
Diffusion of Information Technology for Agricultural Development in the Rural Punjab: Challenges and Opportunities*

_____ Muhammad Zakria Zakar¹
_____ Rubeena Zakar²

Abstract

A majority of farmers in the Punjab is poor; their poverty emanates from their inability to get latest and timely information. Understandably, information-poverty leads to resource-deprivation and marginalization. As a result, many farmers are socially excluded and usually stick to the traditional and economically non-viable agricultural practices. On being socially and politically powerless, farmers lack competence and clout to effectively negotiate with various government institutions to get necessary services for their day-to-day life. The net result is that they are being exploited by various individuals and institutions (e.g. government employees, middle-men, etc.). In many situations, farmers are so powerless that their social rights are routinely violated.

Of late, various gadgets of modern information technology (e.g. mobile phones, CDs, DVDs, computers, internet, cable TVs, etc.) have qualitatively changed the Punjab's rural

* The authors gratefully acknowledge the financial support of Pakistan Agricultural Research Council (PARC) Islamabad for the completion of this research under ALP project.

¹ Professor of sociology in the Institute of Social and Cultural Studies, University of the Punjab, Lahore

² Doctoral Candidate, Department of Public Health Medicine, University of Bielefeld, Germany

information landscape. Popularization of information technology has opened up new opportunities for economic development and social change. Now, the question is: how could this new information environment be used to upgrade the level of information of farmers?

To address this challenge, an Information and Communication Center (ICC) was established in the district Sialkot on pilot basis. Characteristically, the ICC was a community-based and community-run voluntary institution meant to provide information to farmers by using various sources of modern information technology. The basic philosophy of the ICC was to expose and introduce the farmers to modern sources of information. Being located within the community, the ICC brought the latest information at the doorstep of the farmers. By getting innovative information, the farmers community initiated a powerful social discourse and dialogue to evaluate the applicability and relevance of the new information.

The functioning of the ICC demonstrated that the farmers were greatly receptive to innovative information, provided it was relevant to their local needs and available resources. It was also noted that diffusion of new information was deeply influencing farmers' social and occupational life. Based on the field experiences, this paper underlines the procedural and functional bottlenecks of ICC; and offers suggestions for its replication in other communities. At the end, the paper highlights the need of conducting further research to understand the information-seeking and information-verification behavior of the farmers.

Information in Rural Setup

Majority of Pakistani farmers is illiterate, socially excluded and poorly informed about the latest advancements in the field of agriculture (Zakar 2007). It is not that they are resisting technology; the fact is that new technology and necessary support systems were rarely provided to them. Their poverty led them to various disadvantaged situations which further undermined their ability to compete for scarce agricultural resources. Structurally, farmers face many vulnerable situations. They have poor access to various civic services like health care, education, portable water, sanitation, transportation and communication. Economically they are vulnerable to

exploitation of middleman to market their products. They lack skills, resources and technical know-how to store and process the products for value addition and proper marketing (Zakar 2007).

At social level, farmers lack competence and clout to negotiate with government officials for a variety of services which have direct bearing on the farm productivity. The net result of the farmers' plight is that agriculture seems to be a unviable economic activity. At the heart of such incapacitating situations is the lack of information about many things—their rights, legal entitlements, official procedures and so on. As a result, their time and precious resources are wasted or at least not optimally utilized. The quality of their life is generally very poor; this may be the cause and effect of their low income and low-key social status. Massive and persistent rural to urban migration may be another indicator of this reality.

With the globalization of trade, economy and agriculture, farming needs specialized and most cost efficient procedures. Now only well-informed farmers can select appropriate variety of seeds, fertilizers, pesticides and a range of other agricultural inputs. Again, farmers need updated knowledge for land preparation, inter-mixture of cropping, water management, harvesting and so many farm related activities. Farmers also need to know weather and market forecasting, consumers' behavior, storage techniques, processing, standardization, packing and safe transportation of products for value addition (especially for vegetables and fruits). In the rapidly changing local and global agriculture market and price mechanism, it is difficult for the traditional farmers to maintain their competitiveness, without using the advanced technology which is cost efficient and ensures high productivity. Again, for doing all things, one needs to be well-informed, well-connected with market.

New Information Environment

In 2001, in an effort to improve both governance and democracy, the Government of Pakistan introduced devolution plan replacing the old political system. "The fundamentals of the new local government system are devolution of political power, decentralization of administrative authority, and diffusion of the power-authority nexus, distribution of resources to the district

level and increase coordination between various public sector institutions to achieve development goals (CIET 2008).

The devolution reform is intended to improve access to public sector services through community mobilization and increased transparency. Here the most important thing is to achieve transparency through information sharing. Development experts argue that adequate flow of information between various public service departments is essential to achieve development goals. For example, when a farmer applies for credit to a financial institution, he needs some documents; hence he is dependent on some other public sector institutions. At local level, inter-agency collaboration is a must and institutionalized sharing of information between various departments is essential for the effective and speedy public sector service delivery system.

If one looks to the existing situation in Pakistan, things seemed to be at the stage of transition. Because of the huge influx of technology, the information environment is changing rapidly. Information creating and disseminating institutions are expanding rapidly and are getting equipped with the latest technology. There is a proliferation of mass media, capacity building institutions (public sector new universities, sub-campuses) private universities and colleges, fee-for-service ICT centers, expansion of market economy, private extension services, advocacy organizations, massive development of infrastructure especially means of transportation and communication. Cumulative effect of all these developments is the creation of new information environment. Many social scientists have pointed out that there is an urgent need to comprehensively understand the socioeconomic dynamics of the new situation. For example, Prabha et al. (2007:74) noted:

The current information environment is rich, characterized by a proliferation of information sources and providers, a multiplicity of methods for accessing information, and a redundancy of content from multiple sources. In this “overloaded” information environment, many information users tend to experience a sense of information inadequacy and anxiety. How do individuals navigate this complex landscape of information?

Proliferation of sources of information and communication is also conspicuous in Pakistan. Presently, more and more Government departments are introducing their web-site and computerizing their records (if they have not yet done, they will have to do it in the next three years). What are the dynamics of this rapidly changing information landscape? What quality of information they are going to upload on the web-sites. How farmers are getting benefits from this information?

However despite all the high talks about the popularization and universal access of information, the flow of information from public sector departments to ordinary farmers is very inadequate and in some situations non-existent. The most disturbing thing is that the agriculture extension professionals seemed relatively isolated at the district level in terms of receipt and transmission of information. As a result their roles remain largely confined to the distribution of information provided by Directorate of information, Agriculture Department. Further the public service provision institutions' role is largely confined to provide services to the politically influential big landholders. The challenge before the local government is to devise a system which could popularize the information in such a way that the ordinary farmer could have access to the information. If one closely observes the flow of information various public sector organizations and private welfare institutions, one is disappointed to note that there is no culture of sharing information.

Provision of one-way information without proper social discourse and dialogue creates a sense of "information overloaded and information inadequacy".

It is high time to develop an integrated information sharing system at the district level. Presently information sharing system is inadequate. The most important thing is that we should not "overload" the people with information (developing a web-site and putting lot of information on it is not difficult). What needs to be done is the information should be precise, understandable and relevant. Further, the information should be updated so that it could fit into the local agro-ecological needs. That is why some agriculture development experts have been underlying the

need of developing a “new extension science³”, which could artfully synthesize the multi-disciplinary agricultural knowledge into an easy-to-understand information package readily usable by the ordinary farmers.

