Articles

Understanding Information needs and media habits of poor farmers in Bangladesh

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The relationship between information and communication technologies (ICTs) and poverty remains unclear. The result is likely to remain such if focus is not given to the understanding of needs of the poorer community whose problems ICT interventions are supposed to solve. The present study is an attempt in that direction and it does so by trying to understand the media habit of poor farmers in Bangladesh. The study covered seven major agricultural sectors across 15 districts (out of 64) of Bangladesh. It is hoped that the detailed sector disaggregated findings of the study can be used in better designing of interventions to leverage ICTs, which can address key constraints in different agricultural value chains within Bangladesh.

Background

One of the constraints faced by farmers in developing countries is the lack of access to timely and accurate information. The government Agricultural Extension Service (AES), in spite of being the highly reliable and frequently availed upon source of agriculture information, is not always adequate to serve the large number of farmers effectively (Poole, 1994). As such, many organizations and individuals have come to see information and communications

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technologies (ICTs) as potentially powerful tools for achieving sustainable development through timely delivery of such services (Paz, Russell, & Johnson, 2006); the central idea being that individuals, Small and Medium Enterprises (SMEs) and farmers, would obtain information via ICT channels that could help them make better decisions. In most cases development projects or governments have responded by promoting the availability of more computers, introducing tele-centers, widening the telecommunications network, and hastening the growth of Internet service providers (ISPs) (Warschauer, 2002).

While ICT definitely can be a successful tool in ensuring proper dissemination of agricultural information, it is a fallacy to assume ICT as a priori solutions to societal and economic problems, giving rise to terms like "technophilia" and "cyber-fetishism", which seem to be rampant in popular discourse (Mclver, 2003). Providing information via telecommunication/ internet is not a very difficult task but the major challenge is the transformation of data into meaningful knowledge and the availability of the social resources to do so (Avgerou, 2003; Gigler, 2004).

Therefore while ICTs can be an innovative tool for development, the critical focus should be on the needs and requirements of the community and not the technology itself. Unfortunately emphasis has often been placed on the means (ICTs) rather than on the ends (access to timely and accurate information for the community or rural population). Focus should be on how ICTs can help achieve community's social, economic, cultural, or political goals (Gurstein, 2000) and the critical problems they pose for developers of information systems (Leigh & Loader, 2001;McIver, 2003).

The present paper discusses the findings of a study conducted in the rural areas of Bangladesh, on the media habits of poor farmers. The study covered farmers engaged in seven major rural value chains, and provides sector-wise disaggregated information. The detailed findings from the study will significantly assist in the future undertaking of more informed decisions on the part of private sector and public sector enterprises, who wish to engage the rural economy through ICT products and services.

Literature review

An overwhelming majority of government ICT projects have failed in the past because they fail to take in to account what kind of information rural entrepreneurs need and how they seek it (McIver & Elmagarmid, 2002). Thus Warschauer (2002) and Gurstein (2003) stated that the focus should not simply be on access to information but rather on meaningful access (Gurstein uses the term "effective use") to ICTs. Furthermore what has often been overlooked in the traditional ICT debate is that there has been another information revolution especially in the South, this refers to the other ICTs of radio, television and the press (Deane et al, 2003). Hence many NGOs are currently arguing for attention to be paid to these traditional ICTs.

Unfortunately traditional media is seldom viewed as a key player in private sector development, which may require specific attention and support (Anderson & Hitchins, 2007). There has been significant media liberalization across many developing countries in the last fifteen years and government media monopolies are increasingly being replaced by diverse media industries (Anderson et al, 2007). Around three billion people in the world earn less

than three dollars a day and in Bangladesh it is around 77% (World Bank, 2015). Thus access to information through the internet may be difficult to obtain, but traditional media can provide the information, perspective and analysis that enable these people to make more informed decisions (Deane et al, 2003).

In Bangladesh, agriculture is one of the major driving forces of the economy. It provides employment to around 48% (World Bank, 2015) of the workforce and contributes 20% of the GDP, although this has declined from 30% in the 1980s. However it still constitutes perhaps the largest proportion of the poor, either as producers or laborers. Numerous constraints impinge on this sector and result in its underperformance, ranging from poor sourcing of quality inputs to lack of information regarding better farming practices, irrigation, crop care and market prices; and poor market linkages that result in reduced farm productivity (Mondal, 2009).

