

# Smallholders and Micro-enterprises in Agriculture: *Information needs and communication patterns*

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## EXECUTIVE SUMMARY

Agriculture in developing economies often employ the largest share of the workforce yet contribute the least to GDP when compared to the Industry and Services sectors. The reasons for this low productivity are numerous: land fragmentation; lack of post-harvest infrastructure; low technology utilization; weak market linkages; absent or inefficient markets; information and knowledge asymmetries (or lack thereof). This is further exacerbated by overall socio-economic structural deficiencies such as lack of access to finance and crop insurance.

Smallholder agriculture often constitutes the largest segment of agricultural producers in developing countries. Increased performance of agricultural smallholders is sine-qua-non for inclusive development not just in agriculture but also at a more broad-based level. The 2010 Growth Report by the Commission on Growth and Development mentions utilization of knowledge and integration into global value chains as two of the characteristics of high growth countries. Given this context, the information and knowledge needs as well as the communication patterns (specifically the use of ICTs) were investigated using an exploratory non-representative survey of smallholders and agricultural micro-enterprises (only collectors, traders, commission agents and retailers of agricultural produce) in Bangladesh, India, Sri Lanka and Thailand.

### Information needs

Amongst smallholders, the main information needs over an entire crop cycle were information on fertilizers, market prices and pesticides. However informational priorities varied depending on the stage of crop cycle and to a lesser extent across countries. The overall informational priorities differed for agricultural micro-enterprises, where the main information needs were market prices, sources and costs of inputs and information on transport.

In a majority of the cases (by stage or by country), for both the smallholder and micro-enterprise samples, the most important sources of information and advice were self-knowledge, family and friends, and peers (other farmers in the case of smallholders and traders/ collectors/ buyers in the case of the micro-enterprises). This was true even amongst the Sri Lankan and Thai sample, which were most likely to make farming related decisions by themselves.

What was striking in the survey results was the lower ranking of agricultural extension and input suppliers, even with regards to information related to the more well known functions of these sources, i.e. information related to best practices, inputs, etc.

## Communication patterns and ICT usage

Face-to-face communication trumped all other modes of communication amongst the smallholder, as well as the micro-enterprise samples. Calling people using phones was however the second most used communication mode with information sources. Furthermore, the micro-enterprise sample displayed consistently higher mobile phone usage than the smallholder sample. The use of SMS, Internet or computers was virtually non-existent. Mobile phone ownership was high amongst both the smallholder and micro-enterprise samples, with the latter sample showing consistently higher ownership levels in all four countries.

When it came to the usage of different phone functionalities, both the smallholder and micro-enterprise samples used the phone virtually for only three functions: Making phone calls, receiving phone calls and sending/ receiving missed calls. SMS usage was very low.

Finally when it came to the perceptions of the smallholders (Table 42) and micro-enterprises (Table 43) regarding the benefits of phone access, they were mostly similar, with the main benefits being the ability to contact others in an emergency, maintaining relationships and reduction in travel costs.

## Key Takeaways

1. Fertilizer information clearly ranks as smallholders' highest information need, even more so than market price information.
2. The variability in the information priorities amongst the smallholder sample could be attributed to a variety of reasons that warrant further investigation in future studies. These include, amongst others, natural environmental variations, infrastructure and market structures, and the capacities and incentives of smallholders to transform information into knowledge that can be leveraged for higher economic returns.
3. Agricultural extension and input suppliers play a lesser role as information and knowledge sources than expected, even though the sample sizes prevent generalizability. However the overwhelming dependence on self-knowledge for most information, merits further investigation of the efficacy of agricultural extension as a system of knowledge transfer.
4. The preference for face-to-face communication and the use of phones primarily just for voice calls, raises some issues pertinent to the design of mobile-based agricultural information services. At the very least this tempers the optimism of quick transformational changes through the use of such services.

# 1. BACKGROUND

## 1.1. Objective of this report

The purpose of this report is to shed light on the information and knowledge needs in low-income smallholder farms and agricultural micro-enterprises in Bangladesh, India, Sri Lanka and Thailand. The micro-enterprises in this study only include traders, collectors and small retailers that sell agricultural produce. In particular this report also explores the use of Information and Communication Technologies (ICTs) and especially mobile phones amongst these micro-enterprises.

The report has been prepared for Food and Agriculture Organization (FAO) of the United Nations, based on the Teleuse@BOP4 research conducted by LIRNEasia. The report focuses primarily on the findings of the exploratory agricultural micro-enterprise survey component of the Teleuse@BOP4 research, which was conducted in Bangladesh, India, Sri Lanka and Thailand. Where relevant, findings from the other components of the Teleuse@BOP4 research have been incorporated.

The Teleuse@BOP4 research has been funded through a grant from the International Development Research Centre (IDRC) of Canada and the United Kingdom's Department for International Development (DFID).

## 1.2. State of Agriculture in developing Asia

**Table 1: Contribution of the Agriculture sector to the economy**

		Bangladesh	India	Sri Lanka	Thailand
Income level		Low income	Lower middle income	Lower middle income	Upper middle income
Share of GDP as a percentage (2010)	Agriculture	19	19	13	12
	Industry	28	26	29	45
	Services	53	55	58	43
Share of labor as a percentage (Year)	Agriculture	48 (2005)	52 (2008)	33 (2009)	42 (2009)
	Industry	15 (2005)	N/a	25 (2009)	20 (2009)
	Services	37 (2005)	N/a	40 (2009)	39 (2009)

Source: World Bank Data, <http://data.worldbank.org/indicator>

Agriculture in developing economies often employ the largest share of the workforce yet contribute the least to GDP when compared to the Industry and Services sectors (Lokanathan et al, 2011). This is true amongst all the countries of relevance to this report, except Sri Lanka where agriculture is the second highest contributor to labor. However, even in Sri Lanka it is still lowest contributor to GDP (see Table 1).

The reasons for low productivity are numerous: land fragmentation; lack of post-harvest infrastructure; low technology utilization; weak market linkages; absent or inefficient markets; information and knowledge asymmetries (or lack thereof). This is further exacerbated by overall socio-economic structural deficiencies such as lack of access to finance and crop insurance.

In the countries studied in this report, the smallholder sector constitutes the largest segment of agricultural producers (see Table 2). Being resource constrained, smallholders lack the ability to make the necessary investments to increase their productivity. Furthermore, the small land sizes prevent farmers from exploiting economies of scale (Niroula and Thapa, 2005; Rahman and Rahman, 2008; and Tana et al., 2010).

**Table 2: Agricultural landholding composition**

	Bangladesh	India	Sri Lanka	Thailand
Average landholding size	0.6	1.3	0.83	3.2
Percentage of smallholdings (Size in ha)	88.5 (≤1ha)	81.8 (≤2ha)	70.5 (≤2ha)	64.5 (≤3.2ha)

*Source: Calculations by author based on available data<sup>1</sup>*

Similarly, the use of inferior quality inputs, such as seeds and fertilizer, results in low yields and hence poor productivity. The use of inferior quality inputs is often due the unavailability of high quality inputs and the lack of appropriate knowledge amongst farmers (Ruttan, 2002), which is exacerbated by failures in agricultural extension (Mwangi, 1996; Kapugama et al., 2011; Perera et al, 2011).

With inefficient agricultural markets that often fail to clear, smallholders in developing economies are unable to engage effectively in markets (Barret and Mutambatsere, 2008; Fafchamps, 2004, World Banks, 2002). This is further exacerbated by information asymmetry especially with respect to market information (Lokanathan et al., 2011) The mismatch between supply and demand is more acute when relevant complimentary infrastructure such as cold storage and warehousing are not available, which is often the case in developing economies.

Increased performance of agricultural smallholders is sine-qua-non for inclusive development not just in agriculture but also at a more broad-based level. The 2010 Growth Report by the Commission on Growth and Development<sup>2</sup> mentions utilization of knowledge and integration into global value chains as two of the characteristics of high growth countries.

<sup>1</sup> Data used for calculations were sourced from Bangladesh's Agriculture Sample Survey, 2005; India's Agricultural Census, 2001/2002; Sri Lanka's Agricultural Census, 2002; Thailand's Agricultural Census, 2003

<sup>2</sup> The full report can be accessed from [http://www.growthcommission.org/index.php?option=com\\_content&task=view&id=96&Itemid=169](http://www.growthcommission.org/index.php?option=com_content&task=view&id=96&Itemid=169)

In this context, the use of Information and Communication Technologies (ICTs) and especially mobiles, have the potential to reduce the information and knowledge gaps in agriculture value chains. This possibility exists because of the high proliferation of mobile phones in the world and even in developing countries (see Table 3), which are the focus of this report.

**Table 3: Mobile penetration**

	Bangladesh	India	Sri Lanka	Thailand
Mobile SIMs/ 100 population (June 2011)	51.4%	71.11%	86.5%	100.8% (2010)
% of BOP who have used a phone in the last 3 months (June 2011)	99%	89%	90%	91%
% of BOP teleusers who own their own phone (June 2011)	48%	37%	71%	88%

*Source: Compiled by author from various sources<sup>3</sup>*

### 1.3. The importance of information and knowledge in agricultural value chains

Batchelor (2002) articulated the high demand for information in rural areas. Jensen (2007) and Aker, (2008) have shown that access to timely information, in their case price information, enabled the fishermen and farmers respectively to gain better prices for their produce. Jensen (2007) clearly shows how the reduction of information asymmetry with respect to market prices allowed markets to clear (resulting in wastage being eliminated). Obtaining such information imposes a cost. In their seminal work on information search costs in agriculture from a developing country context, de Silva and Ratnadiwakara (2010) showed how 11% of the total production cost of a representative sample of 300 smallholders in Sri Lanka, was spent on information search cost. They found that the majority of that cost (54%) was spent during just the growing stage. Information is a key input not just for the livelihoods of farmers, but also for micro-enterprises in the sector.

This report attempts to articulate some of the information needs (as well as variances) of farmers and agricultural micro-enterprises. The report also looks at the current sources of information as well as the modes used to obtain the necessary information.

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<sup>3</sup> The SIM penetration data for Bangladesh, India, Sri Lanka and Thailand was obtained respectfully from the Bangladesh Telecommunications Regulatory Commission (BTRC), Telecom Regulatory Authority of India (TRAI), Telecommunications Regulatory Commission of Sri Lanka (TRCSL) and the International Telecommunication Union (ITU). The BOP usage data was from the LIRNEasia Teleuse@BOP4 survey from June 2011.

## **2. RESEARCH DESIGN**

### **2.1. Overview of the Teleuse@BOP studies**

The objective of Teleuse@BOP studies conducted by LIRNEasia is to provide insight into the use of ICTs (i.e. “teleuse”) by those at the BOP in emerging Asia. Using a market research categorization, the studies define the BOP as those belonging to the Socio-Economic Classification (SEC) D and E in urban and rural areas (or R3 and R4 in rural India and Pakistan). Furthermore the study is limited to teleusers, who are defined as those who have a used phone (fixed or mobile) to make a call in the last three months. Over the past seven years, four Teleuse@BOP studies have been conducted using quantitative and qualitative research methods to investigate different focus areas in seven countries in emerging Asia.

The 2011 study, Teleuse@BOP4, conducted in Bangladesh, India, Pakistan, Sri Lanka, Thailand, and most recently, Java (Indonesia), was designed to investigate the livelihood-related usages of mobiles. Furthermore, the study probed the contribution of mobiles to the productivity and income of respondents, with particular focus on those employed in the agriculture sector. The study further examined the uptake of More-Than-Voice<sup>4</sup> (MTV) services, some of which attempt to enhance the productivity and livelihoods of users.

10,147 BOP teleusers between the ages of 15 and 60 were surveyed from May- June 2011.

### **2.2. Smallholder and agricultural micro-enterprise surveys**

The smallholders and agricultural micro-enterprise surveys together, constituted an additional exploratory module that was conducted as part of the 2011 Teluse@BOP4 survey. The SEC classification was relaxed to include SEC C, D and E. The purpose of this module was to articulate the information and knowledge needs as well as ICT use amongst smallholder farmers as well as agricultural micro-enterprises in a subset of the countries namely India, Bangladesh, Sri Lanka and Thailand. The definition of smallholder and micro-enterprise are outlined in Table 4. This component is the primary focus of this report.

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<sup>4</sup> More-Than-Voice (MTV) services are broadly defined as applications and services that are available either directly on mobile phones or through mobile phones, which go beyond just the use of mobiles for voice calls. The ability of phones to send/process/ receive voice, text, images and video are utilized for a variety of services including payments, information access and retrieval, etc. All these aspects come under this broad definition of the term.