Studies have demonstrated that many developing countries have utilized ICT in different ways and with varying degree of success. Understandably, the countries who have failed to properly exploit this resource fell behind in the international development competition. Now, the core question is: how can developing countries properly use ICT for getting benefit from the huge global stock of knowledge? It may be noted here that ICT only facilitates the acquisition of knowledge, but ICT itself cannot change the attitude and practices of the people. “Technology is not however packages that can be bought off from the shelf and become immediately productive: it is a cumulative process of learning (Hellberg and Bond 1996).

How could people tend to change their behaviors? Social behaviorists suggest that, for real change in the behavior, there is a need to create new institutional context which stimulates individual to adopt a new set of behaviors. For example, mass media, peer group, voluntary associations, interpersonal network of relations and other such institutions play a role in shaping people’s behavior patterns.

In the face of emerging information revolution, it seems essential that some new institutions are established or some alterations are made in the existing institutional structure. A caveat here: By establishing new institutions does not mean asking for creating new government departments (thus putting more burden on public exchequer or duplicating the existing services). By establishing new institutions means encouraging communities to organize themselves to create self-sustaining and people-centered institutions owned and run by the community. These institutions ought to have the capacity, credibility and

³ For detailed discussion about “New Extension Science” see “Farmers rationality and the adoption of environmentally sound practices; A critique of the assumptions of traditional agricultural extension” by F. Vanclay and G. Lawrence (1994) Published in the *Journal of Agriculture Education & Extension* Vol 1, issue 1 pages 59-90

inherent strength to integrate modern knowledge with the local knowledge. That is what China and Malaysia have successfully experienced during the last ten years.

The scientific also falsifies the commonly held belief that traditional people resist new technology and innovative information. Seemingly some traditional farmers failed to adopt new techniques. But it is not the problem of their inherent irrationality, but it is problem of their under-developed cognitive and logistical capacities human capabilities are impaired within the unjust and oppressive social system⁴. The most important thing is that the capabilities of the farmers should be developed so that they could successfully handle the complex situations arising out of applying the innovative technology in the traditional agriculture set up.

A deeper look at the resistant behavior shows that actually farmers are not resistant to new technology, but they are resistant to the technology which is difficult to handle because of their limited and deficit sources and capabilities.

Little consideration was given to farmers' points of view. The idea that resistance or reluctance to change might have some logical basis was never considered. Recent analysis reveals that most 'barriers' have rational basis and can be categorized as: conflicting information; implementation costs and capital outlay; intellectual outlay; loss of flexibility; complexity; and incompatibility with other aspects of farm management and farm and personal objectives. (Vanclay & Lawrence 1994).

Agriculture in Pakistan is at the crossroad. Farmers are facing multiple and formidable challenges ranging from acute water shortage to very high prices of agricultural inputs, low prices of produce, deteriorating environment and

Farmers are the principal managers of global usable lands and will shape the surface of the Earth in the coming decades.

⁴ See "Operationalising Amartya Sen's ideas on capabilities, development, freedom and human rights – the shifting policy focus of the human development approach" by Sakiko Fukuda-Parr (downloaded on June 2008 <http://www.revistadesarrollohumano.org/Biblioteca/0161.pdf>)

depletion of non-renewable agricultural resources. Concomitantly, population explosion and growing consumerism have created situation of acute food insecurity among the lower sections of the society (recent food-riots may be taken as evidence of this fact)⁵. In essence, given the present circumstances agriculture is going to be an economically non-viable activity. Pakistani agricultural development experts are facing tough time to suggest appropriate policy prescription for the multi-layered and intricate agricultural problems.

At the heart of agricultural crisis in Pakistan is the underdeveloped capabilities of farmers whose majority is illiterate and socially marginalized. Pakistani apex decision makers have yet to realize that farmers are the chief managers of our usable land and the destiny of our land is in their hands. Through their education, awareness and capacity building we can transform the impoverished and isolated hinterland to well-informed and participatory empowered rural communities. That is the only way to ensure sustainable agriculture in Pakistan. By illuminating the pivotal role of farmers in the preservation of environmental integrity and agricultural sustainability, Tilman et al. (2002) gave a note of warning:

Global food demand...poses huge challenges for the sustainability both of food production and aquatic ecosystems. Agriculturalists are the principal managers of global useable lands and will shape, perhaps irreversibly, the surface of the Earth in the coming decades. New incentives and policies for ensuring the sustainability of agriculture and ecosystem services will be crucial if we are to meet the demands of improving yields without compromising environmental integrity or public health (p.671).

The basic philosophy of ICC

The very concept of ICC was based on Amartya Sen's (1999) theory of "Development as freedom." Sen (1999) argued that information, no matter how small it may be, could have far

⁵ Though poor governance (e.g failure to check wheat smuggling) may also be a contributory factor in food shortage, but the plight of farmers remains a powerful factor in low productivity)

reaching implications on individuals' life and determines their chances of getting control over economic resources. Sen warned that denial of knowledge and information lead to undermine the development of capabilities. An individual with impaired capabilities, Sen believed, may not be able to compete for scarce economic and social resources.

This research proposed the establishment of Information and Communication Center (ICC) at community level to enhance the level of information of farmers through multiple sources. It was proposed that ICC would be a community driven and people owned institution. By design, this institution would retrieve information from the latest Information and Communication Technology (ICT) sources. It was planned that the under the umbrella of ICC, information will be shared and discussed by the representatives of various government departments, local experts, professionals, community leaders and influential people and ultimately transmitted to the common farmers. Hence ICC was an institution designed to initiate "social discourse and dialogue" on the applicability, relevance, economic viability of any innovative agriculture related information.

It may be noted here that ICC was not a parallel institution or duplication of already existing agricultural extension services. The main objective of this institution was to build the capacity of farmers by developing information seeking culture and exposing them to diverse sources of information including ICT. It was assumed that the ICC would have far reaching implications on the lives of farmers by establishing information seeking culture, and by exposing them to innovative and diverse sources of information.

Objectives

It may be noted here that these objective were set-out in 2000. For the last eight years the changes in the sphere of information are so fast and unpredictable that it is essential to constantly revise the theoretical assumptions and incorporate fresh perspective. However, an effort was made to work within the parameters of the stated objectives.

The main objectives of ICC were: 1) to enhance coordination and interaction between local public functionaries and farmers by exposing them to the latest information at ICC; 2) to retrieve

latest information about farming and related activities by using modern information technology and disseminate that information to farmers in a simple local language and concepts; and, 3) to bring attitudinal change among farmers and create information seeking culture and 'culture receptive of innovative technology' by widening their exposure and developing their social capital.