However these are symptomatic outcomes to underlying constraints, one of which is lack of access to timely and accurate information. The government AES is not adequate to serve the large number of farmers effectively. The estimated workforce of approximately 13,000 extension officers falls considerably short in being able to cater to 15 million[1] farm holdings. In addition to seeking agriculture information the rural farmers and SMEs also tend to look for various basic IT-enabled services (ITES). Given the situation it is possible to deploy information and communications technologies (ICTs) as potentially powerful tools for ensuring access to such critical information. However it is prudent to be aware of the aforesaid discussion on the pitfall of looking at ICTs as a kind of a panacea; the present study is an attempt to examine these issues. Before one plans to develop ICT based solutions for rural farming households in Bangladesh, it is important to actually look at the media habits of the poor and to contextualize the environment where an ICT-based solution can be deployed. Thus it is hoped that the findings of the study can be used in better designing interventions to leverage ICTs, which will address constraints in different agricultural value chains within Bangladesh. The following section discusses the objectives and the study methodology, with specific emphasis on the research design.

Research Methodology

Broadly the objective is to understand the media habits of the rural poor, focusing on key economic sectors. In order to achieve this broad objective, the following questions needed to be answered:

- What kind of information do farmers/SMEs need for business/ agriculture?
- How and where do they seek it now? (peers, government worker, input retailer, media, Community Information Centre (CIC Kiosk), etc.)
- Why do they use media? (entertainment, news, business information, voice, sharing experience of others)
- How do they use media for accessing business information?
- How do they raise their voice to policymakers and other stakeholders?

[1] http://www.moa.gov.bd/statistics/bag.htm

- How do they access and use different types of media? (Radio/TV/Print/internet)

The study covered seven rural sectors across 15 districts (out of 64) of Bangladesh. Sectors included maize, vegetables, fish, prawn, jute, potatoes, and rice. Most of these sectors are the major agricultural ones in Bangladesh. Sample size per sector was 100, with a total of 700 farmers. The study used a quantitative face to face farmer survey with structured questionnaires, which were administered via trained enumerators. The survey was conducted in the first two weeks of March, 2011. The location of the survey was based on production concentrations at district, sub-district and village levels.

In order to select poor farmers within a sector in a village, the progress out of poverty index (PPI)2 was used as a screening question. PPI uses ten verifiable indicators to get a score that is statistically correlated with the poverty status. The scorecard is based on data from the 10,080 households in the Household Income and Expenditure Survey (HIES 2005) conducted by the Bangladesh Bureau of Statistics (BBS). The PPI scorecard measures a particular household's "poverty likelihood", that is, the probability that the household has a per capita expenditure below a given poverty line (Chen and Schreiner, 2009); in this paper we will use the USD 2.5/day 2005 PPP (Purchasing Power Parity).

In defining who falls under the stipulated poverty line a threshold or cut-off PPI level was defined, so that households with PPI scores at or below the cut-off points are labeled poor—for program purposes—and thus were considered to be below the given poverty line (Chen & Schreiner, 2009; Katalyst, 2012b). For the present study a cutoff point of less or equal to PPI score of 49 was chosen, which gives a poverty likelihood of 92.7%[3]. The choice of the cutoff point was based on the various methodologies and suggestion (total net benefits method, total accuracy method, preset poverty rate etc.) made by Chen & Schreiner (2009) in their paper.

In total over 1400 respondents were contacted in order to reach a sample size of 700 with each sector having 100 respondents with a PPI score of equal or less than 49. Systematic random sampling technique was followed to locate and interview the target respondents (schematic diagram provided) In the following section we will discuss in detail the findings from the study.

Study findings

It is not surprising that the most sought information was relating to one's own area of economic activity. Thus 100% of the agricultural farmer respondents mentioned agriculture related information as the most sought information while it was aqua farming related information for the fish and prawn farmers. However, in general, news, education, entertainment and health were the most sought information by the target audience, mentioned by 90% to 76% of respondents in descending order. The following table gives a detailed

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2 CGAP, Grameen Foundation and the Ford Foundation endorse the use of rigorous poverty assessment tools and believe the Progress out of Poverty Index™ (PPI) is a highly effective tool for those institutions interested in measuring the likelihood of client poverty. Retrieved : http://progressoutofpoverty.org/understanding-the-progress-out-poverty-index

3 A farmer who has a PPI score of equal or less than 49 has a 92.7% likelihood of being below the USD 2.5/day 2005 PPP poverty

breakdown of the major source of agricultural information for the selected agricultural sectors.