**Table 4: Respondent criteria**

Smallholder	Agricultural micro-enterprise
<ol style="list-style-type: none"> <li>1. The respondents had to be involved in farming either as farmers (leased or / and own land) or as agriculture workers.</li> <li>2. The respondents had to belong to SEC C, D or E</li> <li>3. The cultivation area had to be less than or equal to five acres.</li> <li>4. Farmers could not be subsistence farmers and had to sell some portion of their crops.</li> </ol>	<ol style="list-style-type: none"> <li>1. The respondents had to be a collector, trader, commission agent or a retailer of food crops</li> <li>2. The respondent had to belong to SEC C, D or E</li> <li>3. Had to employ 1-9 employees.</li> </ol>

In all a total of 505 smallholders and 447 agricultural microenterprises were interviewed (Table 5). Unlike the basic Teleuse@BOP survey, the surveys in this component are not representative. The sample was selected opportunistically, based on Teleuse@BOP respondents who met the requisite criteria (Table 4) above. Where needed, snowballing techniques were used to find additional respondents. Hence the respondents in each country come from different regions in a country. One respondent was selected per household; in households with more than one eligible respondent, a Kish grid (random number chart) was used to randomly select the respondent.

**Table 5: Sample size**

	Bangladesh	India	Sri Lanka	Thailand	Total
Smallholder sample	100	205	100	100	505
Micro-enterprise sample	100	147	100	100	447

### 2.2.1. The smallholder survey

The smallholder survey focused primarily on finding the information requirements of farmers during the crop cycle. The areas explored included:

- The types of information required for cultivation.
- The importance of each of the type of information the respondents identified. The responses were picked from a Likert scale of one to five.
- The current sources of the identified type of information and the mode of communication with the source.
- The accuracy and the timeliness of the information obtained
- The respondents access to Information and Communication Technology (ICT) and ownership

The survey looked at the information needs of farmers based on the six stages of a crop cycle identified in de Silva and Ratnadiwakara (2010). These stages include:

1. **Deciding stage:** This is the stage where farmers decide on the crop(s) to grow, how much land to allocate for each crop and also arrange financing.
2. **Seeding stage:** During this stage farmers either purchase or prepare seeds.
3. **Preparing and planting stage:** Land preparation using labor or machines and actual planting occur during this stage.

4. **Growing stage:** Applying fertilizer, pesticides and water occurs during this stage.
5. **Harvesting, packing and storing stage:** Finding labor for harvesting, harvesting and packing and storing are the main activities that happen during this stage.
6. **Selling stage:** In the final stage (some) farmers check prices at the market; find a method of transporting and transport the packed produce to the market and sell.

In total 26 different types of information were listed in the six stages of the crop cycle, some of which were listed in more than one stage (see Table 15 in Annex 1 for the complete list). In addition, respondents were queried regarding their level of access to ICTs and as to their perceived benefit(s) from ICTs especially from mobiles and/ or specialized mobile-based services.

The Sri Lankan and Thai samples were almost evenly split amongst farmers who were members of a farmer organization and those that were not. Virtually all the Bangladeshi and Indian farmers in the survey did not belong to a farmer organization. Similarly, the majority of the farmers in each country sample inherited their farmland. Table 17 in Annex 2 summarizes the main characteristics of the smallholder respondents.

### **2.2.2. The agricultural micro-enterprise survey**

This survey looked at micro-enterprises involved in the agriculture sector, specifically, traders, commission agents, collectors and retailers. Unlike the smallholder survey, only part of the focus was related to understanding information and knowledge needs of micro-enterprises (type of information, sources as well as mode of communication with source). This report does not delve into the other focus areas of the micro-enterprise survey. Table 16 in Annex 1 gives a list of the different types of information needed by micro-enterprises. In addition, data was gathered about the respondents' access to ICTs and their perceived benefit(s), especially from mobiles and/ or specialized mobile-based services.

The majority of the micro-enterprise samples were entrepreneurs who started their business themselves. The vast majority of the sample was not registered, except in Sri Lanka where a little less than half of the sample were registered with a government organization. The micro-enterprise sample was mainly skewed towards retailers (more so in Bangladesh than the other countries). This composition should be kept in mind when viewing the rest of the survey results. Table 18 in Annex 2 summarizes the main profile characteristics of the micro-enterprise sample.

### 2.3. The qualitative study

The aim of the qualitative module of Teleuse@BOP4 study was to understand the role played by the mobile phone in the livelihoods of the BOP population in Bangladesh, Sri Lanka, India, Indonesia, Pakistan and Thailand. Amongst others, one particular focus of this component was on the various stakeholders in agriculture. These included smallholder farmers as well as laborers and also owners and employees of agricultural micro-enterprises. A variety of qualitative techniques were utilized including focus group discussions, home visits and mini-ethnographies to shed further light on some of the key findings from the quantitative surveys.

Amongst the major exploratory themes of this component, the ones of relevance to this report, include:

1. The use of mobile phones for productive, or livelihood-related purposes by the BOP in general, with emphasis on the agriculture sector
2. The reasons for poor awareness and usage of more-than-voice services by the BOP
3. The modes of communication among the stakeholders in the agriculture sector and the role played by mobile phones in building and maintaining business relationships and trust.
4. The patterns of information seeking in the agriculture sector
5. The use of ICTs for organization by the BOP

Some findings from this research component have been utilized in this report, mainly to shed further light on the key findings of the agricultural micro-enterprise survey. These findings have been included as boxes in this report. Table 19 to Table 23 in Annex 2, gives the profile of the respondents in each of the five locations of relevance to this report. These locations are:

- Chandina: a rural village in the district of Comilla of the south-eastern Chittagong division in Bangladesh
- Samastipur: a rural village in the eastern state of Bihar in India
- Hallegare: a rural area in the Mandya district of the south-western state of Karnataka in India
- The rural areas in Dambulla: Dambulla falls in the Matale district of the Central Province in Sri Lanka.
- Lom Kao: a rural district in the northern province of Phetchabun in Thailand

### 3. INFORMATION NEEDS

#### 3.1. Information needs of farmers

##### 3.1.1. Decision making and overall information needs

The Sri Lankan and Thai farmers in the smallholder sample were more likely to make decisions related to their farming activities by themselves (without any outside advice), when compared to the Bangladeshi and Indian farmers (Table 6). This was true in each of the stages of a crop cycle. In contrast, the majority of the Bangladeshi (at least 66%) and Indian farmers (at least 60%) reported making decisions sometimes with the advice of others.

**Table 6: How farmers make decisions**

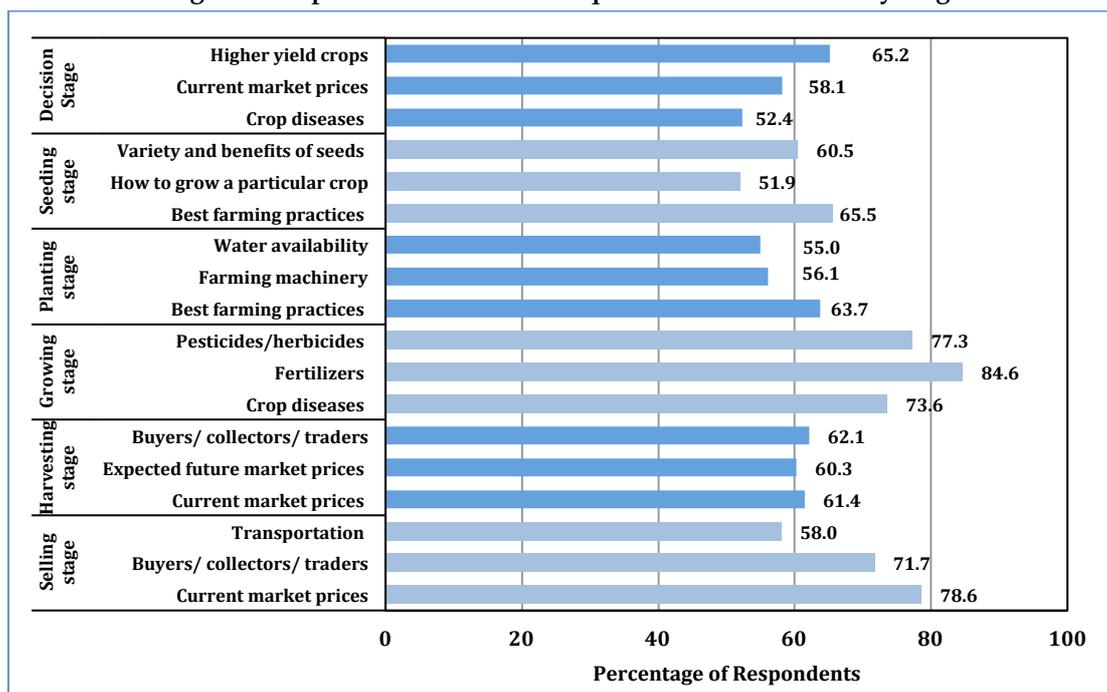
		Decision	Seeding	Preparing & Planting	Growing	Harvesting, packing & storing	Selling
BD	Always by myself	28%	22%	29%	21%	26%	33%
	Sometimes with the advice of others	70%	77%	71%	77%	73%	66%
	Always with the advice of others	2%	1%	0%	2%	1%	1%
IN	Always by myself	34%	40%	40%	37%	39%	38%
	Sometimes with the advice of others	66%	60%	60%	63%	61%	62%
	Always with the advice of others	0%	0%	0%	0%	0%	0%
LK	Always by myself	73%	73%	70%	61%	71%	77%
	Sometimes with the advice of others	25%	25%	28%	37%	27%	20%
	Always with the advice of others	2%	2%	2%	2%	2%	3%
TH	Always by myself	76%	71%	71%	76%	60%	70%
	Sometimes with the advice of others	19%	26%	24%	22%	31%	25%
	Always with the advice of others	5%	3%	5%	2%	9%	5%

*Note: The main method of making decisions has been highlighted*

When it comes to one of the key inputs for decision-making, i.e. information, an interesting picture emerges.

On a stage by stage basis, when we consider the entire smallholder sample (Figure 1), the top-three overall information needs were (in order): information on fertilizers during the growing stage (84.6%), current market prices during the selling stage (78.6%) and information on pesticides/ herbicides during the growing stage (77.3%).

**Figure 1: Top-three information requirements of farmers by stage**



A more disaggregate analysis of the top-three information needs in each of the four country samples (Table 7), revealed a slightly different picture. Information on fertilizers appeared amongst the top-three in all the four country samples. Information on pesticides/ herbicides appeared amongst the top-three in all countries except Bangladesh, where it was actually quite low (11<sup>th</sup>). Market price information however appeared amongst the top-three only in Bangladesh. However it did remain amongst the top-five in all the country samples.

**Table 7: Overall top-three information needs by country**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Current market prices during the selling stage (98%)	Information on fertilizers during the growing stage (79.5%)	Information on buyers, collectors and traders during the selling stage (94%)	Information on fertilizers during the growing stage (74%)
2 <sup>nd</sup>	Higher yield crops during the decision stage (97%)	Information on pesticides/ herbicides during the growing stage (78.5%)	Information on crop diseases during the growing stage (90%)	Information on pesticides/ herbicides (71%)
3 <sup>rd</sup>	Information on fertilizers during the growing stage (96%)	Best farming practices during the seeding stage (77.1%)	<ul style="list-style-type: none"> <li>Information on fertilizers (89%) during the growing stage</li> <li>Information on pesticides/ herbicides (89%) during the growing stage</li> </ul>	Information on crop diseases (63%)

Drilling down further, the survey results point to the fact that information needs vary from stage to stage and from country to country.

### 3.1.2. Information needs during the deciding stage

During the decision stage (Table 8), information on higher yield crops was amongst the top-three information needs of the farmers from Bangladesh (1<sup>st</sup>), India (1<sup>st</sup>) and Sri Lanka (2<sup>nd</sup>). It may be that this need arose, because multiple cropping is often the norm for smallholders and the crop-mix changes from season to season. This is the case in Sri Lanka where Lokanathan et al. (2011) showed that high seasonal, inter and intra-day price volatility is symptomatic of the fruit and vegetable markets in Sri Lanka. In such a scenario, smallholders change the basket of crops that they grow from season to season and often want to know about higher yield crops.

**Table 8: Top-three information needs during decision stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Higher yield crops (97%)	Higher yield crops (75.9%)	Weather (76%)	Current prices in the market they sell at (48%)
2 <sup>nd</sup>	Current prices in the market they sell at (63%)	Crop diseases (67.3%)	Higher yield crops (70%)	Inputs (45%)
3 <sup>rd</sup>	Finance (54%)	Water availability (63.8%)	Crop diseases (65%)	Water availability (42%)

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

### 3.1.3. Information needs during the seeding stage

When we consider the seeding stage (Table 9) the top-three information needs amongst the countries were similar (mostly related to seeds and farming practices). Whilst most can be explained, the demand for information on government schemes amongst the Thai sample (3<sup>rd</sup> most important) is unusual. However this may be related to some form of subsidies e.g. a government scheme that provides seed subsidies.