New Information Environment and Role of ICC

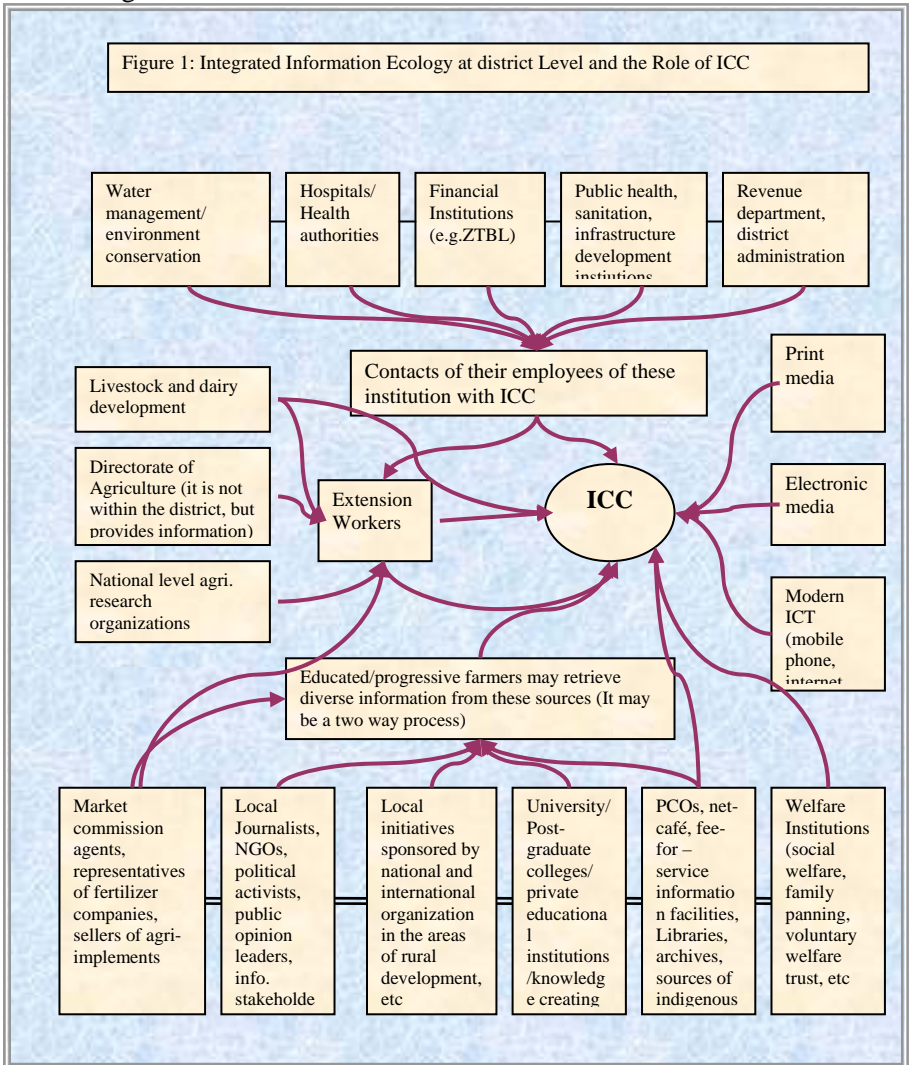
In 2001, in an effort to improve both governance and democracy, the Government of Pakistan introduced devolution plan replacing the old political system. The devolution reform is intended to improve access to public sector services through community mobilization and increased transparency. Here the most important thing is to achieve transparency through information sharing. Development experts argue that adequate flow of information between various public service departments is essential to achieve development goals. However, to date, District Government system has not yet developed a viable system of information sharing among various line departments.

If one looks at the existing situation in Pakistan, things seemed to be at the stage of transition. Because of the huge influx of technology, the information environment is changing rapidly. Information creating and disseminating institutions are fast expanding and are getting equipped with the latest technology. There is a proliferation of mass media, capacity building institutions (public sector new universities, sub-campuses, private universities and colleges), fee-for-service ICT centers, expansion of market economy, private extension services, advocacy organizations, massive development of infrastructure especially means of transportation and communication. Cumulative effect of all these developments is the creation of new information environment. But, sadly, there is no information management system at district level

Presently, more and more Government departments are introducing their web-sites and computerizing their records (if they have not yet done, they will have to do it in the next five years). The underlying objective is to popularize information and to create an environment where equal access to information is possible. But to date no institutional arrangements have been made to achieve this objective.

The result is despite all high talks about the popularization and universal access of information, the flow of information from public sector departments to ordinary farmers is very inadequate and in some situations non-existent. The most disturbing thing is that the agriculture extension professionals seemed relatively isolated at the district level in terms their connectivity with other departments which may have farmer-related information. As a result, the role of extension system remains largely confined to the distribution of information provided by the Directorate of Information, Agriculture Department. A brief review of the district level flow of information among various departments, it was noted that farmers' related information could not be circulated properly between various departments. As a result, farmers have to contact various departments to get a set of information necessary to take an important decision. It was visualized that ICC could play an effective role to integrate and expedite the flow of information by collecting necessary information from various departments and pool it at one place. For example, if the officials of revenue department, irrigation department, extension professionals, health workers and live-stock experts are invited at ICC to discuss a particular problem of farmers and demonstrate how they (officials) thought that problem could be solved. Such meetings are immensely beneficial and informative as the problem could be discussed from different dimensions. It may be noted that no single department can offer any solution to a particular problem; problems can always be solved by the synergic and collective action of various organizations and institutions. If one looks at the emerging institutional structures at the district level, one may find various government, semi government and non-government and local institutions creating knowledge (at last theoretically) and offering intervention to various problems faced by the common people. For example, for the prevention of Hepatitis-C local hospital, schools, public health and sanitation officials and many other departments could create awareness about the preventive measures. For this their coordination is essential and the key for successful coordination lies in the systematic and institutionalized information sharing. It is therefore necessary that all the information creating local institution should share information for the development of a

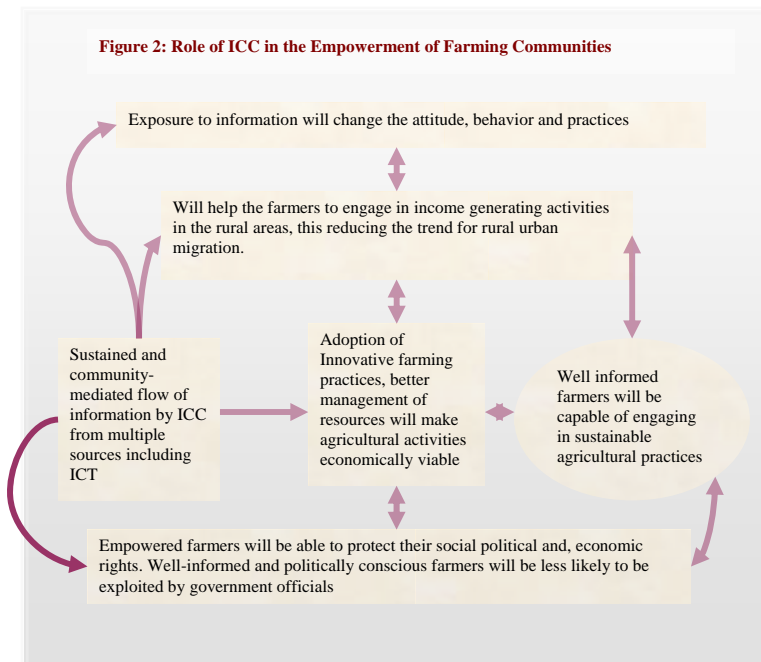
new “information society”. For schematic presentation of the idea see figure 1.



