Understanding the Needs of Pakistani Farmers and the Prospects of an ICT Intervention

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Abstract

This paper describes initial efforts in the form of a user research phase as part of a larger project to provide ICT based interventions to farmers in Pakistan to facilitate information dissemination. We conducted face to face interviews with 9 Pakistani farmers and 3 agricultural experts. Our main results show that mobile technology is present but under utilised, a strong peer reliance network exists and most information and media modalities are inaccessible. We relate the results obtained to design implications and future work.

Author Keywords

ICT4D; D4D; Agriculture

ACM Classification Keywords

H.1.2 [User/Machine Systems]: Human Information Processing.

Introduction

In this paper we report on the initial user research conducted as part of a larger collaborative research project focusing on a user-centered perspective on design interventions for farmers in Pakistan between IT University (ITU) Punjab, Lahore, Pakistan and the University of Western Sydney, Australia. Approximately 27% of Pakistan (where the case study is being

conducted) is currently under cultivation and of that area 80% is crop irrigated [1]. This means Pakistan has one of the highest proportion of crop irrigation cropped area in the world; with agriculture contributing more than 20% towards the nations GDP, according to the most recent survey produced by the Ministry of Finance, Government of Pakistan [10]. Therefore it is of utmost importance to understand the need and potential of ICT based interventions as an information disseminating mechanism for agriculture in Pakistan.

Literature [6] strongly endorses the value of communication technology as a mechanism to improve the well being and prosperity of the rural working classes of developing countries. Communication technologies (such as Avaaj Otalo from India [15]) can improve information dissemination in agricultural communities of the developing world, where there is a significant lack of access to reliable information, limited infrastructure, and the time constraints of farmers mean that agroinformation dissemination is deficient. It is generally acknowledged [5] that farmers seek agricultural information but do not know where to look for it at a given instance. They often ask fellow farmers in a wordofmouth fashion. By their very nature, ICT and design interventions can provide information access at the most opportune time (i.e. when needed). In other developing countries various facets of ICT and design technology are already being utilised to improve the livelihood/efficiency of farmers. These include mobile technology [14] (touch enabled apps, voice enabled apps, messaging), online and interactive portals, message boards and forums, media based platforms [8] (social media, television), etc. Mobile technology is already being implemented by several developing countries (India, Nigeria [4], Kenya [12], etc) in order to setup an agroadvisory service that can provide information about

weather, market prices, policies, government schemes, etc. A thorough review of ICT interventions in agriculture within developing countries can be found in [2, 7].

Relatively, in Pakistan the spread of mobile and ICT technology has been slower especially in the rural areas [3], namely due to issues of accessibility, lack of infrastructure, poor well being, illiteracy, technology inhibitions, etc. This has caught the attention of the governments of Pakistan in recent years and some policy interventions have been initiated to facilitate the inculcation of ICT in Agriculture [11]. Other local research teams within the country have begun [16] to investigate the value of propagating technology in farmers lives to support their sustenance and produce however the farmer per se has been more or less uninvolved in the process (i.e. questionnaires were used without taking into account the relative literacy requirements of farmers). Therefore, currently it is hard to determine the roadblocks, challenges and general hindrances towards technology acceptance from both an external and internal perspective on behalf of the Pakistani farmer.

In order to understand the information needs of farmers in Pakistan and possibilities of technological and design interventions and ensuing modalities in rural Pakistan, we conducted a two fold user research process. Semi-structured face to face interviews were conducted with nine farmers in rural Lahore along side three interviews with agricultural experts in Punjab. The main purpose of the user research phase was to determine information needs of farmers and to explore the possibility of communication technologies as a medium to transport this information. In conclusion, the results from the user research cycle are translated into design guidelines for the next steps of our user-centered methodology. Our

methodology is akin to other works in the area (such as from Sri Lanka [5]) where an action research paradigm is initiated with a user research phase prior to designing information systems to support information dissemination for farmers.

User Research

The semi-structured interviews aimed to primarily determine the prospects of information dissemination in agricultural regions of Pakistan being improved through communication technologies. Other sub-aspects that we wished to ascertain were firstly, what information requirements do Pakistani farmers have within their current agricultural processes, mechanisms and habits. Secondly where and how do Pakistani farmers get their information currently, the issues encountered therewith and the amount of trust they have in the received information. Lastly we aimed to find, what information dissemination mechanisms and ICT tools are in place and/or within the knowledge of the Pakistani farmers.

Participants and Procedure
Nine farmers were voluntarily interviewed individually in the outskirts of Lahore (city in the north eastern region of the Punjab province and close to the borders of India), in the field where the farmers would be the most comfortable. The farmers were involved in a variety of crop production (wheat, rice, fruit and vegetables). Four of the farmers were illiterate (with no reading or writing ability). The farmers were invited through proxies at IT University Lahore (ITU) (employees at ITU invited farmers from their local village to participate). We did not believe this would bias the information attained as we were not evaluating any product per se, if anything because of the sustained trust we believed the farmers would be much more open and willing to discuss their

issues with us. Whenever possible it was ensured the proxy was present during the interview. The interviews were conducted by research staff from ITU in the local language that was most accessible to the farmers (Urdu or Punjabi). All interviews were video recorded. The interview data was then translated to English and shared amongst the team in both Australia and Pakistan.

Concurrently, interviews with respect to finding out information regarding Pakistani farmers were conducted with three agricultural experts in Lahore. They included two governmental officials and one academic. The agricultural experts were invited for interviews through the local network. Interviews were conducted in English by research staff from ITU (one facilitator and one observer). The entire sessions were video recorded and notes were transcribed by an observer.

Consent was attained prior to any participation from either farmer or expert. Ethics clearances to conduct this research was attained from the University of Western Sydney.

