum of aids received and reported in Table 9 exceeds 100%.

Figure 7: Major shocks experienced by households in the past one year

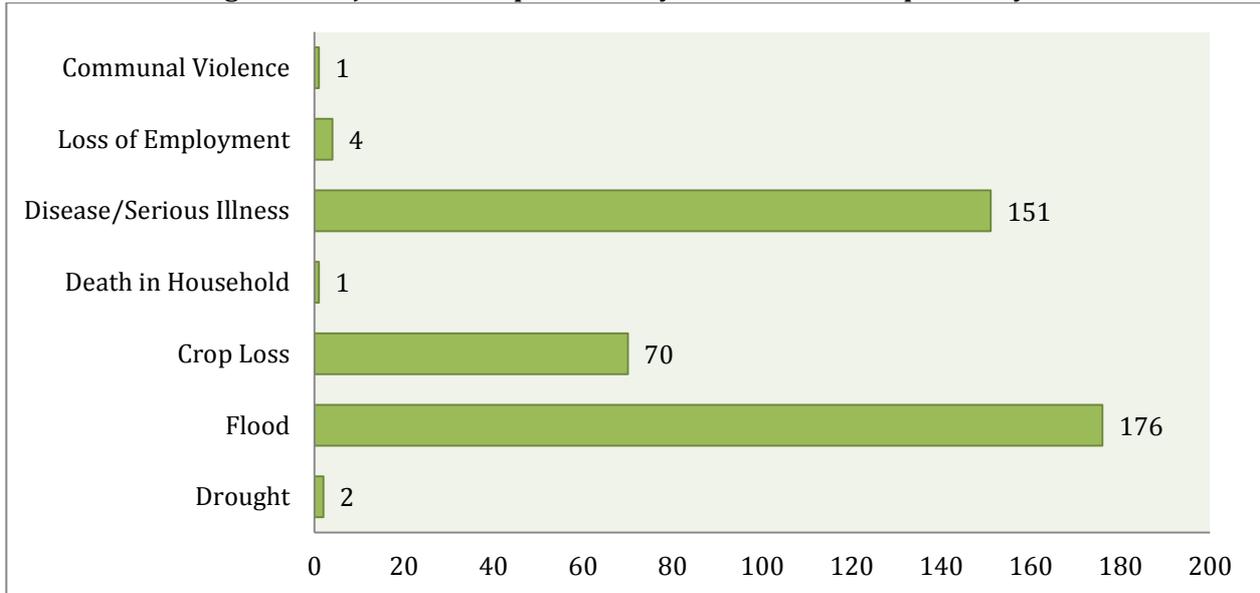
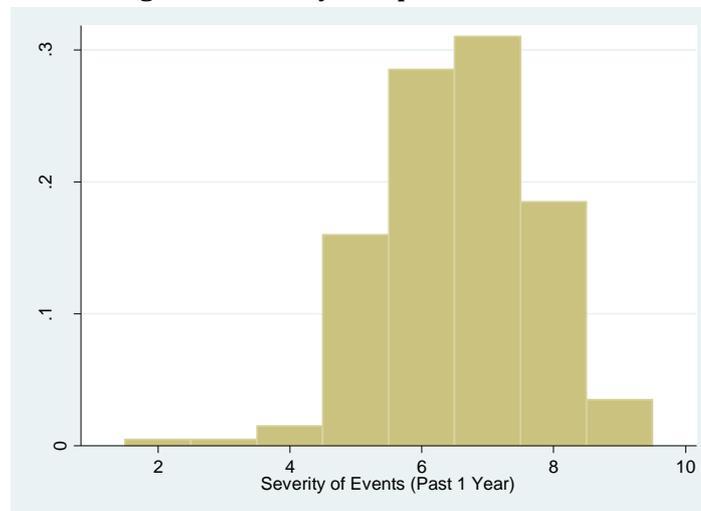