Table 1: Major source of agricultural information (%)

Source	Rice	Potato	Vegetable	Maize	Jute
TV	62.00	60.82	52.00	49.49	46.00
Agriculture Office/ Agriculture Officer/ Block Supervisor	59.00	34.02	40.00	55.56	73.00
Peer Group (friends/ relatives/ neighbours)	51.00	51.55	51.00	35.35	54.00
Agro-Input's detail/ wholesale traders	50.00	55.67	50.00	51.52	12.00
Lead farmer	23.00	31.96	32.00	13.13	34.00

TV appears to be the main source of most sought information, followed by respective service providers and peer groups. It is interesting to note that in the case of jute farmers little reliance is placed on input dealers or wholesalers but there is a disproportionately higher reliance on extension officers. In the case of fish and prawn farming (Table 2) the main source still remains TV, however greater emphasis falls on peer groups than others.

Table 2: Major source of aqua farming information (%)

Source	Fish	Prawn
TV	61.00	51.00
Peer Group (friends/ relatives/ neighbours)	39.00	61.00
Fisheries Office/ Fisheries Officer	52.00	47.00
Lead farmer	34.00	53.00
Agro-Input's detail/ wholesale traders	12.00	19.00

It is interesting to note that radio does not come into this list; this is likely to change with increasing penetration of smartphone based FM radio apps and proliferation of community radios. Another reason for low radio listening could be poor quality programs and the lack of adequate radio stations (Bangladesh Betar, the state run station, is the only one authorized to operate nationally).

For agriculture farming most of the information (Table 3) that involved high yielding crops , technology, seed, fertilizer pesticide, irrigation, etc. were rated as important almost universally. While for aqua farmers (Table 4) the pattern was the same, rating fish/prawn cultivation related information such as farming techniques, information on high yielding varieties, weather forecasts, fish/prawn care etc. as important by most; percentage figures ranging between 84% to 100%. However both aqua and agricultural farmers did not rate packaging and transportation as of high importance; this might be due to their lack of knowledge regarding the significance of packaging. In the farming sectors, for technical

information relevant service providers (agricultural offices, etc.) appeared to be the major source of the aforesaid information, followed by TV. For weather forecasts it was found to be TV, for seeds, pesticides and fertilizer it's the wholesaler, and for crop care, irrigation, market information and access to finance it's the peer group and lead farmer. The following tables give detailed sectoral level disaggregated data.

Table 3: Major source of different agro information (%)

Medium	Information	**Rice**	**Potato**	**Vegetable**	**Maize**	**Jute**
TV	Weather forecast	80.00	54.00	42.00	54.00	81.00
	Cultivation techniques	38.00	33.00	22.00	21.00	9.00
	Information on high yielding crop / species	13.00	30.00	26.00	24.00	4.00
Agriculture Officer/ Block Supervisor	Soil condition	41.00	28.00	17.00	37.00	54.00
	Information on high yielding crop / species	39.00	17.00	29.00	34.00	55.00
	Crop care	6.00	9.00	15.00	35.00	40.00
	Cultivation techniques	11.00	10.00	12.00	38.00	32.00
	Information on quality, affordable Seed	9.00	15.00	8.00	42.00	26.00
Agro-Input's detail/ wholesale traders	Pesticide usage	70.00	67.00	79.00	58.00	52.00
	Fertilizer usage	57.00	55.00	72.00	50.00	44.00
	Information on quality, affordable Seed	46.00	39.00	38.00	19.00	53.00
	Information on high yielding crop / species	18.00	32.00	23.00	22.00	17.00
Associates (friends/ relatives/ neighbours)	Market access (e.g. price information)	74.00	35.00	41.00	29.00	26.00
	Access to finance /financial issues	60.00	35.00	18.00	21.00	38.00
	Crop care	59.00	25.00	41.00	21.00	13.00
	Transportation	72.00	12.00	22.00	21.00	11.00
	Irrigation methods	51.00	8.00	20.00	24.00	15.00
Don't get any information	Packaging techniques (crate, basket)	70.00	48.00	62.00	58.00	47.00
	Transportation	25.00	59.00	60.00	51.00	40.00
	Irrigation methods	19.00	33.00	38.00	36.00	29.00
	Access to finance /financial issues	7.00	30.00	60.00	27.00	19.00
	Soil condition	22.00	23.00	40.00	25.00	27.00