Structural and Functional parameters of ICC

The ICC was a community run and need driven institution. Characteristically, it was of the community, for the community and by the community. The ICC was in fact designed to mobilize and coordinate the existing community information resources to build the capacity of farmers as well as extension workers (Zakar

2007). The most important thing is that ICC was planned to develop information seeking cultures among farmers, village notable, low ranking local functionaries and extension workers. The ICC was meant to create information plurality at community level by connecting various sources (both human and technological) to initiate a discourse and dialogue on the innovative agriculture information and technologies. Presumably, it was expected that, by popularizing information, ICC would be instrumental to develop some ‘information equity’ at community level, which for many development experts is essential for overall empowerment of farmers. Decidedly, only empowered, well-informed and technological well aware farmers are capable of engaging in sustainable agricultural practices (for schematic presentation of the idea, see figure 2).



The Development of Idea in the last eight years

The idea of establishment of ICC was introduced by this project in 2000. At that time, it was innovative rather speculative

idea and many peers did not consider this institution practical and feasible for the existing Pakistani ground realities. However after the lapse of eight year, so many things have changed in Pakistan including its information environment. Of late, Pakistan has witnessed a boom of mobile phones, cable TV channels, availability of cheaper computers, CDs, and many other gadgets of IT. The use of such ICTs is no more restricted to urban centers; such things are increasingly getting common in the rural areas as well. Popularization of such technology led to create an information revolution. Hence there is an urgent need to manage and harness this information revolution for social and agriculture development.

After introduction of the idea of ICC by this project, many similar projects have been launched in Pakistan under different titles though the core objective was the same. This project legitimately claims the credit of being pioneer initiative in this field.

Establishment of ICC

As per plan, Information and Communication Centers (ICC) were established on pilot basis in the district Sialkot. No community development initiative could be successful if people are not properly mobilized to accept and own it. Hence, before establishing ICC, social mobilization process was initiated. This work was done by two professional community mobilizers who were familiar with the geography, agricultural ecology and social environment of the area⁶.

Social mobilizers established information coordination associations at village level. In order to sensitize people about the objectives of the ICC introductory meeting with village notables, farmers and other stakeholders were conducted. This exercise

ICC is a community-owned institution: It is of the people for the people and by the people.

1,2 This was the theoretical model originally presented in 2000. However, experienced gained from other projects like HEC funded project in the District Sheikhpura and another NGO sponsored initiate in the District Multan, the strategy was slightly altered.

helped in identification of the village groups, and village level information provision dynamics and information environment.

This exercise also sensitized the community about their information needs and proposed role of ICC. Once the information associations surfaced, their capacity building process was started. This objective was achieved by regular informal and formal training sessions with these associations. Keeping in view the bench mark information, the training package was prepared which included: i) Information of the Information; ii) Effective Communication Skills; iii) Institutional Management of information; and, iv) Coordination Skills.

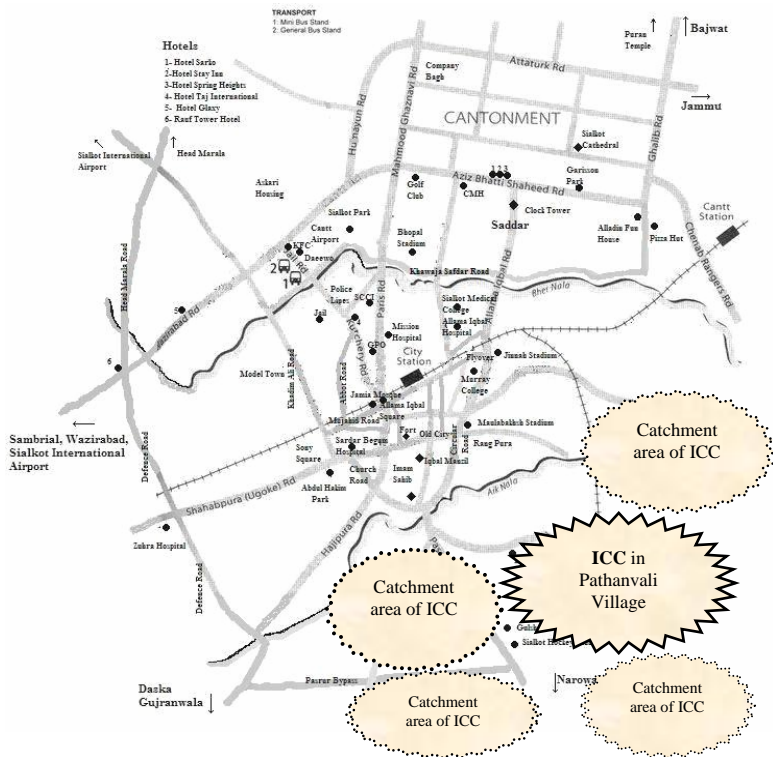
Establishment of Information Management Association⁷

After appropriate mobilization of community and formation of information coordination associations at village level, the next step was the formation of Information Management Association at village level. This institution was supposed to run the ICC as it had roots in the local population. The Information Management Association was also collaborated with the front line staff of all the line agencies in their respective areas. This association also ensured the participation of ethnic and religious minorities and other disadvantaged groups. The association consisted of elected members from all the village level Information Coordination Associations (ICA). An effort was made that at least one information coordination committee must be actively functional in the catchments area of ICC so that all the villages covered under the ICC should have regular contact with the institutions (see figure 3.). The tenure of ICA was four months⁸. After the completion of tenure the Management Associations were dissolved itself for re-election.

⁸ At the time of conceptualization of this project, the tenure was fixed for six months. However practical experiences gained in the district Shekhupura, it was decided to reduce the tenure from six to four months as for a longer period of time, and members lose their interest in the activities of the ICC.

It may be noted here that this was the structural scheme proposed at the time of submission of this project. An effort was made to implement this scheme in its true letter and spirit. However, practically there were many unforeseen problems especially in the formulation of information associations as well as in the smooth functioning of Information Management Association. The main problems were inter and intra-group rivalries, conflict of interest which sometimes halted the functioning of these associations.

Figure 3.:Map of Sialkot and its Suburbs



II. Functioning of ICC

After completing the process of community mobilization and the formation of information coordination associations and Information Management Association, full functioning of ICC started. For the smooth functioning of ICC, an effort was made to develop coordination among the line agencies and pool up the information which could be relevant to the need of the farmer. At the beginning, the focus of the ICC activities was to explore the local information resources (interpersonal, institutional, and technological) and, to the possible extent, bring those resources under the roof of ICC.

It may be noted here that the basic idea and objectives of ICC was very abstracted and it was difficult to quickly and lucidly tell the farmers what this ICC was all about. The most pragmatic way was to convey the idea by “doing things.” For example, one immediate and tangible function of ICC was to improved coordination between various public and private entities (e.g. veterinarian, public health experts, and extension workers) which could provide useful information to the farmers. While sitting in the ICC, these people talked about their work, their objectives, achievements and the usefulness of information they had. These discussions were immensely informative and interesting for the farmers as the things they talked about were practically relevant to their needs, concerns and problems.