**Table 9: Top-three information needs during seeding stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Information on seed varieties (84%)	Best farming practices including how to prepare seeds (78.2%)	Information on seed varieties (84%)	How to grow a particular crop (48%)
2 <sup>nd</sup>	Best farming practices including how to prepare seeds (83%)	How to grow a particular crop (71.8%)	Best farming practices including how to prepare seeds (72%)	Water availability (37%)
3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Finance (52%)</li> <li>• Farming machinery (52%)</li> </ul>	Information on seed varieties (69.8%)	Water availability (61%)	Government schemes (35%)

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

### 3.1.4. Information needs during the preparing and planting stage

The top-three information needs during the preparing and planting stage (Table 10) again showed similar needs amongst the different country samples. Information on

farming machinery appeared amongst the top-three in Bangladesh (2<sup>nd</sup>), India (1<sup>st</sup>) and Sri Lanka (1<sup>st</sup>) samples. Similarly best practices related to growing crops appeared in all four country samples (1<sup>st</sup> in Bangladesh, 2<sup>nd</sup> in India and 3<sup>rd</sup> in Sri Lanka and Thailand)

**Table 10: Top-three information needs during preparing & planting stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Best farming practices related to growing crops (84%)	Farming machinery (75.5%)	Farming machinery (85%)	Crop diseases (48%)
2 <sup>nd</sup>	Farming machinery (69%)	Best farming practices related to growing crops (70.9%)	Weather (79%)	Water availability (45%)
3 <sup>rd</sup>	Labor (62%)	Water availability (62.8%)	Best farming practices related to growing crops (63%)	Best farming practices related to growing crops (43%)

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

### 3.1.5. Information needs during the growing stage

**Table 11: Top-three information needs during growing stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Fertilizer information (96%)	Fertilizer information (81.1%)	Crop diseases (93%)	Fertilizer information (74%)
2 <sup>nd</sup>	Pesticide/ herbicide information (71%)	Pesticide/ herbicide information (79.6%)	<ul style="list-style-type: none"> <li>• Fertilizer information (89%)</li> <li>• Pesticide/ herbicide information (89%)</li> </ul>	Pesticide/ herbicide information (71%)
3 <sup>rd</sup>	Crop diseases (71%)	Crop diseases (71.6%)		Crop diseases (63%)

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

The top-three information needs during the growing stage (Table 11) were the same in all four countries, though the ordering was slightly different from country to country. These top-three information needs were: information on fertilizers, pesticides/ herbicides and about crop diseases). Information on fertilizers was either the most important information need (Bangladesh, India & Thailand) or the second most (Sri Lanka). Also see

#### Box 1: Information needs regarding fertilizers and pesticides in Samastipur (India)

Farmers in the village of Samastipur, had concerns about their inadequate knowledge of the changing soil conditions as a result of the use of modern synthetic fertilizers and pesticides. The farmers claimed that yields were decreasing over time despite the use of fertilizers. Similarly, many of the pesticides that they had used earlier now seemed to be less effective. Whereas earlier their own self-knowledge was enough, now they depended on multiple sources for information and advice related to fertilizers and pesticides/ herbicides.

These concerns were aptly voiced by Kunal Singh, a smallholder in Samastipur:

*“We are aware that all of north Bihar has soil that is deficient in zinc and hence we use fertilizers accordingly. But there are other deficiencies in my soil that I am not aware of and need information about”*

### 3.1.6. Information needs during the harvesting, packing and storage stage

**Table 12: Top-three information needs during harvesting, packing & storage stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Expected future market prices around the time when your crops are ready to harvest (85%)	Buyers, collectors & traders (67.7%)	Market prices where they sell at (79%)	Buyers, collectors & traders (56%)
2 <sup>nd</sup>	Market prices where they sell at (78%)	Expected future market prices around the time when your crops are ready to harvest (64.1%)	Buyers, collectors & traders (70%)	Market prices where they sell at (42%)
3 <sup>rd</sup>	Prices in markets other than where they sell at (65%)	Labor (62.1%)	<ul style="list-style-type: none"> <li>Expected future market prices around the time when your crops are ready to harvest (68%)</li> <li>Packing material (68%)</li> </ul>	<ul style="list-style-type: none"> <li>Expected future market prices around the time when your crops are ready to harvest (31%)</li> <li>Transportation (31%)</li> </ul>

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

Not surprisingly, despite slight variations, the most important information needs were related to market prices and information on buyers, collectors and traders (Also see ).

#### Box 2: Shopping for buyers in Chandina (Bangladesh)

Musharraf Hossein, a smallholder in the village of Chandina never sells his produce to just one buyer. This is mainly because a buyer would often never make a quick payment for the entire sale. Hence, during the time of harvest he starts looking for different buyers. By the time of selling, he splits his harvest between two to three buyers and expects each of them to make payments relatively quicker since volume he sells to each buyer is less than when he used to sell all of his produce to just one buyer.

*“Suppose I may sell 30% to one and 30% to the other buyer. If I sell to a single person, he may have to pay a huge amount. He may fail to carry this out”*

### 3.1.7. Information needs during selling stage

**Table 13: Top-three information needs during selling stage**

	Bangladesh	India	Sri Lanka	Thailand
1 <sup>st</sup>	Prices in market they sell at (98%)	Prices in markets other than where they sell at (76.5%)	Buyers, collectors & traders (94%)	Prices in market they sell at (61%)
2 <sup>nd</sup>	Prices in markets other than where they sell at (87%)	Buyers, collectors & traders (74.5%)	Prices in market they sell at (88%)	Buyers, collectors & traders (47%)
3 <sup>rd</sup>	Buyers, collectors & traders (73%)	Prices in market they sell at (69%)	Transportation (65%)	Transportation (37%)

*Note: The ordering was based on the percentage of respondents who cited a type of information as important, which is given in brackets*

Understandably prices in the market they sell at and information on traders, collectors and buyers appeared amongst the top-three information needs for farmers

during this stage in all four countries (Table 13). Both Bangladeshi and Indian farmers considered price from other markets amongst their top-three information needs (Also see ). The overall importance for this information need amongst the Sri Lankan and Thai farmers was much lower. The results suggest that information on transportation matters more to Sri Lankan and Thai farmers (also see ). In reality this information need missed the top-three by just a few percentage points in both Bangladesh and India.

#### Box 3: Market information search for smallholders in Samastipur (India)

While farmers like Kunal Singh, a smallholder in Samastipur often look for market price information, it is not necessarily to increase their bargaining power when selling crops. Rather it is for personal planning so that they have an idea of what to expect from their harvested crops. Often if farmers have obtained credit from a buyer they are informally obliged to sell their harvested crops to that specific buyer. When that happens, they virtually never question the price that the buyer gives.

However in the case of Kunal and several others who were interviewed, new buyers and traders often approach farmers during the harvesting stage. Even when this happens with Kunal, he still asks around for prices being offered by other traders and buyers in his market as well in markets in other villages. In the latter case, he calls relatives in other villages nearby to find out the market prices there.

Given the lower prioritization of price information from other markets, it could be theorized that Sri Lankan and Thai farmers would prioritize information on transport quite low. Yet it appeared amongst the top-three. One possible explanation is that the Sri Lankan and Thai samples grew more perishable crops than the Bangladeshi and Indian samples. However it was not possible to verify this from the survey results.

#### Box 4: The importance of transport a smallholder in Dambulla (Sri Lanka)

Kamal Priyantha, a smallholder in Dambulla, Sri Lanka who mostly grows vegetables, starts looking into sources of transport once his crops are ready to harvest. He is concerned about spoilage between the time of harvest and actually selling at the market (which is about 10-15km from his farm land). Given that he doesn't have access to post-harvest infrastructure that he can use such as warehousing and cold storage, his only option is to sell his crops as soon as they are harvested.

He used to use sacks to pack his crops, but at the time of his interview, the government had mandated the use of specific-sized baskets/ crates for transporting fruits and vegetables. Because vegetables must now be packed into these baskets and then loaded into trucks, the amount of vegetables that he could load had almost halved thus increasing transportation costs. Furthermore, the crates had to be brought back when empty and couldn't be left behind at the market like sacks. Hence finding transport to take his harvested crops to the market was a major concern for him.

## 3.2. Agricultural micro-enterprises

When it came to the micro-enterprise agricultural microenterprises, it's evident from Table 14 that market prices were the most important information need for them (also see ). This is in contrast to the smallholder sample, where information on fertilizers was more important overall (See Figure 1 and Table 1). If we were to compare the main information needs of smallholders during the selling stage (Table 13), then the main information need of smallholders and micro-enterprises were market price information (except in the case of the Sri Lankan smallholder sample, where market price information was the second most important information need).

**Table 14: Relative importance of information needs of agricultural micro-enterprises**

	All countries	Bangladesh	India	Sri Lanka	Thailand
Market prices of crops	91%	91%	88%	93%	91%
Sources and costs of inputs	73%	45%	74%	91%	83%
Transport (sources & cost)	72%	68%	74%	86%	59%
Buyers of your goods and prices offered	70%	48%	86%	84%	62%
Finance (sources & cost)	61%	50%	67%	68%	61%
Electricity timings	54%	52%	65%	64%	36%
News related to your business	53%	31%	56%	57%	67%
Waste reduction	52%	39%	66%	62%	43%
Govt. schemes & policies	51%	36%	67%	68%	32%
Storage (sources & cost)	49%	21%	59%	60v	55%
Labor availability & costs	36%	36%	58%	29%	21%
Insurance (sources & cost)	35%	25%	52%	32%	29%

*Note: The top-three information needs of each country have been highlighted*

### Box 5: How traders source market price information in Samastipur (India)

For Nirmal Kediya, a wholesale trader in rice in Samastipur having up-to-date information on rice prices in the entire region was very important for his business. At one point he used to have agents in every major agricultural market in the region, including Kolkata in the neighboring northern state of West Bengal. But nowadays he just calls people he knows in those markets and gets the information over the phone

## 4. SOURCES OF INFORMATION AND ADVICE

### 4.1. Sources of information and advice for farmers

Annex 3 contains a list of tables (Table 24 to Table 35) which consists of two tables for each stage: the first outlines the three most used information sources for the top-three information needs during a particular stage; and the second outlines the full extent of utilization of all the information sources during that particular stage. Table 36 in Annex 3 outlines the three most utilized sources of advice in a stage, when farmers' make decisions with the help of others.

When it comes to information sources, three sources featured prominently: self-knowledge, family and friends, and other farmers. Furthermore when it came to the Indian farmers, these three sources were always the top-three sources across every stage.

A similar pattern emerges when we consider sources of advice. Family and friends, and other farmers featured prominently for all countries (except in Thailand, where other farmers appeared amongst the top sources of advice in just three stages: preparing and planting, growing, and the harvesting stages).

#### 4.1.1. Self-knowledge

By and large the vast majority of the respondents (irrespective of country or stage) depended on themselves to fulfill their information needs for farming activity. In certain cases you see an evolution in how an information need (common to multiple stages) is fulfilled through different sources. For example in Bangladesh where market price information was amongst the top-three information needs in both the harvesting, packing and storing stage as well as selling stage, self-knowledge was one of the main sources during the former stage (Table 32), but was replaced by "trader/ collector/ buyer" in the latter stage (Table 34).

#### 4.1.2. Other farmers

##### Box 6: The role of other farmers for a smallholder in Chandina (Bangladesh)

Musharraf Hossein considers other farmers in his village and his relatives as important sources of information and advice:

*"Suppose I am cultivating potatoes. One of my relatives does the same job and I take advice from him. I ask him about the condition of his farm. If he says that his farm is affected by insects, I may advise him to use specific insecticides. They also advise me."*

For Musharraf, coordination with other farmers is very important when it comes to irrigation. The farms in Chandina depend on irrigation from canals, for which they have to rent a water pump from a private operator. Farmers decide amongst themselves on when to schedule each farmer's use of the pump and then the contact the pump operator.

Based on the number of times “Other farmers” appeared amongst the main information sources (either for the top-three information needs or overall) it could be considered the second most important information source (after self-knowledge) overall for the farmers’ main information needs. In the case of Bangladesh “Other farmers” was the main source of advice (also see      ).