As mentioned before, TV is mostly used for weather forecasts, but it is interesting to note that a substantial number of respondents also got information on cultivation techniques from the same source. There is also a difference between the behavior of rice farmers and others. It seems rice farmers depend on their associates far more than others do. Most farmers do not seem to receive information on packaging techniques and that is probably the reason why farmers did not rate packaging and transportation as of high importance. Other media such as radio, newspaper, mobile phone or tele-centers were almost never used for gathering such information; although around 68% of the respondent had access to a mobile phone. In the following table we look at the response of the fish and prawn farmers. TV still remains the major source of information regarding weather. From the table it becomes obvious that unlike

homogeneity in behavior among different agricultural sectors, the behavior of the fish and the prawn farmers are in some respect significantly different.

Table 4: Major source of different aqua culture information (%)

Medium	Information	**Fish**	**Prawn**
TV	Weather forecast	61.00	85.00
	Aqua farming techniques	31.00	18.00
	Information on high yielding fish/prawn	34.00	11.00
Fisheries office/ Fisheries Officer/ Block Supervisor	Soil condition	22.00	44.00
	Aqua farming techniques	31.00	30.00
	Information on high yielding fish	28.00	30.00
	Fish care	21.00	22.00
	Fertilizer usage	19.00	19.00
NGO	Access to finance /financial issues	20.00	9.00
Retail trader of agriculture input/ Large trader	Pesticide usage	23.00	38.00
	Fertilizer usage	14.00	34.00
Associates (friends/ relatives/ neighbours)	Access to finance /financial issues	39.00	67.00
	Market access (price info, where to sell etc)	21.00	33.00
	Fish care	29.00	22.00
	Information on quality, affordable fry	20.00	30.00
	Transportation	2.00	40.00
Lead fish farmer/ Wholesaler	Market access (price info, where to sell etc)	70.00	50.00
	Information on quality, affordable fry	42.00	47.00
	Transportation	32.00	19.00
	Information on high yielding fish	13.00	29.00
Don't get any information	Packaging techniques (crate, basket)	83.00	48.00
	Irrigation methods	74.00	46.00
	Transportation	63.00	37.00
	Soil condition	59.00	12.00
	Pesticide usage	43.00	19.00
	Fertilizer usage	42.00	13.00
	Access to finance /financial issues	27.00	16.00
	Weather forecast	28.00	6.00

Quite a few fish farmers seem to get information on aqua farming technique from TV but this is not the case for prawn farmers. Both in the case of prawn and fish farmers, it is the associates and peer groups who provide most information on access to finance and not necessarily the NGOs. Transportation is critical for both fish and prawn farmers, however in the case of prawns it seems associates and peer groups are sufficient in providing relevant information. This is clearly reflected in the fact that only about 37% of the prawn farmer respondents suggested that they did not get information on transportation whereas for fish this stands at 63%. In line with the agricultural farmers we see that the fish and prawn

farmers also believe that they receive very little information on packaging techniques. So there is a significant gap in information pertaining to the area of packaging.

Across the sectors TV was mentioned as the most common media as a source of awareness, mentioned by 74% of the target audience. Nearly 50% watch TV 5-7 days and 32% watch 1 to 4 days a week. As a whole, most people (41%) watch TV at a market place, followed by home (27%), and 15% watch at a neighbor's house. However, females mainly watch at home (45%) and at a neighbor's house (29%). In regards to viewing time, 7 pm to 10 pm is the most popular time slot of watching TV. The peak is reached at 8 pm -9 pm when 72% of the target audience have reported as watching TV, followed by 7pm -8 pm and 9pm -10 pm with around 50% each. There is very little heterogeneity in regards to TV viewership across the selected 8 sectors. While both males and females watch TV more during the hours of 7:00 pm to 10:00 pm, a significant portion (88%) of females also watch TV between 3:00 pm and 6:00 pm, when males watch less (38%).