Figure 8: Types of damages experienced



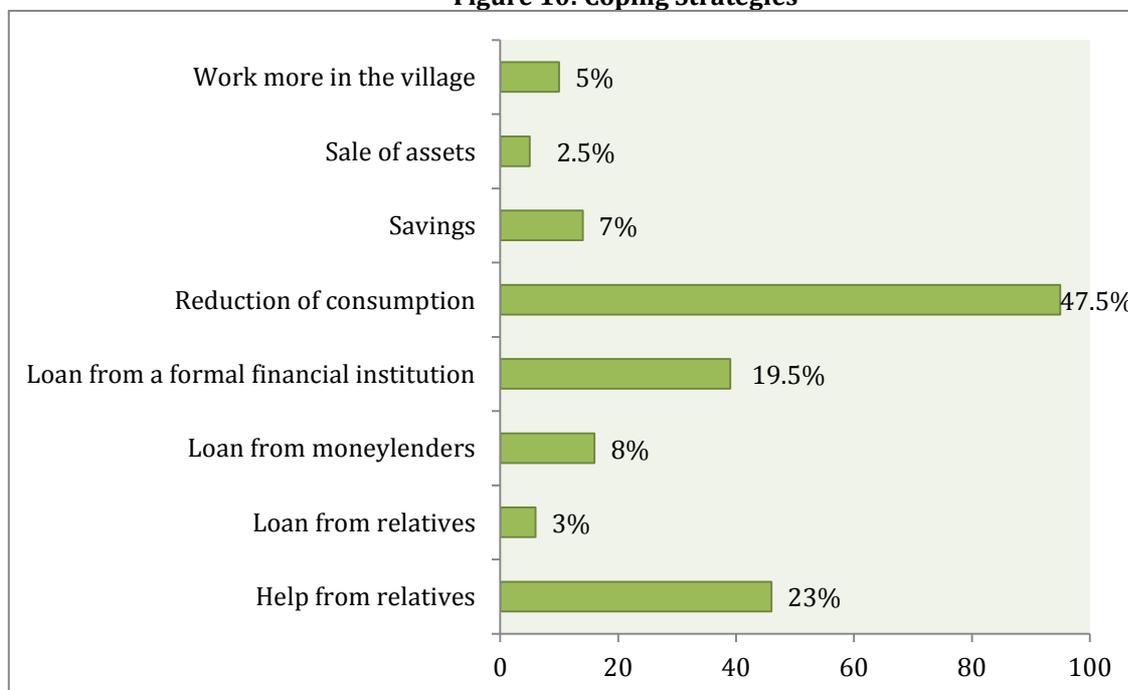
We then also enquired the severity of these events in the past 12 months. To this end, we asked subjects to evaluate how severe the events they experienced were, from a scale of 1 (no severe at all) to 10 (extremely severe). Results are shown in Figure 9 below:

Figure 9: Severity of experienced events



We then asked subjects how they cope with the shocks they experience. Their answers are displayed in Figure 10. It appears that the most common coping strategy for our target population is to reduce consumption (this is indicated by almost 50% of the respondents). Second, subjects tend to receive help from relatives and, finally the third most common coping strategy is to borrow from a formal financial institution.

Figure 10: Coping Strategies



The fact that subjects report that they have to reduce consumption when facing these shocks reveal two main things: on the one hand, the resources they receive (in terms of social safety net programs) are not sufficient to compensate for the losses they experience. On the other hand, it means that the loss in income their experience is larger than the fall in prices that it is registered during natural catastrophes (see also Khandker, 2012). While we need to rely on secondary source data to assess whether prices do fall less than average income during natural catastrophes, our survey instrument allows us to ascertain to what extent subjects did receive any help to cope with natural catastrophes. It appears that, in line with our hypotheses, these helps are not sufficient. Indeed, we find that only a small share of these people (29 people out of 200, i.e. 14.5%) ultimately receive any help in terms of cash/in-kind transfers. Among them, the vast majority comes from village level union transfers, as shown in Table 13.

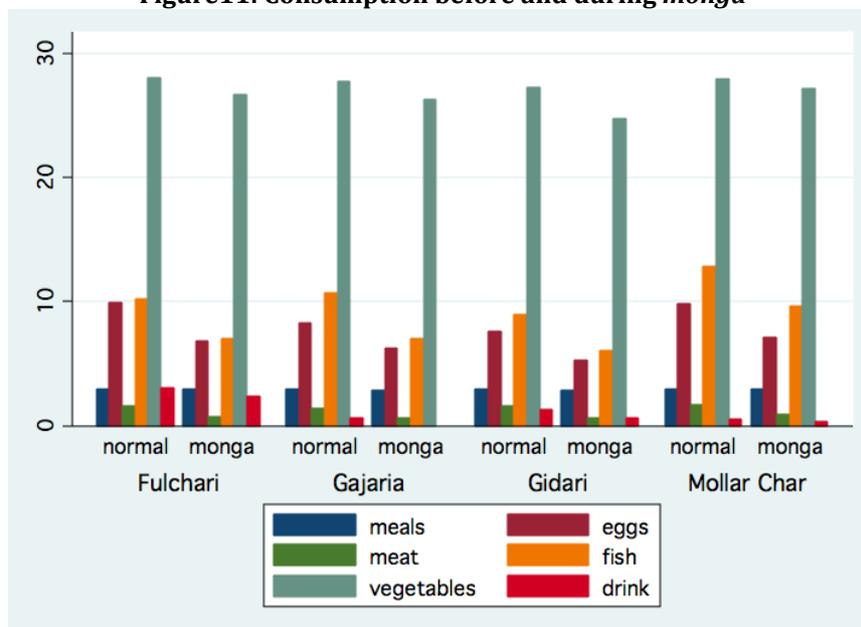
Table 4: Transfers

Type of help	Frequency	Percentage
NGO Transfers	6	20.69%
Village Level Union Transfers	23	79.31%
Total	29	100%