#### 4.1.3. Family and friends

After self-knowledge and other farmers, Family and friends was the next most important information sources overall. They appeared amongst the main information sources (both for the top-three information needs as well as overall for a stage) for all the countries in nearly all the stages. When it came to being a source of advice, family and friends were amongst the top-three sources of advice in all the countries, irrespective of the stage (Table 36 in Annex 3). There is a possibility of overlap between “other farmers” and “family and friends”, which is not possible to discern from the data set.

#### 4.1.4. Traders, collectors and buyers

Traders/ collectors/ buyers were amongst the main information sources for most, mainly during the last two stages (i.e. harvesting, packing and storing, and selling). When to it came to soliciting for advice, the famers in all countries count them as an importance source of advice during the selling stage.

Interestingly they did not appear amongst the top-three sources in India in either of the last two stages. This was despite the fact that the Indian farmers did look for market price information during these stages. Amongst the Thai farmers, traders/ collectors/ buyers were considered important sources during the initial stages and surprisingly seemed to be a top source for information on inputs, water availability and information on how to grow crops.

#### 4.1.5. Government agricultural extension officers

##### Box 7: A farmer’s experience with agricultural extension in Chandina (Bangladesh)

Unlike the experiences recounted by the qualitative study farmers in India, Musharraf Hossein in Bangladesh generally has faith in agricultural services provided by the state. He often gets his crop advice from a state agricultural officer and even buys his paddy and wheat seeds from the Upazila Agriculture Office in Chandina (an Upazila is a sub-district level administrative unit in Bangladesh). Musharraf keeps a good relationship with the local agricultural officer, calling him from time to time to make sure he gets any information that may be useful to him.

*“He also advises me about using fertilizers. As a farmer I keep a good relation with him”*

Extension officers seemed to play an important role only amongst the Bangladeshi and Sri Lankan respondents (more in the former). The slight variance in the

importance of extension officers (amongst Bangladeshi and Sri Lankan respondents) became more pronounced when it came to advice. The Bangladeshi farmers placed extension officers amongst the top-three sources of advice in the first four stages (also see ). They were rated amongst the top-three amongst Sri Lankan farmers only in the decision stage.

Government agricultural extension workers were one of the least used sources for information and for advice for both the Indian sample (also see ) and for the Thai sample (where a role for them as a source is virtually non-existent).

#### Box 8: The role of extension and universities in Samastipur and Hallegare

A Krishi Salaahkar is a government appointed local agricultural advisor. Farmers in Samastipur as well as in Hallegare district expressed dissatisfaction with respective Krishi Salaahkar. This was partly from an overall lack of faith in government services and most farmers, recollected the difficulty they had in navigating government-run systems which were meant to provide them with information and support.

Whilst farmers in both locations wanted greater technical knowledge about soil testing, pest-detection and specific agricultural practices, they often found the information they received from their respective advisors unreliable.

Farmers in Samastipur however had great faith in the services provided by the Rajinder Agricultural University, which was in the village, which included information services as well as short-term technical class on various agricultural techniques and practices. Even though farmers trust the information provided by the institute, they often do not uptake this information for several reasons. One of the reasons for this is perception that advice provided by 'technically advanced' sources, such as research units and state-run agriculture departments, require greater investment than small holding farmers can afford. Secondly, farmer respondents were of the opinion that information from these sources is based on theoretical knowledge and is incongruent with the actual farming conditions of the area

#### 4.1.6. Input suppliers

#### Box 9: The role of input suppliers in Chandina, Bangladesh

The qualitative study underscored the importance of input suppliers in Bangladesh. Musharraf Hossein, a smallholder in the village of Chandina in Bangladesh gets his information related to seed varieties, pesticides and fertilizers from the input supplier in his village.

*"I explain the age of my paddy, the condition of fields to my input supplier, and then I ask for advice about using insecticides, they advise me accordingly."*

For Musharraf and other farmers in his village, often the relationship with a specific input supplier starts through an introduction through the farmer's buyer. When a farmer in the village needs to buy pesticides and doesn't have enough money, he turns to a trader. The trader then directs the farmer to get the required materials directly from a specific input supplier. That input supplier is paid by trader, and often also offers the trader a commission for the business. Upon harvest, the farmer has to sell his crops to the same trader he obtained the credit from.

At the same time traders are often directed to specific farmers who are growing crops they are interested in purchasing, by the retailers who sold pesticides to the farmers.

As a source of advice, input suppliers seemed to play a role only in Thailand during the seeding stage (Table 36). As a source of information, they played a very minor role in all countries except in Bangladesh (also see       ).

#### **4.1.7. Mass media**

The use of mass media as an information sources was quite low (Table 24 to Table 35). This is true even amongst the Sri Lankan and Thai farmers, who reported high ownership of TVs (and to a lesser extent radios).

#### **4.1.8. Specialized service from a private business**

Specialized services from private businesses (either as a paid or as a free service) are not used as an information source by virtually all of the country samples. Only amongst the Indian sample does it show some small usage.

### **4.2. Information sources of agricultural micro-enterprises**

The three most used sources of information for the micro-enterprises were self-knowledge, family/ friends and traders/ collectors and buyers in all the countries except in Sri Lanka where mass media appears instead of traders/ collectors and buyers (Table 37 in Annex 3). However the latter was the fourth highest source of information (11.4%), missing the top-three by just a few percentage points.

## 5. COMMUNICATION PATTERNS AND ICT USAGE

### 5.1. Communication patterns

When it came to communicating with their information sources, face-to-face communication trumped all other communication modes for both the farmers (Table 38 in Annex 4), as well as the micro-enterprises (Table 39 in Annex 4), irrespective of country or the stage. For both groups, the second most preferred mode was calling using a phone. See below for a farmer's perspective.

#### Box 10: A farmer's views on in-person meeting versus a phone call (Bangladesh)

Musharraf Hossein, a smallholder in the village of Chandina in Bangladesh would never call to book the use of the pump for irrigation purposes. He felt that if he interacted with the irrigation personnel over the phone, he would either not be taken seriously or would not get a response. For him an in-person meeting was essential to get the job done.

*"If I meet them directly they give more me importance."*

The only difference between the farmers and the micro-enterprises was that the difference in usage between the two communication modes, was lesser in the latter case. Usage of phones by the micro-enterprises was consistently higher than the farmers in all country samples (Also see ).

#### Box 11: Use of mobiles by agricultural micro-enterprises in Samastipur (India)

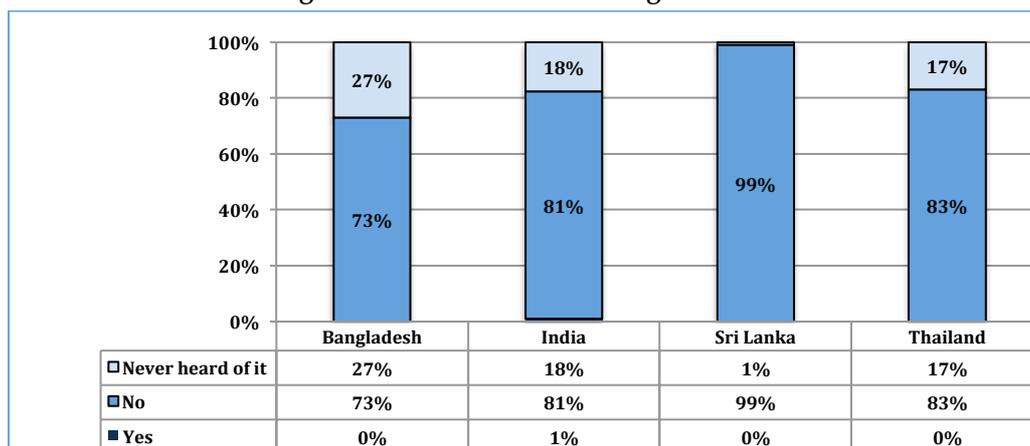
Agricultural micro-enterprises in Samastipur, found phones to be useful tool for building networks and professional contacts.

Mahesh Kumar, a renter of farming machinery in Samastipur claimed that after his purchased a mobile phone, he started getting inquiries from new customers further away. Generally, these phone inquires were then followed up with in-person meetings.

Nirmal Kediya, a wholesaler of rice in Samastipur, regularly calls five to ten people in the local market to get prices from them. When asked if he would like to have one number to call from which he would get the officially reported market price, he expressed reluctance to use that service. This was because he felt the prices varied from stall to stall inside the market and the official market price would be of little value.

The use of SMS, computer or Internet for communicating with information sources was at most negligible and often non-existent for both groups (Tables 27 and 28 in Annex 4). In fact the use of Internet in general amongst the entire farmer sample was non-existent (Figure 2).

Figure 2: Use of Internet amongst farmers

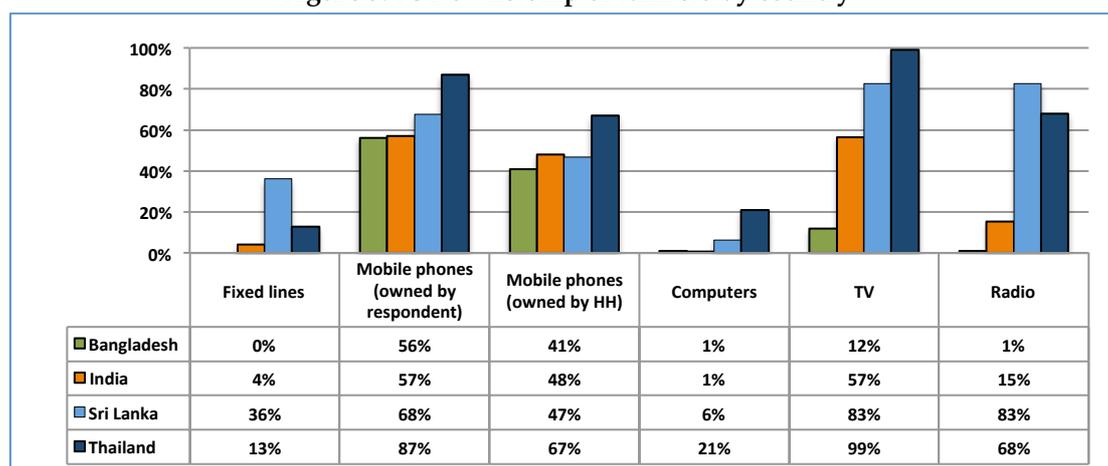


Given that Sri Lankan micro-enterprise respondents listed mass media as one of their main information sources, one would have expected a relatively high percentage in the use of newspapers or TV. However, both did not appear to be used much (Table 39 in Annex 4). A closer analysis of the data found that in the case of the Sri Lankan respondents, they were mostly accessing mass media indirectly through others, which did appear amongst the communication modes.

## 5.2. ICT ownership

Despite the preference for face-to-face communication, ownership of mobiles was high amongst both the farmers (Figure 3) as well as the micro-enterprises (Figure 4).

Figure 3: ICT ownership of farmers by country

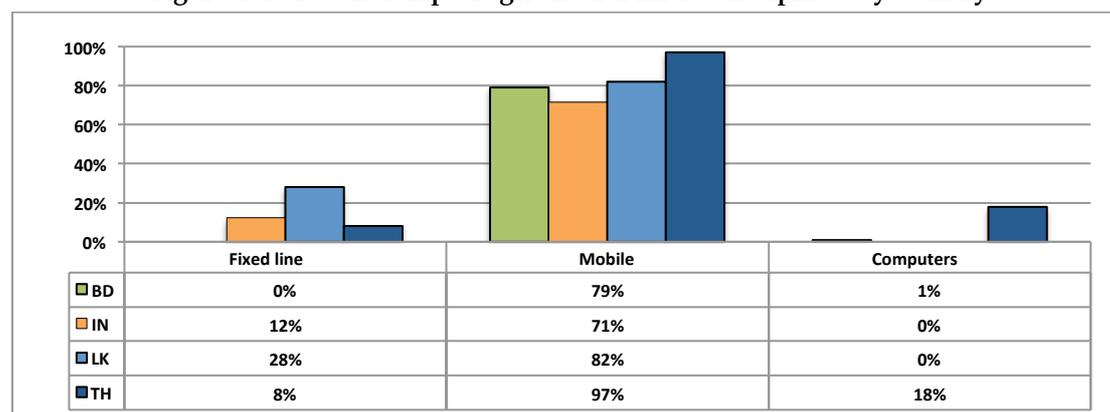


The percentage of mobile owners was higher amongst the micro-enterprises (56-87% with the lowest being Bangladeshi farmers and the highest being the Thai farmers) than the farmers (71-97% with the lowest being the Indian micro-enterprises and the highest being Thai micro-enterprises).