Results

We first individually discuss the summary of the results from the two phases of the interview (farmers and agricultural experts). Thereafter, we compare and contrast the results attained and present design implications.

Summary of Feedback from Farmers
We now summarise the main trends from the feedback attained by the farmers:
Mobile Phone Usage: All farmers claimed to own a mobile phone. However four of the nine farmers claimed to use the mobile infrequently (only a few times in a week). Only one participant claimed to use the mobile phone every

day. The most common purpose was to make calls to connect with their family members.

Information Seeking Behaviour: All participants agreed there had been no attempts made by outsiders to improve local agriculture (neither government nor extension workers). Therefore all farmers commented that they would seek information primarily from retailers or solve the problem themselves. Six farmers were quoted to seek advice from peers. The quality of the advice given by peers and retailers has mixed opinions. Six farmers agreed that the retail advice was good (although the distance to the stores was found to be a limiting factor for five farmers), two farmers found the quality of the retail advice poor. One participant who thought the advice was good, also said at times they can be abused by the retailers where *sometimes shopkeeper give[s] fake spray which spoils crop[s]* (Participant 3). A number of factors were mentioned related to which the farmers would seek information. Determining operational details for Pests/Insecticides was easily the most significant (all but two farmers). The participants mostly thought information sourcing was time consuming (six farmers), while a few thought it was not (three farmers). Of these few that did not think it was time consuming this was because they did not seek advice beyond their own selfconsultation. Out of the nine participants eight wanted further assistance with only one not wanting further resources.

Usage of ICT/media to Seek Information: Six participants stated a preference to absorb information via visual means (video), only two participants mentioned audio as their tool of choice. One participant did not have a clear preference. Kisan TV is an agricultural educational program broadcast on local television in Pakistan, but it was not being watched by the farmers (83% do not watch the program). This, as a participant noted, is because

they had *No time for watching Kisan TV* (Participant 3) or because they *Have no access to this channel* (Participant 6). Four farmers commented that they had Internet access but mostly used this to connect with friends in a limited fashion. Only 1 participant from the four used Internet regularly. Accessibility was an issue as most farmers commented that Internet was not available in their fields but only in villages nearby.

Summary of Feedback from Agricultural Experts
The summary of the feedback attained from the 3 agricultural experts is presented below:

Mobile Phone Usage by Farmers: The experts commented that most farmers are aware of someone who owns a smart phone and it was typical to have at least one smart phone in their direct family. The experts pointed towards the Punjab Agriculture Helpline to which the farmer could call and gain assistance towards an enquiry, however more efforts were required to increase uptake and retention.

Information Seeking Behaviour of Farmers: All three experts acknowledged that the farmers would have a wide network of social contacts to whom they would contact for information. These included not only peers but also retailers and middlemen. Expert 3 commented that most illiterate farmers would have written information in brochures translated or read out by literate peers. It was thought that peers would have a lot of importance in the information making decision processes of the farmers. Expert 1 commented that a lot of farmers would copy the action of their peers (which crops to go for e.g.) when they saw that such actions were generating profit. This ties in with the comment of Expert 1 that farmers do not take risks and rely on conventional and traditional methods of information access. All experts commented that the primary category to which farmers would require information would be crop selection.

Usage of ICT/media to Seek Information by the Famers:
All experts agreed that a combination of audio and video was the most optimal information dissemination modality. The experts claimed that audio alone would not increase retention and could prove to be a hurdle given that most farmers were illiterate or semi-literate. The option of TV (Kisan TV and the like) was thought to be a dilemma as the accessibility of cable TV was not widely available to farmers in rural areas. Expert 2 considered the generation of information to not be an issue rather the issue was simply its dissemination.

Discussion
The results from our interviews have revealed that the mobile phone is being under utilised by Pakistani farmers. Its presence is gaining in numbers (more than other media) and its popularity in rural areas is increasing [17]. It is not of surprise that Smart phones are available for as low as $100. Therefore therein lies great potential for Pakistani farmers to be educated about the possibilities but also for designers to create underlying applications that can assist the farmers. A simple review of existing literature reveals a dearth of applications that leverage the accessibility of information for Pakistani farmers, especially in comparison to other developing countries. From the interviews it was clear that all farmers preferred minimum disruption to their daily activities. As a consequence mobile phones have greater potential than TV channels such as Kisan TV; allowing for seamless integration into their farming environment. The inadequacies and inefficiencies of agricultural information disseminated through cable TV in Pakistan has been documented [3]. Farmer interviews unanimously stated they get their information from retailers or work it out on their own, but 66% of participants also mentioned they get their information from their peers. This reliance on peer consultation can also promote communication of what does work. Digital green [8] is an example of a successful network that relies on peer to peer collaboration. Any prospective system must therefore involve the larger community. The slight distrust in information attained through retailers was an interesting result, showcasing that at times farmers are heavily dependent on liaising with agents and retailers. Similar results have been reported from research with farmers in Australia [9].

Conclusion and Future Work
Our results are a first step in determining the information needs and the information sourcing methods of Pakistani farmers. Similar results have been reported in other contexts such as in India [8] but although similarities may exist, both countries have different political, social and agricultural scenarios [13]. Therefore our results will enable us to better understand the environment of the Pakistani farmer. In conclusion, our results have indicated that based on our sample of farmers, in general we can expect farmers to be receptive to information dissemination through advanced communication technologies. As part of our future work we aim to incorporate our results in the form of design implications to create initial prototypes of a mobile information system which we aim to evaluate in a longitudinal fashion. Such longitudinal studies will also enable us to better understand the process of information flow in a farmer's family and their environment. Moreover, we aim to investigate which interaction modalities are the most optimal for a possibly uneducated target group, be those speech, touch/icon based or a combination thereof.

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