5.8 Consumption and Expenditures on Major Items

We asked subjects a full set of questions to understand if their consumption is affected by the *monga*. Figure 11 below shows subjects' consumption of different goods (vegetables, eggs, fish, drink, including number of meals), before and during the *monga*.

Figure11: Consumption before and during *monga*



It is easy to see from Figure 11 that, during the *monga*, households tend to reduce the amount of calories intake. While the number of meals remains three even during the *monga* (and this is also confirmed by subjects' answers to a specific question about any reduction in the number of meals per day), there is a significant reduction in almost every food category they consume: meat, vegetables, eggs, and fish.

5.9 Migration

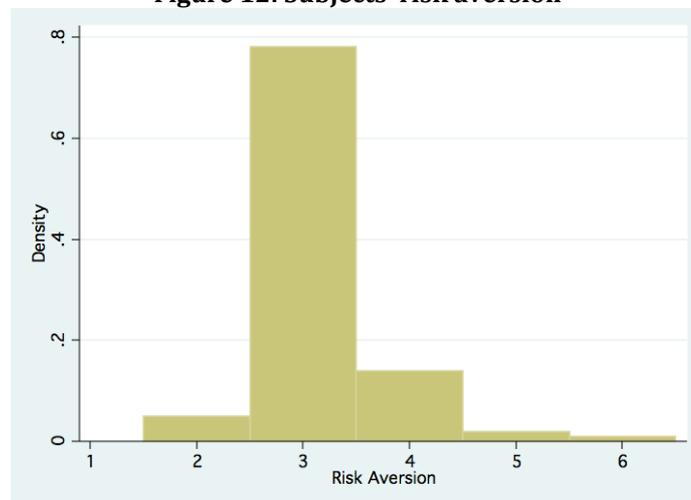
We also asked subjects a set of questions to assess whether any family member has migrated. Surprisingly, it appears that only a few households experience migration (10%). This reveals that households are not taking advantage of migration as a potential coping strategy against shocks. Instead, as Bryan et al. (2012) have shown, migration represents a crucial strategy to help poor households cope with the *monga*.

5.10 Time Preferences and Risk Aversion

Through our pilot, we were also able to measure subject's time preferences by means of two lotteries. The first asked the subject whether she prefers a sure amount of 200 tomorrow *versus* 210/220/230/240/250 in three months. The second lottery asked exactly the same thing but we time horizons shifted by three months. We find, in line with existing literature, that 66 out of 200 subjects (33%) in our sample are **present-biased**, that is, they display self-control problems. This is extremely interesting as it implies that new mobile money products could be introduced in the market to work as commitment devices. These would help subjects with little self-control to increase their ability to save and smooth consumption across the year (Ashraf et al., 2006).

We also measured risk aversion by means of a simplified protocol of the standard Holt and Laury (2002)'s risk elicitation task.⁸ We thus obtain an index of risk-aversion that ranges from 1 to 6, with 1 identifying very risk-loving subjects and 6 very risk-averse individuals. Results are shown in Figure 12: subjects in the sample all appear risk-neutral/moderately risk-averse.

Figure 12: Subjects' risk aversion



5.11 Household Decisions Dynamics

In our questionnaire, we included a set of 13 questions to measure household bargaining power. In order to have enough sample size (and heterogeneity) to assess households' decision dynamics, we surveyed 100 women and 100 men. Questions to assess household bargaining power were aimed at understanding who makes a set of decisions in the household concerning health, children's education, and expenditures. In particular, we asked subjects to report whether they take those decisions by themselves, whether the decision process is shared with their spouse, or it is their spouse to take the decision for themselves. Each answer was then graded 2 if the respondent reports taking the decision for him/herself, 1 if he/she reports to take the decision jointly with his/her spouse, and 0 if he/she

⁸ see Mahajan and Tarozzi (2011).