### Box 12: Looking for market price through phones in Lom Kao (Thailand)

Farmers in Lom Kao claimed that before mobiles, they did not have access to information as quickly as they do now. After have access to mobiles, most farmers now call multiple traders and buyers before they decide who to sell to. Ideally they would like to receive SMS on government minimum-support prices for specific crops, so they can be sure that their buyers are not offering a lower price. However such a service didn't exist at the time and they had to instead call different people to find that minimum-support prices.

Figure 4: ICT ownership of agricultural micro-enterprises by country



### 5.3. Perceived benefits of phones

#### Box 13: Kunal Singh's perceptions of the role of phones (Samastipur, India)

The phone usage patterns of Kunal Singh, the smallholder from Samastipur, revealed different issues at play that determine the usefulness of having phone access.

When Kunal needs to book time for the usage of the bore well, he would generally never call first. The time and effort that can be saved by using the mobile phone was not considered a major factor.

*"The distance is not great enough to warrant making a phone call. I can go to his house directly. We are not so advanced as to make phone calls when we can go visit."*

This was partly to do with social norms related to relationship maintenance, since the owner of the bore well was someone known to him.

At the same time, Kunal often used the phone to contact an agricultural scientist at the nearby Pusa University. He had obtained the number for the scientist from a friend and occasionally calls him to obtain advice on various farming related activities. Though he has never met the scientist in person, he has found the advice to be very useful and trusts the scientist. Kunal felt that if he were a bigger farmer, he would probably call the scientist more. As a smallholder he is resource constrained and felt that he couldn't make use of the advanced knowledge that he could possibly get through the scientist.

When it comes to obtaining market prices, his mobile phone is an indispensable tool. Even before he owned his own phone, he would borrow mobile phones from friends or other farmers to call buyers and ask for prices. After he purchased his phone, he calls at least three to four buyers after harvest to get market prices.

The top-three perceived benefits of phones were similar when comparing the farmer sample (Table 42 in Annex 6) and the micro-enterprise sample (Table 43 in Annex 6),

irrespective of country. The ability to contact others in an emergency was the most important for both groups, while the ability to maintain relationships and the ability to reduce travel costs appeared amongst the top three in both instances. The ability to reduce travel costs was rated high as well in both samples, except for the micro-enterprise Indian sample (where it was the fifth most important perceived use of mobiles).

**Box 14: Perceptions of an Indian farmer and Thai trader on the potential of getting advice on crop diseases over the phone.**

When Kunal Singh, a farmer in Samastipur (India) was asked if he would be able to ask for advice about a crop disease by taking a photo and sending it via his phone to an agricultural expert, his answer was a resounding “No”. In his opinion, the touch and feel element was important in diagnosing crop diseases and this was not something that the mobile could accomplish.

Saryut, a Thai trader and seller of hybrid corn seeds in Lom Kao, held a differing view. Farmers occasionally approach him when there are problems with their corn crops. He then visits the field and takes pictures of the potentially diseased corn plants using a camera that was given to him by the corn seed firm he represents. He then transmits those images to his supervisor at the corn seed company using his phone as a modem. Later he contacts the farmer with the advice that he obtained from supervisor.

The Indian farmer sample did report some minor usage of specialized service from a private business (paid or free) as an information source. It is possible that some of the services were mobile-based agricultural information services. However it is reasonable to conclude that usage of such mobile based agricultural information services were low, given that overall awareness and usage of MTV services by the BOP were low (see Figure 5 and Figure 6 in Annex 7). The reactions of farmers in the qualitative study, provides some explanation for the low uptake (See ).

**Box 15: Farmer reactions to mobile agricultural information services**

Very few farmers encountered during the qualitative study, were aware of agricultural information services that were available through the phone. A few had heard of one such service, IKSL, which is offered through a partnership between IFFCO (the largest fertilizer cooperative in India) and Airtel (one of the main mobile operators in the country). Those that had heard, were unsure of the benefits. A fellow-farmer of Kunal Kumar used the IFFCO-Airtel SIM card through which he received messages about agriculture at first but claimed that eventually the messages stopped. Though Kunal had never considered taking the SIM earlier, this only convinced him further. While the IFFCO-Airtel SIM has been pitched by local retailers as a SIM essentially for farmers, Kunal Kumar mentioned that among his social and professional circle, the information received wasn't perceived as valuable. According to the rural mobile shop owner interviewed in Bihar, some IFFCO-Airtel SIMs meant to be distributed free to farmers were sold to them by the retailers.

Awareness of a similar service in Sri Lanka, called Tradenet, was also low. Some of the Sri Lankan farmers, who were a part of the qualitative study, had in fact subscribed to market price SMS alerts from Tradenet. These farmers felt that since market volatility causes prices to change the rate may be slightly different when one reaches the market with the produce. This was one of the reasons why Premadasa, unsubscribed from the service.

## 6. KEY TAKEAWAYS

An essential premise in the rise of mobile agricultural information services was based on the fact that the implicit and unmet information and knowledge needs of the agricultural poor could be delivered through the ubiquitous mobile phone. The high access rates amongst the poor (Table 3) in Bangladesh, India, Sri Lanka and Thailand and even ownership amongst the respondents in the agricultural micro-enterprise survey, speaks to the universality of mobile access and ownership. However as the survey results show, the relative importance of different information and knowledge needs of poor farmers vary not just from stage to stage but also from country to country.

Secondly when it comes to the farmer sample, whilst we find some variation in the sources of information and advice, by and large, the vast majority depended on three sources: self-knowledge, family and friends, and other traders.

### 6.1. Farmers' demand for fertilizer information versus market prices

What is common amongst the respondents in the surveyed countries is the importance placed on information on inputs, especially fertilizers and pesticides/ herbicides. Market price information became very important only during the harvesting and especially the selling stage. But the overall high rating for information on fertilizers is indicative of the difficulties smallholders have in adapting to the changing nature of agriculture, where the use of technology inputs such as modern synthetic fertilizers, pesticides and other chemicals are now the norm. Whilst the increased use of technology inputs in developing countries, that started with the Green Revolution, have led to measurable improvements in yields (Evenson et al., 1998), they have placed a greater burden on farmers to be more knowledge intensive in their farming activities. When we consider the survey findings coupled with the experiences of the farmers from the qualitative study, the possibility exists that this particular information need is currently not being adequately met.

Whilst market information (prices as well as buyers) was important during the last two stages, how this information is utilized varied across countries. For example the farmers from Samastipur in India (participants in the qualitative study) used this information for personal planning purposes and to have a benchmark. Even if they looked for other buyers, they still generally utilized their usual trader/ buyer.

## 6.2. Understanding the variability in information priorities

Whilst the overall top-three information needs were fertilizers, market prices and pesticides, the survey results speak to the variability in the priorities of information needs from stage to stage and from country to country. The variability in the need during stages is to be expected, given the different activities that take place during a crop cycle.

The top-three overall information priorities in the different countries are not significantly different (Table 7), but there is higher variability when we compare the information priorities of the different country samples from a stage-by-stage perspective (Table 8 to Table 13). Such variability is to be expected given that agricultural production is more location specific and unstable than other sectors such as industry, where technical factors are equally if not more important (Biggs and Clay, 1981). This affects the agricultural knowledge market in different countries. The local-context explanation for the variance could manifest itself in various ways. Whilst the study results cannot test the proposed hypotheses below, it merits brief discussion, possibly as starting points for future research.

1. In the first instance agricultural production is a variable natural biological system that also evolves over time and space. Information priorities therefore will logically vary. For example Thai agriculture is mainly rain-fed with only twenty-percent of the agricultural land being irrigated (Nikomborirak & Pongsukcharoenkul, 2011). This may explain why information on water availability appears amongst the top-three information needs in the early stages for the Thai sample unlike the other countries (Table 8, Table 9 and Table 10). Of course the high importance for water information may be due to other related factors such the Thai sample being skewed towards those geographically situated in rain-fed areas as compared to the other country samples. Also, it could be that the Thai sample has a higher incidence of respondents growing crops with a higher water requirement than respondents from other countries.
2. Secondly infrastructure and market structures also vary from country to country. For example when we compare the importance of information on market prices in other markets during the selling stage, it is the third highest amongst the Bangladeshi farmers, fourth amongst the Indian farmers, ninth amongst the Sri Lankan farmers and eight amongst the Thai farmers. The low priority for this information amongst the Sri Lankan and Thai farmers could be due to the lack of alternate markets that farmers can utilize. We see similar variations with respect to infrastructure elements in the survey, where the Sri Lankan and Thai farmers (as opposed to the Bangladeshi and Indian farmers) gave information on transport higher priority during the last two stages. This could be either because of inadequate transportation infrastructure or could be that the Sri Lankan and Thai respondents growing more perishable crops than the other country samples. The more perishable a crop, the greater the

urgency to get the crops to the markets due to general lack of cold-storage in these developing economies.

3. A third factor could be due to the differential capacities of the respondents to convert the information into knowledge that can then in turn be leveraged for higher economic returns (Also see Section 6.3)

### **6.3. The role of agricultural extension and input suppliers**

The rationale for greater knowledge utilization is higher economic returns. Yet transforming information into greater technical knowledge, which can then be leveraged for higher economic returns, requires in the first instance an organization of information. As de Silva and Ratnadiwakara (2010) showed, smallholders in Dambulla, Sri Lanka already spend 11% of their production cost purely on information search. If organization of information were to be considered endogenous to a farmer's activities, then it is questionable how much effort resource-constrained smallholders can expend to make sense of the information. The survey results suggest that this organization process does in fact by and large depend on sources that can be considered endogenous i.e. self-knowledge, family and friends, and other farmers.

It could be argued that the rationale for the existence of agricultural extension exists to make such information organization largely exogenous to the farmer. Yet we find that agricultural extension by and large doesn't appear to be one of the main sources of information and/ or advice, except in a few instances amongst the Bangladeshi and Thai farmers. This holds true even if we consider only information that agricultural extension is more likely to give e.g. how to grow crops, etc. (Table 24 to Table 35) and also when we consider stages where their advice would be of possibly greater relevance i.e. the stages up to growing (Table 36).

When it comes to input suppliers as sources of information, we see them appear as a main source in only a few instances and that too only in Bangladesh and Sri Lanka (Table 24 to Table 35). They seem to play some role as sources of advice amongst the Thai sample (Table 36) but it should be noted also that the majority of the Thai sample claimed to make decisions without the advice of others (Table 6).

While the survey results do not permit generalizations to the country level, they do provide evidence to warrant further investigation of the effectiveness of agricultural extension.

### **6.4. ICT usage patterns and the viability of mobile-based services**

The survey results suggest that face-to-face communication trumped all other modes of communication amongst both the smallholder (Table 38) and micro-enterprise

samples (Table 39). However, calling people using phones was the second most used communication mode, with consistently higher phone usage amongst the micro-enterprise sample than the smallholder sample.

Mobile phone ownership was high amongst both smallholder (Figure 3) and micro-enterprise samples (Figure 4), with the latter sample showing consistently higher ownership levels in all four countries.

We also found that both the smallholders (Table 40) as well as the micro-enterprises (Table 41) used the phone virtually for only three functions: Making phone calls, receiving phone calls and sending/ receiving missed calls. SMS usage was very low.

Finally when it comes to the perceptions of smallholders (Table 42) and micro-enterprises (Table 43) regarding the benefits of phone access, they were mostly similar, with the main benefits being the ability to contact others in an emergency, maintaining relationships and reduction in travel costs.

Collectively these results reiterate two important facts regarding mobile-based agricultural information systems:

1. Whilst SMS/ data-based service delivery options may be cheaper to implement, when it comes to users, the preference by and large would be for voice-based communications.
2. Despite there being several mobile-based agricultural information services in each of these countries, we did not see any evidence of usage amongst the country samples, except possibly in the Indian sample. Amongst Indian farmers we did see some minor usage of specialized services from private business (paid or free), which could be one of the many mobile information services that are available in India (but it was not possible to verify this based on the survey data). However the representative Teleuse@BOP4 survey did reveal that amongst the BOP in these countries, awareness (Figure 5) and use (Figure 6) of mobiles for More-Than-Voice (MTV) applications and services were both low.