A few also mentioned radio (9%) as the common media source of awareness for such information, however around 14% of the respondent mentioned that they do listen to radio. newspapers (6%) were also mentioned as a common media source of awareness after TV and radio even though newspapers are read by about 28% of the target respondents, most of whom read at least once a week. The main place of reading newspapers is the market place, read by 23% out of the 28% i.e. roughly 82% of the sample population that reads newspaper. Only about 7% of the target audience as a whole reported to have received agriculture related information from newspapers. This might explain why so few cited newspapers as a major source of information. From this it becomes evident that both radio and newspaper have the potential to be used as a vehicle for providing agriculture related information. In the case of newspapers however lack of literacy might also be a hindrance. However, when lead farmers were interviewed it was found that usage of radio as a source of farming information was 3% while for newspaper it was 17%. It seems in the case of lead farmers because of their higher income, radio was substituted for by TV which was rated by 98% as the major source of such information. Obviously the lead farmers were also found to be more literate and as such 70% of the lead farmers were found to read newspapers. Thus with higher incomes TV and newspaper become the major media platform for sources of information.

Among the TV channels BTV was the most mentioned channel (52%), of whom 31% mentioned Mati O Manush[4] and 13% mentioned Krishi Diba Nishi while 56% did not remember the program. This was followed by Channel I (6%), with the program mentioned being Hridoye Maati O Manush (49%), and 51% did not remember the program name. Around 63% of those who were aware of media that covered issues concerning agriculture/ farming claimed to have shared information received from the media with others. The incidence of sharing information, among those who are aware, was highest among fish farmers (72%) and lowest among potato farmers (49%).

The farmers when they receive any information with respect to farming or marketing of agricultural products from any media, on average mostly shared with 4-6 persons and some even claimed to have shared with more than 10 persons. However, on average information was shared with 5-6 persons. This figure was higher for lead farmers, who on average shared

[4] Mati O manush, KrishiDiba Nishi and HridoyeMaati O Manush are TV programs which exclusively deal with farming issues and in some cases other rural nonfarm activities. BTV (govt. owned) and Channel I (privately owned) are local TV channels.

information with 6.33 persons. Farmers mostly shared the information with neighbors and other farmers (66% each), and around 25% also shared with family members. There seems to be very little difference in media behavior and preference across the different sectors.

With regards to voice and advocacy (Table 5) the farmers take up issues that affect their activities mostly with their peer groups, input retailers and relevant government offices/ officials. Consulting with lead farmers is also common.

Table 5: Raising voice by the farmers (%)

Informants	Rice	Potato	Vegetable	Maize	Jute	Fish	Prawn
Peer group (Friends/relatives/ neighbours)	55.00	57.00	42.00	43.00	56.00	54.00	74.00
Input retailer/trader	56.00	82.00	77.00	66.00	47.00	22.00	33.00
Agriculture or Fisheries office/ officer/block supervisor	55.00	39.00	46.00	57.00	77.00	58.00	54.00
Large aqua/agro farmer /Party leader	25.00	38.00	47.00	15.00	53.00	68.00	62.00

Only 18% of the respondents were found to be aware of the Internet, and 0.13% reported using this service. They all used it at a cybercafé, 3-4 times a week. Potato and Prawn farmers were most aware about internet services (28%). Mobile phone penetration appears to be quite high (68%). Prawn farmers use it most (94%), while vegetable (35%) and maize (39%) farmers use it the least. The following section discusses the possible implication and opportunities that can be drawn from the aforesaid findings.

Summary

Primary findings indicate that the rural poor need information specific to their respective crops cultivated/areas of activities. Types of information sought are mostly technical in nature, concerning farm practices/activities across sectors. The study also shows that farmers use various sources in gathering information. While they might use some form of triangulation in validating the information that they receive in most cases there is significant preference or bias towards a particular source for a particular type of information. For instance TV is found to be the major source of weather related information followed by cultivation techniques. However in the case of maize and jute, farmers rely more on Agricultural extension officers when it comes to cultivation techniques. For information which is more technical in nature such as soil condition and Information on high yielding crop / species, extension officers are most relied upon followed by agro input dealers. Extension officers are also the major source of crop care related information for maize and jute farmers but for the more traditional crops like rice and vegetable, associates and neighbors provides the most information. Associates and neighbors are also the major source of information when it comes to market access.

Agro input dealers/retailers seem to be the most important and reliable source of agro farming information. For inputs like pesticide and fertilizer they are the most important sources of

information but they are also relied upon when it comes to information on seed as well as crop care. Additionally one has to remember that while TV was mentioned to be the major source of information, it is in the market place or in agro retail stores that the farmers watched TV most. Similar patterns were observed in the case of fish and prawn farmers, only that they relied on lead farmers for information on quality, affordable fingerlings rather than input retailers as was the case for seed. An interesting anecdote is that when farmers were asked to recall the names of the agro-program they saw on TV, many of them could not recall it; the underlying reason for that was that it was usually the retailer who had control of the TV's remote and most of the time, the audience, i.e. the farmers who came to see the program saw it after the opening credits and titles were shown.