claims that he/she has no power in the decision. We pooled subjects' answers to the 13 questions together and took the average of their answers. Therefore, for each subject, we obtained an index of "bargaining power" ranging from 0 to 2. We then compared this index for the women and the men in our sample, and check whether it significantly differs between and men by means of a mean t-test. Results are reported in table 13 below. The average "bargaining power" index for women is 1, while it is 1.3 for men, this difference being statistically different from zero. Results from table 5 thus reveal that female have a significantly lower bargaining power than men in the household.

bargaining power by gender of respondent	Mean	Std. Error
bargaining power female respondent	1.008	0.036
bargaining power male respondent	1.292	0.016
<i>Difference</i>	-0.284	0.040
Ha: mean(diff) != 0	<i>p</i> -value	0.000
Ha: mean(diff) < 0	<i>p</i> -value	0.000

6. Empirical Findings

In this section, we report the results from our pilot. In particular, we first analyse the relationship between welfare indicators and vulnerability; we then look at which coping strategies subjects adopt, being affected by shocks to different extents. We then look at the role of transfers and, at the demand and usage of bKash by our target population. Finally, we look at the results for a subsample of our subjects who we re-interviewed during the *monga* season, and look at any differences in their vulnerability and coping strategy compared to the pre-*monga* months.

6.1 Shocks and Vulnerability

The first set of our results relate to how respondents' characteristics influence their vulnerability and also their ability to cope with natural catastrophes. We first look at how education and income (or, more generally, poverty status) relate to subjects' exposure to shocks. Because descriptive statistics reveal that almost all respondents experience a shock to some degree, we then look at *how severely* subjects experience these shocks. To this end, we use the index of severity of events presented in Section 5.7. Moreover, we measure poverty by means of a different set of indicators: we first look at characteristics of house i.e. its structure and material it is built of. To this end, we define as "poorer" those households whose premises consist of one room only, while we define as "wealthier" those with houses with more than one room. Results reveal that poorer households experience catastrophes more intensely than richer ones, as shown in Table 6a. Similarly, we look at the relationship between subjects' income and severity of events. To this end, we compute the median of total annual income and we perform a test to see whether there are any differences in the severity of the shocks experience by wealthier households versus poorer household. By means of a mean t-test displayed in Table 6b, we see that this is again the case: wealthier households experience shocks less severely than poorer households. All in all, results from table 6a and 6b confirm our hypothesis that poorer individuals are also more vulnerable and more exposed to shocks. Finally, we test whether these shocks affect differently people employed in agriculture versus people whose main economic activity is other than

agriculture. Although households whose head is primarily employed in agriculture experience these shocks more intensively than other households, this difference is not statistically significant, as shown in table 6c.

Table 6a: Mean difference test of experienced severity of events		
severity of events by house characteristics	Mean	Std. Error
severity of events only one room	6.720	0.122
severity of events more than one room	6.359	0.107
<i>Difference</i>	0.361	0.167
Ha: mean(diff) != 0	<i>p</i> -value	0.032
Ha: mean(diff) > 0	<i>p</i> -value	0.016

Table 6b: Mean difference test of experienced severity of events		
severity of events by house characteristics	Mean	Std. Error
severity of events income < median	6.89	0.120
severity of events income >= median	6.23	0.107
<i>Difference</i>	0.66	0.161
Ha: mean(diff) != 0	<i>p</i> -value	0.000
Ha: mean(diff) > 0	<i>p</i> -value	0.000

Table 6c: Mean difference test of experienced severity of events		
severity of events by occupation	Mean	Std. Error
severity of events occupation = no agriculture	6.551	0.136
severity of events occupation = agriculture	6.566	0.150
<i>Difference</i>	-0.015	0.169
Ha: mean(diff) != 0	<i>p</i> -value	0.931
Ha: mean(diff) < 0	<i>p</i> -value	0.466

6.2 Coping Strategies and Severity of Shocks

During this feasibility assessment, we collected many data on how subjects coped with these hardships. We hypothesised that there are many ways subjects affected by natural catastrophes can cope with them: through savings, borrowing, by receiving helps (from friends, relatives or state aids), by migrating, and, finally, by cutting consumption. In the following paragraphs, we ask 1) whether experiencing shocks to a higher/lower degree relates to the type of adopted coping strategy; 2) which role government transfers play in the ability of individuals to cope with such natural catastrophes.