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## ANNEX 1: INFORMATION NEEDS

**Table 15: Information needs of farmers by stages**

Information	Stage(s)
1. Current market prices for a specific crop(s) in the specific market that I sell at	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
2. Current market prices for a specific crop(s) in market(s) other than what I sell at	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
3. Expected future market prices for a specific crop(s) around the time when your crops will be ready for harvesting	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
4. Information on finance (formal and informal sources, the cost involved, etc.)	Deciding; seeding; preparing and planting; growing
5. Information on government schemes (including subsidies and minimum support prices) & policies on agriculture (current as well as changes)	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
6. Information on higher yield crops	Deciding
7. Information on best farming practices including how to grow a particular crop	Deciding; seeding; preparing and planting; growing;
8. Information on crop diseases and how to solve them	Deciding; seeding; preparing and planting; growing;
9. Information on input availability and associate costs	Deciding
10. Information on labor availability and associated costs	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
11. Information on land availability and associated costs	Deciding;
12. Information on farming machinery/ equipment and associated costs	Deciding; seeding; preparing and planting; preparing and planting; growing;
13. Information on electricity timings	Deciding; seeding; preparing and planting; growing;
14. Information on water availability	Deciding; seeding; preparing and planting; growing;
15. Information on weather	Deciding; seeding; preparing and planting; growing; harvesting, packing and storing; selling
16. Input supply (who is selling, what they are selling, where and costs)	Seeding
17. Variety and type of seeds as well on pros and cons of different seeds and varieties	Seeding
18. Finance (formal and informal sources, the cost involved, etc.) To purchase seeds	Seeding
19. Best farming practices including how to prepare seeds	Seeding
20. Finance (formal and informal sources, the cost involved, etc.) To help with preparing land	Preparing and planting
21. Information on fertilizers (types, sources and costs)	Growing;
22. Information on pesticides/herbicides (types, sources and costs)	Growing;
23. Information on transportation (types, sources and costs)	Harvesting, packing and storing; selling
24. Information on packing materials (types, sources and costs)	Harvesting, packing and storing; selling
25. Information on warehouses and/or cold storage (source and cost)	Harvesting, packing and storing; selling
26. Information on buyers/ collectors/ traders	Harvesting, packing and storing; selling

**Table 16: Information needs of agricultural micro-enterprises**

1. Information on labor availability and associated costs
2. Information on electricity timings
3. Information on government schemes and policies related to your business
4. Information on waste reduction
5. Information on market prices of goods
6. Information on buyers of your goods and prices they offer
7. Information on sources and costs of inputs
8. Information on finance (formal and informal sources, the cost involved, etc.)
9. Information on insurance for your business (formal and informal sources, the cost involved)
10. Information on sources and costs of transport
11. Information on sources and costs for storage facilities
12. Information on news reports related to your business

## ANNEX 2: RESPONDENT PROFILES

**Table 17: Profile of smallholder survey respondents**

	Bangladesh	India	Sri Lanka	Thailand
Number of respondents	100	205	100	100
<i>Member of farmer organization?</i>				
Yes	1	7	51	45
No	99	93	49	55
<i>Ownership status of farming land (%)</i>				
I inherited it	80	87	88	64
I bought it	8	7	6	18
I lease the land for money	8	3	2	22
I am a tenant farmer and share a portion of the harvest with the owner	5	3	4	-

**Table 18: Profile of the agricultural micro-enterprise survey respondents**

	Bangladesh	India	Sri Lanka	Thailand
Number of respondents	100	147	100	100
<i>Primary nature of business (%)</i>				
Trader/ commission agent	20.0	16.3	34.0	30.0
Collector	0.0	17.7	13.0	30.0
Retailer	80.0	66.0	53.0	40.0
<i>Is the business registered with any government organization? (%)</i>				
Yes	0.0	8.2	45.0	13.0
No	100.0	91.8	55.0	87.0
<i>Ownership of business (%)</i>				
I inherited it	11.0	35.2	22.2	20.0
I bought it	5.0	1.4	12.2	3.0
I started it myself as sole proprietor	84.0	61.4	61.1	66.0
I started it with someone else	0.0	1.4	4.4	11.0

**Table 19: Profiles of qualitative study respondents in Chandina (Bangladesh)**

Name	Age	SEC	Sex	Occupation	Education	Use of phones
Md. Hafizullah	29	D	M	Farmer	Primary education	Voice Call
Mufazzal Islam	36	E	M	Rent Equipment to Farmer	Class-VI	Voice Call
Abdul Mannan	36	C	M	Primary School Teacher	BA	Voice Call, SMS
Bazlur Rahman	44	D	M	Shop Owner (Farm Supply)	SSC	Voice Call, SMS
Mamtajuddin	42	D	F	Seasonal Business	Class-X	Voice Call, SMS
Musharraf Hossain	38	D	M	Farmer	HSC	Voice Call, Songs, Take Picture
Md. Shahid Mia	39	E	M	Middleman	Class-V	Voice Call, SMS, Take Picture
Selim Mia	33	D	M	Shop Owner (Farm Supply)	SSC	Voice Call,

						SMS, Song, Ringtone
Kabir Hossain	30	E	M	Seasonal Business	Class-V	Voce Call, Song, Take Picture, Caller Tunes

**Table 20: Profiles of qualitative study respondents in Samastipur (India)**

Name	Age	SEC	Sex	Occupation	Education	Use of phones
Kunal Kumar Singh	32	D	M	Farmer- owns 2 acres	Primary education	Makes and receives calls; multiple SIM usage; multiple handset usage; occasionally texts; beginning to use phone camera; watches videos and listens to songs on mobile
Munna Singh	33	C	M	Middleman for corn	Graduate	Makes and receives calls; listens to songs; occasionally texts
Farzana Khatim	39	D	F	Runs a petty shop; ward member (member of ward administration); sometimes works from home rolling beedis (hand rolled small cigarettes)	No formal education	Makes and receives calls; can recognise numbers to identify caller
Ambreesh: manager at Gupta seed store*	Late 40s		M	Wholesalers and retailers of seeds and pesticides		
Nirmal Kediya	40	B	M	Wholesaler of rice		Makes and receives calls; occasional listens to radio on phone
Mr. Gupta: owner of Gupta Traders*	Late 50s	B	M	General store retailing grains		Makes and receives calls
Mr. Gupta	Late 30s	B	M	Wholesaler of potatoes and onions		Makes and receives calls; occasionally listens to radio on phone
Ranjan	29	C	M	Wholesaler of IFFCO fertilisers	Completed school	Makes and receives calls; texts; was also distributor of IKSL SIM cards for a short while
Surendra Choudhari	31	C	M	PACs agent	Graduate	Makes and receives calls; texts; gets images and similar content uploaded on phone
Mahesh Kumar	28	C	M	Rents out thresher and tractor to farmers	Metric pass	Makes and receives calls; reads texts

**Table 21: Profiles of qualitative study respondents in Hallegare (India)**

Name	Age	SEC	Sex	Occupation	Education	Use of phones
Chaluaraja. H. S	D	M	35	Farmer	12th grade	Using mobile phone since 10 years; mostly used for making and receiving calls
Shankeregowda	C	M	36	Middleman since 10 years;	8th grade	Owens 2 mobile

				deals with rice mill owners and farmers		phones; has been using mobile phones since the past 8-9 years; listens to uploaded songs apart from making and receiving calls
Raju	D	M	32	Daily wage labourer on fields; also trying to get the job of a driver or peon in a government office	College dropout	Uses phone mostly for making and receiving calls; can read but does not text
G.Jayaramu	D	M	40 years	Farmer	Uneducated	Making and receiving calls; used ringtones after mistaken activation; songs uploaded from local mobile shop
Manju	D	M	27 years	Farmer- owns 1 acre land	Studied till 2 <sup>nd</sup> grade	Uses phones mostly for making and receiving calls; other functions such as torch and radio are also used occasionally; some of them have songs uploaded onto their phones and like listening to loud music
Nagaraju	D	M	32 years	Farmer- owns 3 acres of land	Primary education	
Lingaraju	D	M	42 years	Farmer	Studied till SSC	
H.D. Kumar	D	M	38	Farmer	Studied till 3rd grade	
Rama Gowda	D	M	40 years	Farmer	Studied till 1st grade	
Gowda	D	M	42	Farmer- owns 2 acres, 1 acre on lease	Studied till 6th grade	

**Table 22: Profiles of qualitative study respondents in Dambulla (Sri Lanka)**

Name	Age	SEC	Sex	Occupation	Education	Use of phones
M.G. Nimal Premadasa	45	C	M	Agricultural landlord; also involved in procuring agriculture input material and sells crops to wholesalers	2nd standard	Making and receiving calls
Kamal Priyantha	36	D	M	Farmer; also runs petty shop with wife	Advanced level (agricultural sciences)	Calls; occasionally texts
Namal Vasantha Kumara	30	E	M	Landless labourer; works on multiple fields	Studied up to 9th standard	Calls; subscribes to astrology updates
H.G. Somasiri	42 Years	D	M	Farmer; Member of Farmer's Association		Making and receiving calls; some of them subscribe to Dialog market information service
Jayantha Abeysinghe	37 Years	D	M	Farmer; president of farmers' association		
Sumanapala	44 Years	D	M	Farmer		
D.G. Kumarasinghe	39 Years	D	M	Farmer		
H.G. Danapala	41 Years	D	M	Farmer		
M.G. Nandasena	42 Years	D	M	Farmer; secretary of farmers' association		

**Table 23: Profiles of qualitative study respondents in Lom Kao (Thailand)**

Name	Age	SEC	Sex	Occupation	Education	Use of phones
Wicharan	44	C-	M	Farmer: Rice	Elementary School	Call in and Out, Send SMS
Sarayut	30	C-	M	Farmer; Middleman during tamarind seasons	Bachelor Degree	Calls in and out, texts, uses mobile as modem to connect to internet over his computer
Sukanya	29	D	F	Farmer, Farming Corn and Bean	Bachelor degree	Call in and Out, Send SMS from time to time
Adisak	36	C-	M	Farmer: Rice and Corn	Grade 12	Call in and Out, Send SMS, News Checking via SMS, watching TV on mobile phone, some subscribe to weather updates
Charong	33	C-	M	Farmer: Rice, Corn and Chilli and Cooperative	Grade 12	
Boonsong	43	C-	M	Farmer: Corn and Member of the Cooperative	Grade 12	
Yodsaphon	33	C-	M	Farmer: Rice, Corn and Bean Member of the Cooperative	Grade 9	
Narunan		C-	M	Farmer: rice and corn		
Sanong	35	D	M	Farmer: Rice and Corn. Member of the Cooperative	Grade 6	

## ANNEX 3: SOURCES OF INFORMATION AND ADVICE

Tables 19 to 24 outline the top-three sources of the top-three information needs in each stage of the crop cycle. Table 25 outlines the main sources for farmers when they solicit outside advice when making farming related decisions.

Table 26 lists the main information sources for the micro-enterprise sample.

**Table 24: Farmers' three most used sources for the top-three information needs during the decision stage**

		Self knowledge	Family/ Friends	Other farmers	Govt. ext. worker	Input supplier	Trader/ collector/ buyer	Mass-media
BD	Higher yield crops	30.9%		44.3%		29.9%		
	Market prices		30.2%	82.5%	19.0%			
	Finance	61.1%	13.0%	25.9%				
IN	Higher yield crops	73.2%	57.0%	64.8%				
	Crop diseases	70.6%	53.2%	63.5%				
	Water	81.2%	55.6%	53.0%				
LK	Weather	65.8%		34.2%				32.9%
	Higher yield crops	71.4%		52.9%		54.3%		
	Crop diseases	64.5%		62.9%	58.1%			
TH	Market prices	70.8%	35.4%					
	Inputs	75.6%	44.4%				20.0%	
	Water	85.7%	28.6%	9.5%			31.3%	

**Table 25: Extent of farmers' utilization of a source for their information needs during decision stage**

	BD	IN	LK	TH
Self-knowledge	19.0%	31.8%	29.1%	46.6%
Family / Friends	14.7%	22.1%	9.2%	22.5%
Other farmers	36.7%	23.5%	21.3%	9.5%
Farmer orgs/ Coops.	0.3%	5.0%	10.0%	5.2%
NGOs/ SHGs	0.1%	0.9%	2.4%	0.3%
Govt. ext. worker	12.3%	2.6%	12.3%	0.7%
Input supplier	9.3%	3.3%	1.6%	2.4%
Trader/collector/ buyer	2.4%	4.5%	4.4%	8.6%
Govt. Institution	2.6%	1.6%	2.0%	0.7%
Mass media	2.7%	2.9%	7.7%	3.1%
Pvt. Service (paid)	0.0%	1.5%	0.0%	0.3%
Pvt. Service (free)	0.0%	0.3%	0.0%	0.0%