Overall the establishment of ICC was an interesting experience. Being an innovative and new entity in rural set-up, initially the farmers were skeptical about the functioning and utility of ICC. Most of the farmers were inquisitive about the objectives of ICC. Usually, they were concerned about how could the ICC meet their pressing demands of getting subsidized agricultural inputs i.e. chemical fertilizers, pesticides, quality seed and cheap electricity for operating their tub-wells. However, it was clarified that this was not objective and mandate of this institution.

i) Community Response and activism

Initially, the farmers visited the ICC just to know what it was. However, with the passage of time, they started taking interest in the activities of ICC. They also kept on introducing

the ICC to their fellow villagers. Quite expectedly, young and the elderly people were the frequent visitors of the ICC. The young farmers visited the ICC because of their curiosity to know about this new institution. The elderly people had more spare time to sit, chat and smoke Hukka at the center. Overall, people belonging to almost all walks of life used to visit the ICC for seeking information and know about its functioning.

ii) Participation of Minorities

It was noted that members of minority and marginalized groups were somehow reluctant to actively participate in discussing and negotiating the information though some of them visited ICC, but they preferred to remain salient and back-benchers. The obvious reason for their reluctance and inactive participation was their low socio-economic status and caste-based stratification in our villages. For example, when any farmer laborer or kammi (artisan) tried to participate in the discussion, he was snubbed by the “choudhary” or some people laughed at his wisdom.

People belonging to different socioeconomic background perceived the role of ICC in different perspectives. Initially, poor and illiterate farmers showed indifference with the activities of ICC. Mostly, they were “silent-on-lookers” and were reluctant to participate actively. The discussion with these people revealed that they lacked capacity or resources to use any new information.

iii) Participants Expectations

The visitors of ICC expected to have every type of information of their interest. Sometimes, their endless queries for seeking explanations of diverse nature of issues could not be responded properly because of non-accessibility to the relevant information. For example, no satisfactory information could be given in the frequent incidence of morbidity and mortality of Buffalo, which is quite expensive and extremely important animal for the household economy. The ICC management repeatedly contacted the staff of district veterinary hospital but no satisfactory prevention or curative information was provided to the farmers.

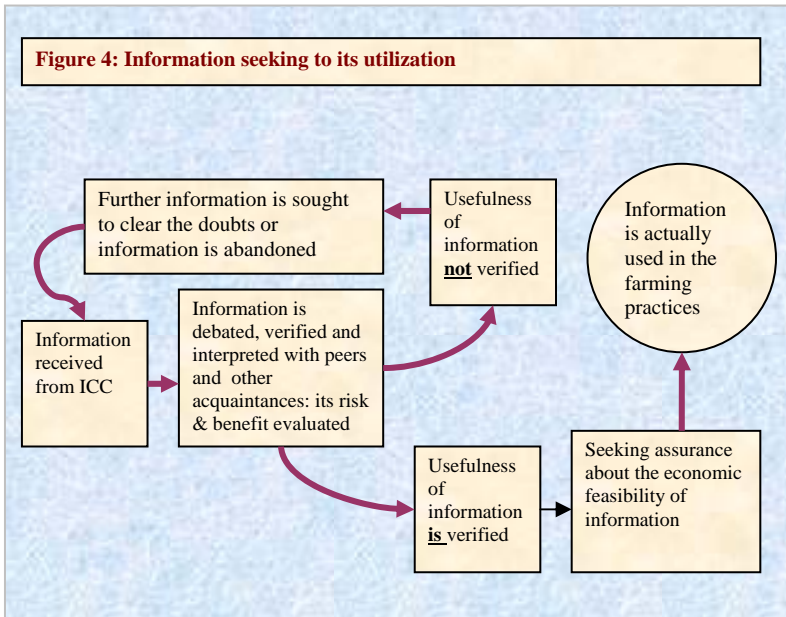
Many farmers developed various misconceptions about the functioning of ICC. Some believed that computers itself generated information and could respond to every question on its own. Some semi-literate farmers were simply technology shy, despite the fact that they could use it if they make little effort. For example, it is very easy to use simple calculator; it is inexpensive, user friendly and immensely facilitating for making day-to-day calculations. At ICC, literate farmers were encouraged and trained to use calculators and their response was encouraging.

iv) Retrieving and processing information at ICC

In Pakistan, information environment has substantially changed and, in the next five to ten years, more changes are in the offing. The multiplicity and plurality of sources and contents of information has added complexity to information seeking and information verification behaviors. At the ICC, it was noted that the farmers were not simply passive recipients of information rather they used to debate and discuss the information within their local context, especially, they intensely debated the modalities and intricacies of transforming information into a gainful farming practice.

The visitors of the ICC appreciated and valued the information available at their door step. It was noted that generally farmers were quite receptive of new farming technology. However, they had tendency to verify information from diverse sources to ensure its credibility and applicability in the local context. It was also interesting to note that many farmers wanted to integrate the new information with the already known facts and existing knowledge. If they failed to do so by themselves, they sought help from others. In any case, social discourse on information was very interesting, intense and self-perpetuating⁹. The processing of information from its reception to verification to utilization has been schematically presented in figure 4.

⁹ For detailed discussion about information verification behavior, see quantitative part of this report.



v) Processing the Information in the local Culture

In fact, ICC provided a forum that brought people together for single purpose, that was, to get new information. It provided an opportunity to people for getting, contesting, verifying and validating information which they received from different sources. By bringing different people and different type of information at one place, ICC helped to develop a culture of dialogue at community level (Zakar 2007).

Slowly, people started realizing that, through debate and informed conversation, the most complex and technologically advanced information could be understandable. Gradually, ICC created a culture where people freely and candidly expressed their opinion and reservations about the utility and applicability of particular information. While commenting on the information discourse, one retired school teacher who actively involved in agricultural activities noted:

It is good to discuss sometimes new here (at ICC). Generally in villages, people have lot of time and they waste this time by discussing politics or petty disputes or just doing back-biting. If

new ideas and information is discussed, it is useful for both younger and older generation. It is essential that people should discuss useful and purposeful issues (from field notes).

vi) ICT Use: Changing the Orientations

Quite expectedly, the young and literate farmers were more open and interactive with the organizers of ICC. A sizable number of the young participants were already familiar with the use of computer, thanks to the introduction of computer in educational institutions, in offices as well as in the net-café. Though computer was familiar equipment for them, however, it was rarely used for information seeking and dissemination purposes. The focus of ICC was to help the local people to use computer for getting information. Hence ICC tried to redefine the function and utility of computer within the local cultural context. Same was the case with mobile phones. Many people had mobile phones and they massively used it for private interpersonal conversation. But they rarely used it for getting information from help-line. Here it was not question of technical know-how; rather it was a problem of information seeking culture.

vii) ICC and Its Relations with Other Institutions

By design ICC ought to develop a close coordination and liaison with the line departments and other local public service institutions. To a great extent, ICC was successful in this objective. It may be noted here that both farmers and officials of government department wanted coordination. In this regard, ICC tried to help the farmers to develop coordination with the various public and private institutions. ICC, because of its extensive community participation, got social clout and influence in the local areas. As a result, functionaries of various government departments and representatives of non-government organizations got stakes in the activities of ICC. Through the platform of ICC, they interacted with the community. ICC was, to some extent, successful in bridging the gap between community and various service providing institutions. It also helped reduce the structural and social isolation of small localities. It may also be noted here that the low ranking

employees (both in service and retired) were particularly interested in the activities of ICC. Additionally, they were great source 'down-to-earth' and realistic information about the functioning of their respective departments. These employees include dispensers, school teachers, field assistants, *patwaris* and so on. The obvious reasons for their relatively more willingness to participate in the activities were; 1) they were local and were quite familiar with the local population; 2) they felt elevated and honored when they were invited to give a talk at ICC; 3) they were well aware about the problems of farmers and felt comfortable to respond the questions.

viii) Utilization and participation in ICC

Being situated in the local community, ICC was easily and equally approachable to all the members of community, though some ethnic and religious minorities could not fully participate in the ICC activities due to structural reasons. Because of its long and flexible opening hours, people were able to visit ICC at their convenient time. Since the organizers and mobilizers were also from the community, therefore, people could frequently talk to them without any hesitation. Overall, the institution was successful in earning trust and confidence of the community.