A series of mean t-tests reveal that those who experienced shocks to a larger extent are significantly more likely to save, to borrow and to migrate. Table 7a shows a mean t-test for saving. In particular, we look at the distribution of the severity index and create a dummy “*shock intensity*” that takes the value of one if the shock experienced by the household is above the median, and zero otherwise. We then study whether subjects who experienced the shock more intensively are more likely to save than the subjects who experienced the shock less intensively. The variable “*saving_index*” is a categorical which takes the value of 0 if the household does not save, 1 if it saves at home, 2 if it saves through an MFI/NGO, 3 if it saves through a formalised bank account. Table 7b

displays a similar exercise considering subjects' borrowing behaviour. In line with results shown in Table 7a, we find that those who experience shocks to a higher extent are more likely to borrow. Finally, we look at migration within the households. To this end, Table 7c shows that households who experienced damages more severely are also those more likely to have a member that migrates. This, once again, reveals that our target population uses migration as a coping strategy.

Table 7a: Mean difference test of likelihood of saving		
likelihood of saving, by severity of shocks	Mean	Std. Error
saving_index low intensity of shock	0.883	0.099
saving_index high intensity of shock	1.283	0.090
<i>Difference</i>	-0.400	0.134
Ha: mean(diff) != 0	<i>p</i> -value	0.003
Ha: mean(diff) < 0	<i>p</i> -value	0.002

Table 7b: Mean difference test of likelihood of borrowing		
likelihood of borrowng, by severity of shocks	Mean	Std. Error
borrowing_index low intensity of shock	0.500	0.083
borrowing_index high intensity of shock	0.849	0.093
<i>Difference</i>	-0.349	0.126
Ha: mean(diff) != 0	<i>p</i> -value	0.006
Ha: mean(diff) < 0	<i>p</i> -value	0.003

Table 7c: Mean difference test of experienced severity of events		
likelihood of migrating, by severity of shocks	Mean	Std. Error
p(migrating) severity below median	0.032	0.018
p(migrating) severity above median	0.160	0.036
<i>Difference</i>	-0.128	0.042
Ha: mean(diff) != 0	<i>p</i> -value	0.002
Ha: mean(diff) < 0	<i>p</i> -value	0.001

6.3 Transfers

We already saw, from the previous section, that only 14.5% of our target population received government transfers. We perform a series of mean t-tests and look at whether individual characteristics like income, education, or distance to the closest market may influence the likelihood to receive a government transfer. It does not appear that any of these variables have a direct impact on the likelihood to receive a government transfer. We then look at whether there is any difference in the likelihood to get access to these transfers based on the location respondents live in. We thus estimate the following regression equation:

$$p(\text{transfer})_i = \beta_0 + \beta_1 \text{Fulchari}_i + \beta_2 \text{Gideri}_i + \beta_3 \text{Gajaria}_i + \epsilon_i$$

Where the dependent variable, $p(\text{transfer})_i$, equals one if the household has received a cash or in-kind transfer and zero otherwise. The omitted location dummy is *Mollar Char*_{*i*}, so β_1 , β_2 , and β_3 should be interpreted in relation to the omitted dummy.

Table 8: Transfers

Regression Table: Transfers		
	(1)	(2)
	p(Transfer)	p(Transfer)
Fulchari	0.079 (0.088)	0.094 (0.095)
Gideri	0.102 (0.090)	0.110 (0.090)
Gajaria	0.144* (0.093)	0.164* (0.095)
Income		0.013 (0.057)
Education (HH head)		-0.015 (0.050)
Age (HH Head)		-0.002 (0.002)
Observations	200	200

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Interestingly, when we look at the coefficient of *Fulchari_i*, *Gideri_i* and *Gajaria_i*, these are all positive, and also significant for *Gajaria_i*. This reveals that access to transfers for people living in these regions is easier than for people living in Mollar Char. We explain this result with the fact that Mollar Char is more remote, compared to the other locations.⁹ The difficulties to reach Mollar Char thus make also the penetration of transfers more difficult.

6.4 Demand and Usage of bKash

One of the main objectives of this pilot is to study the demand and usage of bKash. Descriptive statistics for the usage of bKash displayed in Figure 5 already showed two main results: among those who use bKash, only a tiny share do so by means of a bKash account in their phone, but mainly rely on an agent. Moreover, bKash is predominantly used to receive remittances and sending money. Almost none of the respondents use it for saving. In order to achieve a more complete picture of the demand for bKash, we estimate the following regression equation for each respondent *i*:

$$p(bkash)_i = \beta_0 + \beta_1 distance_i + \beta_2 migration_i + \beta_3 income_i + \beta_4 education_i + \beta_5 age_i + \beta_6 Savings_i + \beta_7 Borrowing_i + \epsilon_i$$

where the dependent variable, $p(bkash)_i$ is a dummy which equals 1 if the subjects reports to use bKash and zero otherwise. $distance_i$ is the distance, measured in Km, from the respondent's place of residency to the closest bKash point in the village. $migration_i$ is a dummy which equals 1 if the respondent reports that at least one member of the household migrated in the past 12 months, and zero otherwise. We then include controls for respondent's income, education, age, but also level of financial inclusion (savings and borrowing). Results are displayed in Table 9. Column (1) displays the basic specification, while we also include location dummies in column (2). As predicted, results show that households that experience the