*Note: The top-three sources have been highlighted*

**Table 26: Farmers' three most used sources for the top-three information needs during the seeding stage**

		Self knowledge	Family/ Friends	Other farmers	NGOs/ SHGs	Govt. ext. worker	Input supplier	Trader/ collector/ buyer
BD	Seed varieties			56.0%		26.2%	23.8%	
	Best farming practices	28.9%		51.8%		28.9%		
	Finance	65.4%		19.2%		11.5%		
	Farm machinery	38.5%	15.4%	48.1%				
IN	Best farming practices	76.6%	51.9%	64.3%				
	How to grow a crop	78.3%	50.0%	56.5%				
	Seed varieties	75.0%	49.3%	62.5%				
LK	Seed varieties	78.3%		51.8%	69.9%			
	Best farming practices	81.7%		56.3%	84.5%			
	Water availability	90.7%	37.0%	33.3%				
TH	How to grow a crop	70.8%	35.4%					20.8%
	Water availability	83.8%	35.1%	16.2%				
	Govt. schemes	85.7%	65.7%	25.7%				

**Table 27: Extent of farmers' utilization of a source for their information needs during seeding stage**

	BD	IN	LK	TH
Self-knowledge	23.2%	32.4%	32.7%	47.5%
Family/ Friends	11.8%	21.8%	12.7%	24.5%
Other farmers	34.3%	23.1%	17.1%	10.5%
Farmer orgs/ Coops.	0.2%	5.9%	2.2%	3.9%
NGOs/ SHGs	0.1%	0.9%	20.6%	0.6%
Govt. ext. worker	14.4%	3.3%	6.5%	0.9%
Input supplier	10.6%	3.8%	3.2%	2.1%
Trader/collector/ buyer	0.7%	3.7%	3.0%	6.7%
Govt. Institution	2.5%	1.6%	1.0%	0.7%
Mass media	2.1%	2.0%	0.7%	2.1%
Pvt. Service (paid)	0.0%	1.3%	0.4%	0.4%
Pvt. Service (free)	0.0%	0.4%	0.1%	0.2%

*Note: The top-three sources have been highlighted*

**Table 28: Farmers' three most used sources for the top-three information needs during the preparing & planting stage**

		Self knowledge	Family/ Friends	Other farmers	Farmer Orgs./ Coops	NGOs/ SHGs	Govt. ext. worker
BD	Best farming practices		55.7%		41.0%	62.3%	
	Farm machinery	33.3%		53.6%			14.5%
	Labor	51.6%	14.5%	46.8%			
IN	Farm machinery	79.7%	58.7%	51.7%			
	Best farming practices	65.4%	74.8%	21.5%			
	Water	78.6%	40.8%	45.6%			
LK	Farm machinery	94.5%	58.9%	67.1%			
	Weather	90.1%	31.0%	70.4%			
	Best farming practices		55.7%		41.0%	62.3%	
TH	Crop diseases	89.6%	62.5%	27.1%			
	Water	91.1%	44.4%	15.6%			
	Best farming practices	86.5%	24.3%	13.5%			

**Table 29: Extent of farmers' utilization of a source for their information needs during preparing and planting stage**

	BD	IN	LK	TH
Self-knowledge	20.8%	38.4%	31.9%	48.6%
Family/ Friends	8.4%	26.1%	14.7%	25.1%
Other farmers	54.2%	10.9%	21.1%	12.1%
Farmer orgs/ Coops.	0.0%	6.7%	5.0%	4.4%
NGOs/ SHGs	0.0%	1.2%	6.6%	0.0%
Govt. ext. worker	8.8%	4.0%	10.1%	0.4%
Input supplier	3.8%	2.9%	0.9%	0.8%
Trader/collector/ buyer	0.2%	3.8%	3.2%	3.1%
Govt. Institution	1.7%	1.9%	0.7%	0.6%
Mass media	1.9%	3.0%	5.4%	4.2%
Pvt. Service (paid)	0.0%	1.0%	0.5%	0.6%
Pvt. Service (free)	0.2%	0.0%	0.0%	0.0%

*Note: The top-three sources have been highlighted*

**Table 30: Farmers' three most used sources for the top-three information needs during the growing stage**

		Self knowledge	Family/ Friends	Other farmers	Govt. ext. worker	Input supplier
BD	Fertilizer	27.1%		51.0%		30.2%
	Pesticide/ herbicide	28.2%		33.8%		46.5%
	Crop diseases			40.8%	39.4%	36.6%
IN	Fertilizer	77.8%	46.8%	53.8%		
	Pesticide/ herbicide	73.0%	49.3%	61.2%		
	Crop diseases	79.0%	52.9%	57.2%		
LK	Crop diseases	79.0%	52.9%	57.2%		
	Fertilizer	77.3%		62.5%	55.7%	
	Pesticide/ herbicide	77.6%		67.1%	56.5%	
TH	Fertilizer	82.4%	45.9%	28.4%		
	Pesticide/ herbicide	84.5%	54.9%	23.9%		
	Crop diseases	90.5%	55.6%	27.0%		

**Table 31: Extent of farmers' utilization of a source for their information needs during growing stage**

	BD	IN	LK	TH
Self-knowledge	24.2%	30.3%	26.7%	42.7%
Family / Friends	12.0%	19.9%	10.2%	25.0%
Other farmers	30.0%	22.4%	20.8%	13.3%
Farmer orgs/ Coops.	0.0%	6.8%	5.0%	3.2%
NGOs/ SHGs	0.6%	1.0%	2.8%	0.8%
Govt. ext. worker	15.2%	3.8%	18.0%	0.5%
Input supplier	12.6%	5.3%	6.3%	5.7%
Trader/collector/ buyer	0.1%	4.0%	2.2%	6.5%
Govt. Institution	1.9%	1.6%	1.9%	0.6%
Mass media	3.3%	3.1%	1.5%	1.8%
Pvt. Service (paid)	0.1%	1.6%	4.1%	0.0%
Pvt. Service (free)	0.0%	0.1%	0.4%	0.0%

*Note: The top-three sources have been highlighted*

**Table 32: Farmers' three most used sources for the top-three information needs during the harvesting, packing & storing stage**

		Self knowledge	Family/ Friends	Other farmers	Trader/ collector/ buyer
BD	Future market prices		18.8%	63.5%	27.1%
	Market prices	28.2%	25.6%	64.1%	
	Other market prices	27.7%	29.2%	64.6%	
IN	Buyer, collector & trader	86.1%	61.1%	66.7%	
	Future market prices	85.8%	61.3%	63.2%	
	Labor	84.6%	54.8%	61.5%	
LK	Market prices	75.9%		68.4%	50.6%
	Buyer, collector & trader	72.5%		79.7%	42.0%
	Future market prices	52.9%		61.8%	55.9%
	Packing material	94.0%	29.9%	73.1%	29.9%
TH	Buyer, collector & trader	82.1%	44.6%		66.1%
	Market prices	83.3%	31.0%		66.7%
	Future market prices	67.7%	41.9%	32.3%	
	Transportation	87.1%	41.9%	29.0%	29.0%

**Table 33: Extent of farmers' utilization of a source for their needs during harvesting, packing and storing stage**

	BD	IN	LK	TH
Self-knowledge	29.1%	32.8%	26.9%	41.0%
Family / Friends	13.1%	22.6%	13.1%	20.5%
Other farmers	37.2%	24.6%	22.9%	9.8%
Farmer orgs/ Coops.	0.0%	4.4%	4.9%	3.4%
NGOs/ SHGs	0.0%	0.8%	2.0%	0.4%
Govt. ext. worker	1.8%	2.3%	4.9%	0.8%
Input supplier	1.7%	1.8%	2.9%	0.8%
Trader/collector/ buyer	11.9%	6.0%	11.1%	19.1%
Govt. Institution	1.2%	1.5%	3.1%	1.0%
Mass media	4.1%	2.3%	7.7%	3.2%
Pvt. Service (paid)	0.0%	0.9%	0.5%	0.0%
Pvt. Service (free)	0.0%	0.0%	0.1%	0.0%

*Note: The top-three sources have been highlighted*

**Table 34: Farmers' three most used sources for the top-three information needs during the selling stage**

		Self knowledge	Family/ Friends	Other farmers	Trader/ collector/ buyer
BD	Market prices		25.5%	68.4%	27.6%
	Other market prices	27.6%	29.9%	62.1%	
	Buyer, collector & trader	32.9%		47.9%	35.6%
IN	Other market prices	72.7%	60.1%	67.1%	
	Buyer, collector & trader	79.4%	54.0%	67.5%	
	Market prices	80.7%	58.5%	68.9%	
LK	Buyer, collector & trader	73.1%		71.0%	62.4%
	Market prices	78.4%		69.3%	63.6%
	Transportation	85.7%	42.9%	58.7%	
TH	Market prices	77.0%	42.6%		50.8%
	Buyer, collector & trader	70.2%	38.3%		72.3%
	Transportation	81.1%	45.9%		35.1%

**Table 35: Extent of farmers' utilization of a source for their information needs during selling stage**

	BD	IN	LK	TH
Self-knowledge	26.0%	31.2%	24.9%	39.1%
Family / Friends	15.3%	22.4%	12.6%	21.0%
Other farmers	38.9%	24.4%	21.3%	10.3%
Farmer orgs/ Coops.	0.0%	5.6%	3.8%	2.1%
NGOs/ SHGs	0.2%	1.0%	2.2%	1.1%
Govt. ext. worker	0.6%	2.5%	3.3%	0.0%
Input supplier	0.9%	1.7%	1.1%	2.1%
Trader/collector/ buyer	14.5%	7.3%	15.9%	21.8%
Govt. Institution	0.5%	1.2%	4.5%	0.4%
Mass media	3.1%	2.0%	9.9%	2.1%
Pvt. Service (paid)	0.0%	0.7%	0.3%	0.0%
Pvt. Service (free)	0.0%	0.0%	0.2%	0.0%

*Note: The top-three sources have been highlighted*

**Table 36: Top-three sources of advice for farmers when making decisions in a stage**

		Decision	Seeding	Preparing & Planting	Growing	Harvesting, packing & storing	Selling
<b>BD</b>	Family/ Friends	63.3%	53.2%	62.0%	54.4%	59.5%	61.2%
	Other farmers	94.4%	81.8%	90.1%	91.1%	85.1%	89.6%
	Govt. extension workers	44.4%	36.4%	38.0%	40.5%		
	Traders/ collectors/ buyers					16.2%	20.9%
<b>IN</b>	Family/ Friends	89.7%	91.9%	94.3%	90.7%	92.8%	91.4%
	Other farmers	89.0%	91.1%	92.7%	90.7%	87.2%	90.6%
	Farmer organizations/ Coops	34.6%	33.1%	34.1%	36.4%	32.0%	
	Traders/ collectors/ buyers						33.6%
<b>LK</b>	Family/ Friends	92.6%	88.9%	80.0%	82.1%	86.2%	39.1%
	Other farmers	55.6%	55.6%	43.3%	48.7%	44.8%	95.7%
	NGOs/ SHGs	33.3%	48.1%	40.0%	38.5%		26.1%
	Govt. extension workers	33.3%					
	Traders/ collectors/ buyers					31.0%	26.1%
<b>TH</b>	Family/ Friends	83.3%	89.7%	86.2%	79.2%	85.0%	73.3%
	Other farmers			20.7%	25.0%	17.5%	
	Farmer organizations/ Coops	25.0%	20.7%	20.7%	20.8%		16.7%
	Input suppliers		10.3%				
	Traders/ collectors/ buyers	20.8%				30.0%	36.7%

**Table 37: Top-three sources for the information needs of agricultural micro-enterprises**

	Bangladesh	India	Sri Lanka	Thailand
<b>1<sup>st</sup></b>	Traders/ collectors/ buyers (36.7%)	Self-knowledge (36%)	Self-knowledge (36.6%)	Self-knowledge (35.1%)
<b>2<sup>nd</sup></b>	Self- knowledge (21.6%)	Family/ Friends (23.4%)	Mass media (14.0%)	Traders/ collectors/ buyers (22.8%)
<b>3<sup>rd</sup></b>	Family/ friends (21.1%)	Traders/ collectors/ buyers (13.0%)	Family/ friends (13.8%)	Family/ friends (20.7%)