Presently, Pakistan is on the threshold of information technology revolution. The availability of cable TV networks, mobile phones, digital cameras, etc. pose a great opportunity and opens new avenues for information revolution. It was noted that even semi-illiterate people were using computers for entertainment purposes (it just requires to insert a CD in the system and it starts working). When one has computer and has the skill to insert CD into the system (it is quite simple exercise), he/she is on the threshold of information superhighway. Now it is up to the policy planners and information managers to decide the contents of those CDs.

For the last five years, there has been a phenomenal increase in the use of mobile phones and computers in Pakistan. The rapid expansion in the number of computer-users and other information technology gadgets has changed the whole information landscape. Further, prices of information technology related equipments and accessories are going down and, due to technological advancements, their accessibility is getting easier

and affordable. For example, used computers (of out-dated version but still functional) are available in the market (and one system costs as low as three to four thousand rupees). It was noted that even some poor households in the rural areas possess computers. They might have bought the computers for entertainments or other purposes (like listening music, watching movies, or making overseas phone calls to their expatriate kin.). Whatever is the reason of getting it, and whatever the capacity they have to use it, the fact is that they have access and exposure to an equipment of modern ICT. And, of course, widespread use of such technologies has multiple impacts on our social structure and agricultural practices (Zakar 2007).

Admittedly, at the moment, most of the ICT users do not specifically use it for seeking innovative information. The reason is simple; region specific agricultural information is not easily available. It may be noted here that getting region specific information about agriculture is even difficult for a professional researcher, not to speak of a lay farmer. Arguably, Pakistani society is experiencing an information revolution. And this revolution should be used for equitable socio-economic development. In order to capitalize this opportunity, Pakistan needs to chalk out a sound strategy of information management through institutional arrangements. Otherwise mere availability of information at grass root level would not automatically lead to social change and economic development. This was the message got from the ICC very loud and clear.

II ICC: Functional Bottleneck, Lessons Learnt, Recommendations

Information Seeking Behaviour

Emergence, growth, development and consolidation of social institutions have their own processes and dynamics. Establishment of new institutions needs time, skillful monitoring and persistent support to make them integral part of the community. However human societies are like living organisms. Societies resist “transplantations” of institutions if an institution is abruptly “imported” established. But natural birth and growth of new institutions is possible and feasible. In this context, ICC

was carefully 'planted in the community so that community should own and operate it. There is a no short-cut to establish institutions; they cannot be established overnight.

In the subject project, the functioning of ICC provided an opportunity to closely watch the information seeking, and information utilization behaviors of the farmers. The ICC also provided 'real-life situations' where farmers were receiving, negotiating, processing and sometimes refuting the information in term of its validity, credibility and applicability in agricultural practices. The following were the salient features of their information seeking behavior of the farmers.

- 1) By observing the information seeking behaviour at ICC; it was noted that farmers received lot of information from diverse sources, but they were willing to apply their mind or seriously consider that piece of information, which they considered was relevant to their available resources. They neglect or ignore the information which they thought was not relevant or applicable to their environment.
- 2) Capacity to access information was linked with individual's socio economic background, education, network of interpersonal relations, technical and cognitive competences and other personal capabilities. Hence uniform and standardized information was not helpful for all categories of the farmers.
- 3) Multiplicity of different sources of information (e.g. newspaper, radio, TV, extension workers etc) may be good to provide multi-dimensional and multiple information. But it may create confusion in making choices available to farmers. Multiple sources of information also need farmers' capacity to synthesize and evaluate relevant information.
- 4) Farmers were not homogenous population in terms of landholding, education, social exposure and attitude towards modernity. Admittedly, different types of

farming practices need different information. For example, vegetable growers need different type of information than the rice growers. However, at this stage, Pakistan has yet to develop a system to produce “information package system” where information is systematically and comprehensively consolidated in one package.

- 5) Various farmers were at different level of adoption of mechanization in their agricultural practices. It was noted that some farmers were operating different types of agricultural machinery, and applying various types of chemicals and pesticides. Characteristically, handling of sophisticated machinery or poisonous chemicals has a potential of many accidents and various types of health hazards. There was no proper education or training for taking preventive or precautionary measures.
- 6) Before acceptance and utilization of information, farmers need authentication and assurances about the applicability and financial viability of the information. For this effective coordination with the lines agencies and other government institution was a must.
- 7) There was culturally embedded elaborated information verification system. It was noted that utilization of information depended on the way it was verified. Decidedly interpersonal sources of information were more popular and effective. Farmers had a tendency to discuss and debate information received from impersonal sources (e.g. electronic, print, ICT etc) with their friends, neighbors and acquaintances. They then, made decisions according to their own calculations.

It is easy to import technology or to buy sophisticated information gadgets, but introducing behavioral change is a difficult and time-taking process. Admittedly, mobile phones are common (it is a material change) but using of mobile phone as an instrument for retrieving agriculture-related information needs a behavioral change. Pakistan still has to do a lot to introduce

this change. Instead of making its own experiences, Pakistan ought to benefit from the experiences of other developing countries like China and Bangladesh, where ICTs have transferred the lives of farmers by providing them important information at proper time. For example, in Bangladesh village women skillfully used mobile phones to update their agriculture and marketing related information. Using mobile phones for agriculture development, Grameen Bank has achieved a significant breakthrough:

The women have started small-scale enterprises through small loans from Grameen Bank to buy mobile cell phones that have been used to provide telephone services and earn them good income. Much of the voice traffic over cell phones commerce directed-access to agriculture market prices, access to agricultural trade information, facilitation of remittances from foreign workers, information on work opportunities using the phone to reduce substantial travel (Richardson 1999)¹⁰.

Bottlenecks in the Functioning of ICC

- 1) Low literacy, lack of English literacy, absence of culture of science, superstitious and fatalistic behaviors are the stark realities of our rural society. It is not the argument here that Pakistan should wait for launching agriculture development projects till the 100 percent literacy is achieved. However, for launching any innovative project, these social realities should be kept in mind. At the initial phases of ICC, these realities hampered the smooth functioning of the institution. However, to counter these limitations one needs, specialized skills, higher degree of political commitment and more resources.
- 2) Privatization of telecommunication may not be always good for the rural poor living in remote areas. The private telecommunication companies can earn more

¹⁰ For details see Don Richardson. 1999. Director International Projects, Telecom Development Group, Ontario Canada. (An unpublished report)

profit if they invest in urban centers. Hence, by this economic logic they give priority to develop communication infrastructure in urban areas for profit maximization. Though mobile services is available in rural areas but land lines have their advantages in terms of its ability to run ICTs. So the relative underdevelopment of telecommunication infrastructure in rural areas hampers the smooth functioning of ICC.