It is surprising to note that most farmers, in both agro and aqua farming (slightly less in prawn), did not receive sufficient information from any source on packaging techniques (crate, basket) and transportation. On the other hand they received adequate information on their soil conditions, which is rather technical information. The following figure shows the information flow connecting major members of the agricultural sectors; the dotted line implies limited connectivity.

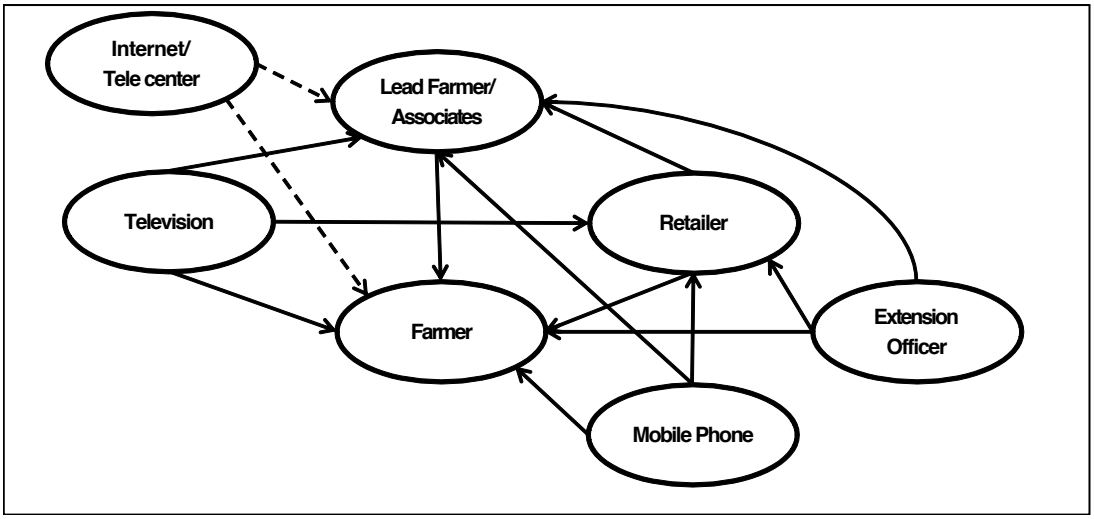

Figure 1: Farmer's information network

Notwithstanding the complex interconnectedness, it becomes quite evident that retailer or input sellers along with the lead farmers are the most important source of farming related information for a farmer. Most of the other sources are in some form connected to these critical players. Additionally survey suggests that input sellers and lead farmers are considered to be credible sources for farmers. Source credibility is a crucial factor since farmers are justifiably risk averse and thus the mere presence or access to information does not necessarily translate into action unless it comes from a credible source.

Information seeking can be viewed as a process of sense-making where the person is trying to develop their point of view which fits in with what he or she already knows (Dervin, 1983; Kuhlthau, 1991). Therefore it is crucial that the ICT solutions are embedded within the context of pre-existing information sources and are consistent with it. People seek

information within a context. Thus solutions have to be designed with the consideration as to how the result integrates with the user's own life; effectiveness of information retrieval depends on this consideration (James, 1983; Bates, 1986a). Social context and social situation are essential to the understanding of information seeking (Bates, 2010). One can thus understand why tele-center focused interventions solely based on providing access to farming information, with no understanding of wider social context, almost always fail (McIver & Elmagarmid 2002).

We can look at the mode of information seeking (Bates, 1986b and 2002) as a function of "Directed vs Undirected" and "Active vs Passive". "Directed" and "Undirected" refer, respectively, to whether an individual seeks specific information, or he/she is more or less randomly exposing themselves to information. While "Active" and "Passive" refer, respectively, to whether the individual does anything actively to acquire information, or is passively absorbing.