⁹ It took indeed two hours by boat for our fieldteam to reach respondents in Mollar Char.

migration of one or more members are more likely to adopt bKash, which is used to receive remittances. Although the coefficient of $distance_i$ has the expected sign (the closer is a household to a bKash agent the more likely it will be to use bKash), it is not statistically different from zero. Interestingly, we do find that households with higher levels of education of the household head are more likely to use bKash (and this is also consistence with evidence collected during focus group discussions). Conversely, we do not find any predictive power of financial inclusion variables (savings and borrowing) on the likelihood to use bkash. Results appear robust also after controlling for geographical dummies, in column (2).

Table 9: Usage of bKash

Regression Table: Usage		
	(1)	(2)
	p(bKash)	p(bKash)
Distance	-0.055 (0.076)	-0.124 (0.106)
Migration	0.309** (0.128)	0.450*** (0.131)
Income	0.061 (0.069)	-0.016 (0.077)
Education (HH head)	0.001*** (0.000)	0.001*** (0.000)
Age (HH head)	-0.000 (0.003)	0.000 (0.005)
Saving	0.035 (0.045)	0.008 (0.048)
borrowing	-0.025 (0.048)	-0.009 (0.052)
Fulchari		-0.149 (0.094)
Gideri		0.041 (0.106)
Gajaria		-0.258*** (0.082)
Observations	192	192

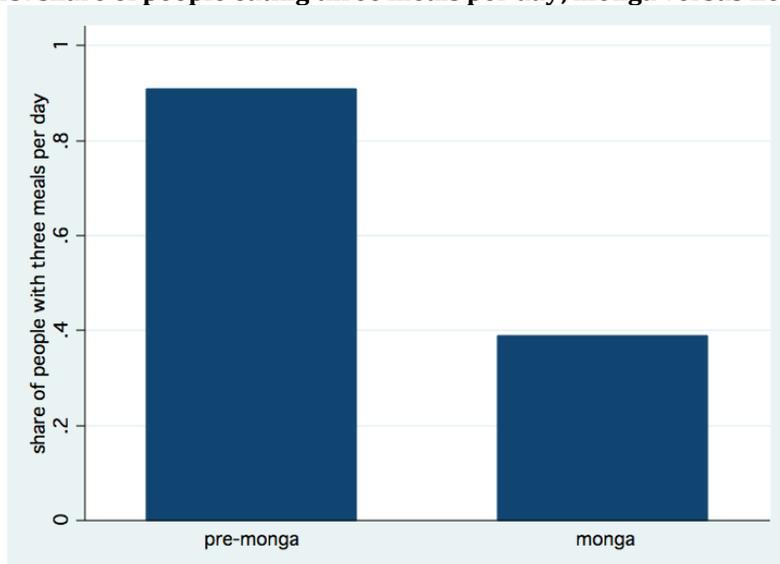
Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

6.6 Monga versus non-monga period

As a final exercise in our analysis, at the end of February 2016, in correspondence of the *monga*, we re-surveyed 100 subjects in 2 out of the 4 areas included in the baseline (i.e. Gideri and Fulchari). The rationale behind this follow-up is to see whether, compared to the pre-*monga* period, we can detect any change in our sample, particularly in terms of poverty and vulnerability. Figure 13 plots the share of individuals reporting eating three meals a day before and during the *monga*. The share of households able to have three full meals a day during the *monga* is less than one half compared to the pre-*monga* period, the difference being also statistically significant. The figure below allows us to get a