- 3) ICT gadgets function with electricity. High cost of electricity and frequent break down of its supply not only disrupt the flow of communication but also damage the gadgets. Unfortunately, the rural areas are the worst victims of frequent, unscheduled and prolonged power breakdown.
- 4) Though cost of internet connection and other ICT gadgets have declined substantially for the last ten years, but still, it is beyond the paying capacity of some rural poor. High rate of inflation is further reducing their capacity to spend on information. Material poverty and information poverty are cyclical and mutually reinforcing.
- 5) There is a lack of political will for the provision of information services to the poor population. At district government level, despite much talks and tall claims about the benefit of ICT, no tangible or practical steps have been taken (if steps have been taken they are not yet visible at the grass-root level). Harnessing ICT for agriculture development is a serious business and needs a persistent and comprehensive policy response.
- 6) Quite expectedly, information available an internet was mostly in English and it needs to be translated in local language. Admittedly, the web-sites of Agriculture Department and other public sector agriculture research organizations provided information material in Urdu language but information demanded by the farmers in other areas of social life was usually available in English

language. Since, an overwhelming majority of the farmers are not literate in English, so the information needs to be translated into Urdu or in other local languages. Of course, translation needs high degree of specialization and huge resources. Additionally, it is not one time work but a continuous process. At ICC it was not possible to do translations or tailor information according to local needs. Lack of processed and locally relevant information was the major challenge for the ICC.

- 7) More than anything else, ICC needed properly trained and motivated local volunteers. Even though some young people had the capacity to use computer but they could not properly understand the importance and significance of information for social development. For this a concerted and long term community development efforts are needed. In essence, the success of ICC depends on the dedication, commitment, and competence of the local volunteers.

Lesson Learned: How to replicate ICC

The following lessons were learnt by establishing ICC on pilot basis:

- 1) The ICC is a sensitive institution. The people at leadership position must be non-political, non-controversial and non-stigmatized. Efforts to use ICC as a platform to advance for one's political interests should be discouraged.
- 2) Like any other community development initiatives, ICC ought to be an inclusive institution. The institution should not be monopolized by the people from a particular caste and ethnic group.
- 3) No political or religious discussion should be encouraged at ICC.

- 4) Before giving any information through ICC, the contents of information should be scrutinized in term of its credibility and correctness. Any piece of information which may not be technically sound or scientifically correct could undermine the credibility of ICC.
- 5) Any attempt to monopolize or politicize this institution from any quarter should be instantly and strongly discouraged.
- 6) The management of ICC should be very careful about its statements. No vague or general statement should be made; it could raise people's unrealistic expectations. If, at any stage, people attach any unrealistic expectations which fall beyond the mandate of ICC, things should be clarified promptly.
- 7) ICC does not create knowledge nor does it provide guarantee of the truthfulness of any information. It is better that the source of information should also be known to the recipients, so that, in case of loss due to inaccurate information, ICC may not be held responsible.
- 8) There was acute deficit of the relevant information material. Many people contacted the ICC management for getting region specific information which was not available on either internet or the written material provided by the extension Department.
- 9) People should know the functional limitations of the institution. People ought not get the impression that ICC is part of the Government or it is being supported by a political party or international organization. ICC must retain its identity as voluntary, community-owned and community-run institution.
- 10) While observing the behavior of the farmers of at ICC, it was noted that provision of information may not be a difficult task: the real challenge was to remove the

concerns and reservations of the farmers when they started translating that information into action. This was the most important challenge faced by the management of ICC. The ICC may be an ideal institution to help the farmers to identify and galvanize the local resources to translate that information into action. However, in this regard, the effective and proactive role of the local non-agriculture departments (e.g. Public health, local government, revenue Department) in improving the level of information of the farmers and consequential standard of living was extremely important.

11) Culturally, Pakistani rural population readily subscribes to conspiracy theories and got suspicions about any new initiative. For this, it is essential that the objectives of the ICC must be carefully narrated to the local people. Extremely careful behavior is needed for image-making. Impression should not be given as if ICC is an advocacy venture to achieve some hidden objectives. The experience demonstrates that people quickly develop misconceptions about the objective of any new initiative. The misconceptions could be:

- It is an effort to spread modernity and secularism.
- It is a stunt of some NGOs to attract foreign money
- It is a marketing tool of ICT gadget producing corporations.

12) Traditionally, rural people are very sensitive about the place and space. They have tendency to readily link the concept of honor with the space: “by going there undermines my honor” is the usual perception. It is essential that ICC should not be established on a space which is overtly non-controversial.

- 13) Private sources of information and their representatives may be invited to give talks and share experiences but they may not be allowed to advance their commercial interests or market their products.
- 14) ICC should be established in geographically central and accessible premises. To the possible extent, the necessary information banners/poster should be displayed on the interior so that stimulating information environment could be created. The outlook of ICC matters a lot for its image-making.
- 15) The most challenging component which determines the success of its functioning is the development of dedicated local leadership. Success of ICC depends on availability of dedicated and well-motivated local volunteers who could organize and mobilize the community around the core objectives of ICC.
- 16) Another challenging task is to maintain the interest of farming community in the activities ICC. Information needs may be limited and could be met shortly. So it is important that innovative areas could be identified like farmers entrepreneurship, value addition, farm management so that ICC may not only provide information but create information needs.
- 17) The functioning of ICC helped to understand the newly emerging information society in Pakistan. Understandably, no scientific study exists to take stock of the new situation, as there is no bench mark information exists. It is essential to conduct basic research on information seeking, information verification and information utilization behaviours.

Recommendations

- 1) Keeping in view the cultural norm and social values of Pakistani society, it is difficult to establish ICC for both

genders (men and women) at least at the early stages. It is therefore recommended that a separate section for women should be established.

- 2) It was learnt that the information provided in ICC may not exclusively focus on agriculture-related problems. It should also provide information related to reproductive health, family planning and public health, sanitation and related matters. The officials of concerned departments are usually interested to share such information at ICC.
- 3) Society always reacts and resists to any abrupt social change. More than any thing else, modern ICT especially mobile phones and cable TV channels have been altering the whole information landscape of Pakistani society. Many people especially conservative religious elements are very skeptical about these changes and float many conspiracy theories. The ICC management should be sensitive about such concerns. ICC must not involve in any ideological debates. It must maintain its functional neutrality and scientific objectivity.
- 4) Social development related issues need to be discussed carefully and objectively. While discussing/introducing innovative information, impression should not be given that traditional way of doing things is inferior. Any effort to belittle or humiliate the indigenous culture may be counter productive and must be avoided.
- 5) Imams/religious leaders may be invited to participate in the activities of ICC. They may also be included in the management committee, provided they do not propagate sectarian religious literature in the ICC.
- 6) There is a need to develop specialized ICC to address the information needs of the physically and mentally impaired population and other sections of society who are extremely socially excluded and disadvantaged. For example, the menial workers, farm laborers, homeless

population and highly stigmatized population like baggers and prostitutes etc, need special information to help them to come out of their stigmatized status.