Table 6 : Mode of information seeking

	Active	**Passive**
Directed	***Searching***	***Monitoring***
Undirected	***Browsing***	***Being Aware***

Conclusions

The objective of this paper was to provide a clear understanding of the media habits of poor farmers in Bangladesh. Based on the above, it may be concluded that among the mass media, TV plays the most important role, especially due to its wide coverage in disseminating agro based information. Primarily information on weather, high yielding varieties and cultivating techniques are sought after in this media. Most farmers watch TV in the market place, near and around the shops of input sellers. The role of radio, newspapers, mobile phones and Internet are either limited or nil. However, mobile phones due to their high penetration can potentially be an important vehicle, if services can be designed and disseminated appropriately. Furthermore with the penetration of economical smartphones, it might be possible to promote radio program as well (Community or FM radio based programs). The Internet or tele-centers can also play an important role if promoted more intensively--targeting lead farmers, focusing on trust building and third party endorsement to ensure source credibility. Additionally such centers have to provide services above and beyond agricultural related information in order to be sustainable from a business point of view.

Relevant government and input sellers, peer groups and lead farmers play a vital role in this regard. Information specific to their respective crops cultivated/areas of activities are mostly sought from these sources. The type of information demanded is mostly technical in nature, concerning farm practices/activities across sectors. However, packaging and transportation were not given high priority by any sector although neither did they receive any information

on this topic from any of their current sources. Hence there seems to be scope to further strengthen these agents.

From a media business perspective, the fact that a significant population holds them with such high value shows much promise. As Chomsky has argued, what media basically sells is audience, hence it should follow from this, that media should target the rural population who are such high in numbers as one of their core target groups. This would help media get more sponsorship from companies who are also targeting the same clients and at the same time address the information need of the rural population.

Recommendations

Farmers may not find the tele-centers as a credible source of agro information unless endorsed by other lead farmers or retailers or even extension officers, who are considered to be more credible. However getting buy-in from retailers or input sellers on endorsing such tele-centers might be difficult as it may directly impinge upon their domain as a monopoly source for such information. This implies that agro-tele-centers ought to be self-sustaining business unit and have to offer other value added services beyond agricultural information in order to make them business viable, at least for the time period during which they build their credibility as a source of agricultural information. However fundamentally third party endorsement (local input sellers or extension officers) is a must to ensure farmers and others integrate ICT as one of the source of such information. Mass awareness, especially above the line (ATL) advertisement, though necessary, may not be a sustainable way to attract farmers to such centers. Farmers' courtyard meetings, probably including lead farmers, might be organized to promote such tele-centers. Lead farmers also might be more receptive to such technology as survey shows that they have higher awareness regarding internet than others.

Retailers or input dealers can be better trained to provide farming related information to farmers. Most input (pesticide, fertilizer, seed etc.) companies already hold retailers training programs regularly as part of their marketing strategy. These are usually half day programs held in a sub district town (there are 500 sub districts in the country) with participants of around 30-50 retailers. The training programs are product specific and as such are primarily used to launch a new product of the company and to enhance company loyalty on the part of the input sellers. It is possible to improve such training programs to include more general topics like cultivation techniques, judicious use of fertilizers and pesticides, disease recognition etc. These are likely to make such programs more interesting for the attending input sellers and thus for the company. Additionally as a credible source such input sellers may provide this information to farmers as an embedded service thus improving their own customer loyalty. Also it might be useful to promote mobile phone based agricultural 'helpline' service directly to these input sellers. While in theory a farmer can easily access such service if he or she possesses a mobile phone, it is more likely that if the input seller endorses such service he or she will be more willing to do so.

Television surprisingly seems to be a more significant source of farming information rather than radio. This is rather surprising since all over the world the trend is rather the opposite. In Bangladesh, radio seems to be a more or less nonexistent source of information. In the case of Television, it is basically the national BTV and privately owned Channel I, which is the most viewed. However, in the case of TV, farmers virtually draw all their information from one

particular program, namely Maati O Manush (BTV) or HridoyeMaati O Manush (Channel I). Further improvement of the program is a possibility, particularly promoting issues related to packaging and the importance of post-harvest loss. Survey results show that an overwhelming majority of farmers and lead farmers do not get any information on packaging and the importance of post-harvest loss. Therefore it is not surprising that farmers do not rate packaging related information as of significant value. An assessment conducted by Katalyst and GMark showed that the average post-harvest wastage rate in the vegetable sector is 20-30%, with the loss being borne by both the poor rural farmers and producers, as well as the end consumers (Katalyst, 2011; Katalyst 2012a). In the case of potato postharvest loss, this was found to be 15.50% including farm level storage loss (Hossain & Miah, 2009). Therefore raising awareness in this arena is crucial and such popular agricultural programs might be an appropriate vehicle.

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