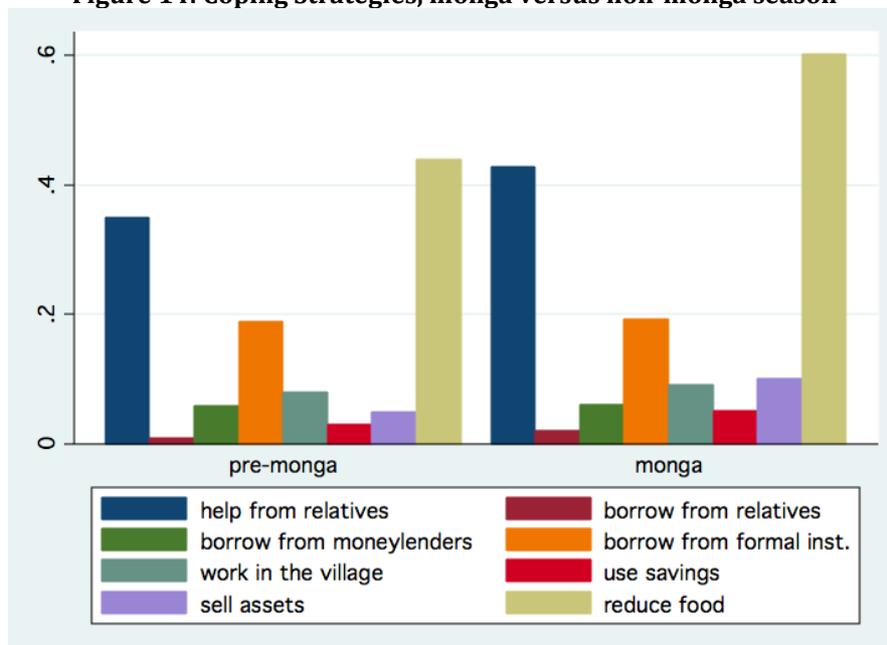
clear sense of how significant the shocks are in the survey area. Besides, it suggests the importance of immediate interventions to fight the consequences of the *monga*.

Figure 13: share of people eating three meals per day, monga versus non-monga



We then look at the differences in the coping strategies people adopt to face natural shocks during the pre-monga and the monga-season, as shown in Figure 14.

Figure 14: Coping Strategies, monga versus non-monga season



It is easy to see that, during the *monga* season, respondents are more likely to receive help from their relatives and to reduce food (in line with findings shown in Figure 11). These are the two main coping strategies that, during the *monga* season, are exerted to a significantly greater extent by our target population.

Table 10a: Mean difference test of weekly expenditures		
	Mean	Std. Error
Weekly expenditure Pre Monga	1079.24	28.603
Weekly expenditure Post Monga	964.73	25.831
<i>Difference</i>	114.51	38.541
Ha: diff != 0	<i>p</i> -value	0.0033
Ha: diff > 0	<i>p</i> -value	0.0017

Table 10b: Mean difference test of monthly expenditures		
	Mean	Std. Error
Monthly expenditure Pre Monga	670.39	23.235
Monthly expenditure Post Monga	648.76	22.387
<i>Difference</i>	21.63	32.263
Ha: diff != 0	<i>p</i> -value	0.503
Ha: diff > 0	<i>p</i> -value	0.251

Tables 10a and 10b show mean t-test for weekly and monthly expenditures before and during the *monga*. In line with previous results, we find that weekly expenditures are significantly lower during the *monga*, revealing the financial hardship experienced by respondents during this time. Interestingly, we do not find that monthly expenditures do significantly decrease during the *monga*. A potential explanation is that, given its seasonality, *monga* has more a short-term impact on the lives of the poor rather than a long-term one. As a consequence, the impact of *monga* can not be detected through monthly indicators of people’s welfare.

7. Discussion of results

Results from our feasibility study show, first of all, that subjects are very much exposed to floods and to a variety of shocks throughout the year, including illnesses and crop losses. The severity of these shocks is significantly more pronounced for the poorest segment of the population. Interestingly, however, we do not find that respondents experience death in the household to a large extent. More surprisingly, the set of coping strategies adopted by respondents against these shocks appears very limited.

Aside from receiving help from friends and relatives, only a few people migrate. At the same time, saving and borrowing are not very common. Moreover, migration, as well as saving and borrowing, are adopted more predominantly by those experiencing the shock to a higher extent. This result reveals that these strategies are considered as “extreme measures” to be pursued.

In addition, our findings indicate that government transfers (delivered either through NGOs or villages) reach only a little share of this population, confirming the limited outreach of social safety net programs implemented by the Government of Bangladesh. This result is also supported by the discussions we had with respondents as well as with the partner NGO for this pilot study. This lack of aids and assistance forces most of the subjects to reduce consumption when facing shocks. We do find that food reduction becomes even greater during the *monga* period. This represents a huge threat to subjects’ welfare and health, as a lower calories intake can trigger food poverty traps. These results suggest that it is important to find an appropriate strategy that helps our target population cope with natural disasters in a more efficient way. A potential innovative strategy is, therefore, to use bKash to

deliver cash transfers, which can reach poor population faster than any cash transfer program, given the presence of many bKash agents in the areas under study (and the fact that they appear not much affected in terms of connectivity during floods).