## ANNEX 4: MODES OF COMMUNICATION

**Table 38: Mode of communication of farmers with information sources**

		Decision	Seeding	Preparing & Planting	Growing	Harvesting, packing & storing	Selling
BD	Face to face	74.4%	79.3%	73.2%	80.1%	77.1%	75.0%
	Through computer	1.0%	0.0%	0.0%	0.4%	0.5%	0.0%
	By calling through a phone	23.3%	18.5%	24.6%	18.7%	22.4%	24.1%
	By sending an SMS	0.3%	2.3%	0.9%	0.8%	0.0%	0.9%
	Through internet facility on mobile phone	1.0%	0.0%	0.4%	0.0%	0.0%	0.0%
	Through other people (indirect)	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%
IN	Face to face	69.1%	67.1%	66.0%	65.8%	66.5%	65.7%
	Through computer	0.6%	0.6%	0.5%	0.4%	0.3%	0.4%
	By calling through a phone	21.4%	22.4%	23.4%	23.7%	23.2%	24.1%
	By sending an SMS	0.1%	2.3%	1.7%	1.7%	0.8%	1.1%
	Through internet facility on mobile phone	0.4%	0.9%	1.0%	2.1%	1.1%	1.9%
	Through other people (indirect)	8.3%	6.7%	7.5%	6.3%	8.0%	6.8%
LK	Face to face	62.8%	82.2%	83.1%	85.5%	63.8%	64.2%
	Through computer	1.0%	0.5%	0.6%	0.0%	0.4%	0.0%
	By calling through a phone	27.5%	13.0%	11.2%	14.5%	20.2%	24.0%
	By sending an SMS	0.0%	1.6%	0.0%	0.0%	0.0%	0.0%
	Through internet facility on mobile phone	0.0%	0.0%	0.0%	0.0%	1.0%	0.3%
	Through other people (indirect)	8.7%	2.7%	5.1%	0.0%	14.8%	11.5%
TH	Face to face	67.8%	68.6%	68.6%	68.9%	63.5%	66.7%
	Through computer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	By calling through a phone	27.1%	27.3%	24.5%	24.8%	29.0%	27.7%
	By sending an SMS	3.0%	2.1%	4.4%	4.9%	4.0%	2.3%
	Through internet facility on mobile phone	1.0%	1.5%	1.9%	1.0%	2.0%	2.8%
	Through other people (indirect)	1.0%	0.5%	0.6%	0.5%	1.5%	0.5%

Note: The top two modes have been highlighted

**Table 39: Mode of communication of agricultural micro-enterprises with information sources**

	BD	IN	LK	TH
Face to face	58.3%	60.9%	48.4%	52.5%
Through a computer	0.0%	0.3%	0.7%	0.3%
By calling through a mobile phone / Land line	37.1%	28.4%	32.4%	31.2%
By sending an SMS/ Text	3.6%	2.6%	2.1%	9.2%
Through internet facility on mobile phone	0.0%	1.9%	0.0%	0.0%
Through other people (indirect)	1.1%	4.8%	16.3%	3.1%
Other: Newspaper	0.0%	0.5%	0.0%	2.4%
Other: TV	0.0%	0.6%	0.0%	1.4%

Note: top two modes have been highlighted

## ANNEX 5: WHAT RESPONDENTS USE PHONES FOR

**Table 40: What farmer phone owners use their phones for**

	BD	IN	LK	TH
Making phone calls	100.0%	100.0%	100.0%	100.0%
Receiving phone calls	100.0%	98.1%	100.0%	98.9%
Sending or receiving missed calls	58.9%	67.6%	69.2%	33.3%
Sending or receiving SMS	8.9%	10.2%	13.8%	21.8%
Sending or receiving MMS	.0%	1.9%	3.1%	1.1%
Taking photos or video clips	7.1%	2.8%	4.6%	9.2%
To play games	10.7%	12.0%	4.6%	4.6%
To listen to the radio	5.4%	6.5%	4.6%	13.8%
To listen to music files (not radio)	7.1%	7.4%	1.5%	9.2%
To share content that you have created	.0%	.0%	.0%	1.1%
As an organizer	.0%	.0%	1.5%	5.7%
To check bill or credit balance	3.6%	7.4%	6.2%	.0%
Sending or receiving talk-time or load	3.6%	3.7%	.0%	2.3%

*Note: The three most utilized phone functions are highlighted*

**Table 41: What agricultural micro-enterprise phone owners use their phone for**

	BD	IN	LK	TH
Making phone calls	100.0%	98.0%	98.8%	99.0%
Receiving phone calls	97.5%	94.0%	98.8%	96.9%
Sending/receiving missed calls	60.8%	60.0%	43.9%	29.9%
Sending/receiving SMS	2.5%	6.0%	11.0%	8.2%
Sending/receiving MMS	1.3%	2.0%	2.4%	1.0%
Sending/receiving emails	.0%	.0%	2.4%	.0%
Taking photos/video clips	7.6%	2.0%	8.5%	10.3%
To play games	13.9%	7.0%	7.3%	8.2%
To listen to the radio	10.1%	7.0%	18.3%	15.5%
To listen to music files (not radio)	16.5%	9.0%	6.1%	15.5%
To share content created	3.8%	2.0%	.0%	1.0%
To share other content	2.5%	2.0%	1.2%	1.0%
As an organizer	.0%	2.0%	4.9%	19.6%
To check bill / credit balance	2.5%	9.0%	.0%	10.3%
Sending/receiving talk-time/load	2.5%	5.0%	.0%	7.2%
To access Facebook	.0%	1.0%	1.2%	.0%

*Note: The three most utilized phone functions are highlighted*

## ANNEX 6: PERCEIVED BENEFITS OF PHONES

**Table 42: Perceived benefits of phone access amongst farmers**

	BD	IN	LK	TH
Contact others in an emergency	94%	77%	80%	90%
Maintain relationships with family and friends	88%	71%	71%	88%
Carry out day to day work efficiently	57%	59%	60%	81%
Maintain or enhance social status/ recognition in the community	45%	61%	31%	58%
Reduce travel costs	81%	72%	76%	81%
Make more money	33%	54%	39%	61%
Save money	81%	58%	29%	40%
Access accurate and timely market price information that you use to improve the price you can get for your crops	48%	54%	47%	74%
Access crop advisory services that allow you produce higher quality crops or reduce losses	37%	48%	47%	67%
Access information on sources and costs of inputs	52%	51%	38%	63%
Access finance in general	22%	39%	32%	56%
Access to finance for your farming activities	29%	44%	31%	61%
Access to government services that aid your farming activities	22%	44%	29%	61%
Access to crop insurance	10%	42%	14%	58%
Plan and make decisions relating to your livelihood	47%	53%	46%	65%
Improve your knowledge and skills related to crops/ seeds/ fertilizers etc.	48%	58%	37%	57%
Improve trust in relationships with business contacts	52%	58%	56%	63%
Coordinate with business contacts	58%	55%	54%	67%
Maintain/improve relationships with traders/ agents/ suppliers of inputs	54%	57%	49%	62%
Ability to access a wider set of business contacts	40%	53%	49%	70%
Ability to protect yourself from price volatilities in inputs	46%	46%	38%	57%
Ability to protect yourself from price volatilities in outputs	51%	49%	35%	58%

*Note: The top-three perceived benefits in each country have been highlighted*

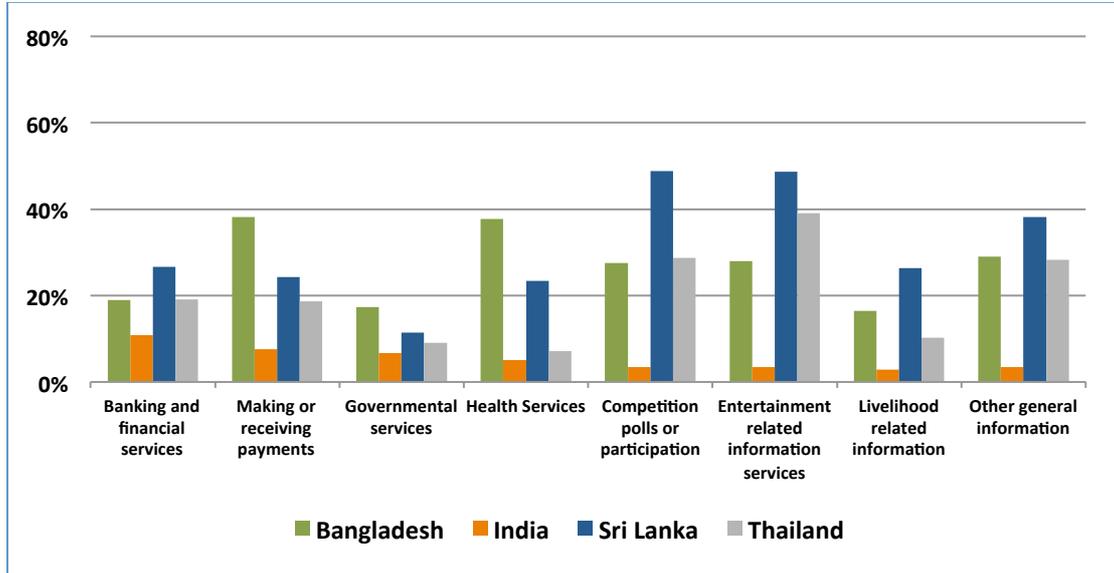
**Table 43: Perceived benefits of phone access amongst agricultural micro-enterprises**

	BD	IN	LK	TH
Contact others in an emergency	91%	71%	83%	92%
Maintain relationships with family and friends	93%	67%	75%	83%
Carry out day to day work efficiently	51%	56%	68%	77%
Maintain/ enhance social status/ recognition in the community	30%	50%	42%	66%
Reduce travel costs	92%	59%	80%	87%
Make more money	39%	56%	44%	68%
Save money	72%	52%	36%	46%
Maintain/improve relationships with traders/ agents/ suppliers of inputs	58%	62%	57%	72%
Improve trust in relationships with business contacts	63%	62%	58%	76%
Coordinate with business contacts	66%	55%	56%	79%
Access a wider set of business contacts	49%	58%	59%	76%
Access to information on sources and costs of inputs	63%	58%	53%	75%
Improve your knowledge and skills related to running a business	49%	54%	45%	75%
Plan and make decisions related to business	54%	56%	42%	71%
Access to finance sources for business	34%	51%	31%	52%
Access to government services/ schemes that aid business	9%	47%	29%	49%
Access finance in general	23%	48%	28%	62%
Access to accurate and timely market price information	35%	41%	20%	51%
Protect yourself from price volatilities in inputs	50%	44%	29%	67%
Protect yourself from price volatilities in outputs	38%	48%	37%	73%

*Note: The top-three perceived benefits in each country have been emphasized*

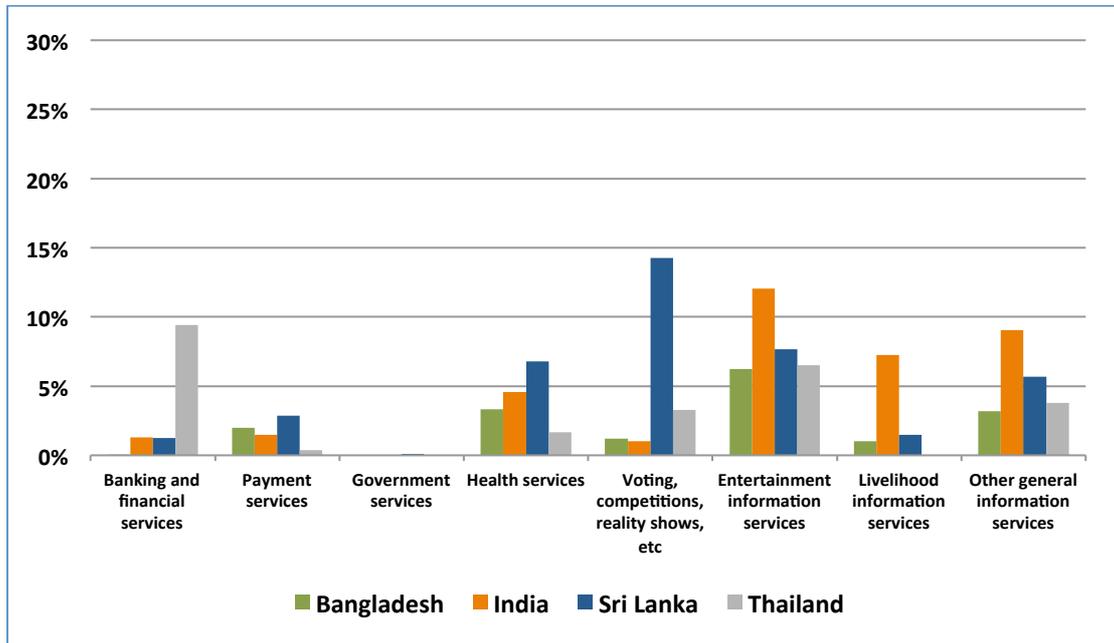
## ANNEX 7: BOP AWARENESS AND USE OF MTV SERVICES

Figure 5: Awareness of MTV services that can be accessed through phone or computers (% of BOP teleusers)



Source: Telease@BOP4: Nationally representative survey of BOP teleusers, June 2011

Figure 6: MTV service usage through phone or computer (% BOP aware of services)



Source: Telease@BOP4: Nationally representative survey of BOP teleusers, June 2011