Results from our pilot indicate that most of our subjects are aware of bKash, although they mostly use it to receive remittances (not for saving) and they do not own a bKash account. Rather, they tend to rely on the closest bKash agent to do “cash-in” and “cash-out” operations. This evidence, along with informal discussions our field team had with the bKash agents in the areas under study, reveals that any intervention relying on bKash users should provide adequate training to prospective recipients about the product usage, in order to limit the burden faced by bKash agents from an operational and logistical point of view.

All in all, results from our pilot provided answers to *what* can be implemented to help poor populations cope with natural shocks, to *where* this should be implemented (in chars areas), and *how* this can be done (that is, by promoting savings, as well). An interesting point is also to understand *when* this type of intervention can take place, i.e. before or during the times where these populations are affected by the shocks. A comparison between the pre-*monga* and the *monga* season reveals that subjects are highly affected in terms of consumption during the *monga*. Thus, it appears that the best timing to deliver mobile cash transfers could be at the beginning of the *monga* season, in order to avoid that these subjects have to start reducing consumption to face the shocks. Still, further study and deliberations are needed, particularly in light of the data collected during this feasibility study, to understand what is the best timing to deliver such an intervention.

8. Proposed Methodology for the broad RCT

Based on the results of the feasibility study, we plan to design and set up an RCT starting at the beginning of 2017. The experiment will allow us to assess the impact of **delivering a mobile cash transfer program** on recipients’ consumption, expenditures and health, as well as on their ability to cope with present and future shocks. In addition, we also want to study whether being offered the opportunity to use mobile money can increase subjects’ awareness in terms of financial inclusion and may lead to higher savings. We plan to specifically test this hypothesis with an ad-hoc treatment.

The experiment will thus consist in the following: we will select a group of 210 villages in the greater Rangpur Region and assign them to either treatment or control group. The control group will receive a standard cash transfer like, for instance, the stipend transfer included in the Chars Livelihoods Program. On the contrary, subjects in the treatment group will receive the stipend transfer via their mobile money account. In addition, we will include a second treatment group where subjects will be offered a more sophisticated bKash product, which also incorporates a savings feature. This second treatment is motivated by the evidence, collected during the pilot, that a remarkable share of people display self-control problems, and, at the same time, they do not use bKash for savings purposes, but also to receive remittances. Therefore, being offered a savings device that strengthens their self-control may largely benefit the way they manage the transfers they receive. In addition, we will also randomize the recipient of the transfer, both in the control and treatment groups, in order to see whether any difference arises between men and women in the way these funds are managed. The experimental design is displayed in Figure 15 (we will include 35 villages in each cell).

Figure 15: Experimental Design

Cash Transfers, female recipient (CF)	Mobile Cash Transfer, female recipient (MF)	Mobile Cash Transfer plus Savings Product female recipient (MSF)
Cash Transfers, male recipient (CM)	Mobile Cash Transfers, male recipient (MM)	Mobile Cash Transfer plus Savings Product male recipient (MSM)

Although Haushofer and Shapiro (2013) find very little impact of the recipient's gender on their outcomes of interest, our hypothesis is that the role of gender may be amplified in the context of natural calamities, as also argued by Aker et al. (2014). More specifically, we will exploit the variation in terms of the delivery channel and the gender recipient to study: i) how receiving the payment via mobile money *vis-à-vis* cash affects the present behaviour of the recipients (e.g. whether treated subjects are more likely not to cash immediately the entire sum but to withdraw only part of it) and their future behaviour (e.g. whether treated subjects are then more likely to use mobile money also for other purposes, e.g. remittances and/or payments); ii) whether the gender of the recipient has a significant effect on the usage of the transfer in terms of expenditures and consumption, and for which group this gender effect (if any) is more dominant. A baseline and a follow-up will be administered before and after the intervention, respectively. By comparing the Mobile Transfer treatment with the Control, we can get the ITT estimate of the impact of bKash versus a cash transfer. Moreover, by comparing the Mobile/Savings Transfer with the Mobile Transfer and the Control group, we can compute the additional effect of receiving a specific savings product rather than a vanilla bKash product. From a policy perspective, the RCT will help us disentangle the additional advantages (in terms of cost-effectiveness) of receiving mobile transfers over cash transfers. Results from the RCT will also give insights on which household member these programs should target in order to maximize their impact in terms of household's welfare. Finally, our RCT will provide the first evidence on the impact of a mobile money product that is specifically designed for cash transfers against recurrent natural disasters. At the same time, we will offer the first evidence of the impact a mobile money product that can be easily replicable and adopted in other countries hit by natural disasters or seasonal shocks, provided an adequate mobile and agents' network coverage.

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