- 7) ICC should not confine its role by just providing technical agricultural information. ICC ought to create awareness to improve the overall living and working conditions of the farmers. For example it is important to sensitize people that discriminating the religious and ethnic minorities is against our cultural values, constitution and religious tradition. Similarly information is needed to educate people about the negative impacts on violence (both physical and verbal) against women, children, farm workers and marginalized sections. Farmers need to be educated how violence undermines women's reproductive health and violence against children diminish their capabilities. Violence disrupts the flow of information and communication in many ways. Violence also disrupts the process of dialogue social discourse on new information.
- 8) Mobilizing science and technology for agriculture in Pakistan has yet to be done. It is essential that agricultural science and technology be translated into language understandable to rural groups and intermediaries. Though it is not mandate of ICC but such things are prerequisite for the successful functioning of ICC.
- 9) There is a need to train information facilitators who can organize, facilitate and coordinate the flow of information within the local cultural framework. Unemployed educated rural youth have a lot of potential and their energies could be chennalized in a constructive way.
- 10) Our public sector universities have big departments of information technology, mass communication and other disciplines related to development studies. Faculty and researchers in academia ought to focus on

management of information for the rural areas. There is a need to create a realization that in our scientific and scholarly world rural life should not be neglected. Study of rural life should not only be the domain of agricultural universities, but general universities should also study farmers' life.

- 11) Information verification behavior varied from social class, level of education and ICT connectivity. The educated and well-off farmers could quickly verify information by using mobile phone or other sources. The poor, illiterate and socially excluded farmers could not quickly verify a particular piece of information, and hence remained indecisive about that information. They usually verified information from their close kin or acquaintances. More theoretical research is needed to understand the underlying mechanism of information verification behaviour in Pakistani rural set up.
- 12) Abundance of information from diverse sources (e.g. radio, TV, written advertisements, extension professionals etc) created confusion among farmers. Too much information created a feeling of "information overload" and "information redundancy". It is recommended that a credible information management system should be developed.
- 13) There are new perspectives and experiences in the area of ICT for agricultural development. For future ICC, these approaches could be tested and tried. For example the idea of "community informatics" is worth trying. "Community informatics" is an approach that begins with the perspective that access to ICT can provide a set of resources and tools that communities and individuals living in communities can use to pursue their goals in such areas as local economic development, cultural affairs, civic activism, and community based health and environmental initiatives. Access of course, is more than simply technical access or even individual access. It includes in the developing country context,

how to ensure that individuals or communities may make use of the opportunities provided by ICTs both where there is a means for direct use of the technology and also where this is locally absent (Gurstein 2000).

This issue is one that is currently being examined in many countries where the cost of individual access is prohibitive. It is also being examined in contexts where there may be reasons for having "community" access in addition to "individual in-home" access. In these instances, how to provide this type of "access" through physical facilities or through the redesign of existing information dissemination systems is a significant starting point¹¹ (Gurstein 2000).

Conclusions

In line with the objectives of the study, information seeking and utilization behaviors of farmers were monitored at the ICC and various strategies were adopted to enhance the level of their information by harnessing modern ICT. The project drew the following conclusions:

1. Farmers needed comprehensive, relevant and lucid information for solving their practical problems related to their day to day farming activities. Overall, farmers had positive attitude towards new information and innovative farming technology
2. Many farmers were dissatisfied with the overall "information environment" prevailing in the society. They narrated many inadequacies in the existing flow of information. Many farmers could not take risk of applying new information because they had meager resources and could not afford any risk.

¹¹ For details, see Michael Gurstein (2000) ,, Rural development and food security: A "community informatics" based conceptual framework for FAO. Sustainable Development (SD), Food and agriculture Organization of the United Nations

3. Some farmers were also cautious and, to some extent, worried about the misuse and exploitation of information for commercial purposes by the private business entities, especially the fertilizers and pesticide producers. They wanted credible and honest information.
4. Some farmers wanted to know how to judge the credibility and correctness of information. There were frequent complaints that they got contradictory information from diverse sources.
5. Because of small land-holdings and decreasing capacity of agriculture to generate enough money for house-hold expenses, many farmers considered agriculture as a “side-business”. Hence they were not full-time farmers. For example, many farmers were engaged in trading of buffalos. They were also interested in trade related information which was difficult to get. They seemed less interested in learning innovative farming practices.
6. Farmers needed comprehensive, integrated, transparent and updated information about the functioning of local public service departments like revenue department, registration, local government and rural department etc. They were not happy with the performance of functionaries of these departments, and wanted their accountability and demanded exploitation free civic services. Farmers’ complaint that these departments deliberately conceal information.
7. Information about agriculture marketing was almost non-existent especially for vegetable growers. They needed precise information and exploitation-free mechanism of marketing their produce. Unfortunately, no proper information could be available to help these farmers.
8. Marginalized sections especially the ethnic and religious minorities, handicapped, un-attendant elderly people, people with chronic ailments, extremely impoverished

and homeless people were especially deprived of very basic information for their dignified survival. Such people had extremely impaired ability to seek even basic information for their day-to-day life.

9. Rigid social stratification was a major hurdle in the way of meaningful dialogue on available information. Poor farmers were conscious that they are “kept at distance” by the influential and rich farmers. There were complaints that government functionaries including extension workers were biased in favor of rich farmers.
10. Farmers were also conscious about the inadequacy of information and services in the areas of health, family planning, sanitation, disposal of solid waste and environmental degradation. Though, they were not able to use scientific and scholarly terms but their simple narrations were sufficient to reveal their deep concerns about the fast degrading agro-ecological environment. Many a times, discussions at ICC were related to these topics.
11. Farmers were aware and concerned about the fast declining standards of various social and professional services. For example, they knew that medical quacks were not competent enough to treat them, the teacher in the school is not dedicated to educate their children, fertilizers and pesticides they buy may be spurious or partly adulterated. A feeling of discontentment, powerlessness and social exclusion were quite noticeable among the small landholders.
12. Despite the fact that they knew the importance of new information, but they wanted supportive and facilitating social and economic arrangements to use that new information.
13. The most important conclusion this research has drawn is the importance flow of information among farming communities. Instant flow of information among

farming communities is possible by increasing their connectivity. Connectivity is not only essential to improve their farming practices, but it is essential for sustainable agriculture and control over environment, land and resources. It is not possible to regulate and change the behavior of a farmer who is not connected. Understandably isolated, excluded and disconnected farmers cannot be rescued at the time of trauma and trouble. Furthermore, isolated and disconnected individuals remain beyond the “writ of science and modernity” on the farmers’ life”. Connectivity help to make disaster resistant communities; the communities who can fight against Hepatitis C, manage water conserve resources and save environment. The benefit of developing connectivity may not be only measured by the farm productivity alone (Zakar 2007)

Despite the many challenges and disappointments, it would be a serious error to underestimate the potential that ICTs can contribute towards the development of human capacities which are necessary to make them productive and contributing human beings. Experiences gained from this project suggests, that farmers, including illiterate and impoverished, were deeply dissatisfied with their social and economic conditions; they wanted a change. They were also aware that new information can change their life, but, they needed proper infrastructure to implement and apply that information in real life situations. It needs to be understood that technology can not substitute for entrepreneurship nor for well thought out strategies for development

Notes and References

CIET. 2001. "Pakistan: Social audits of delivery of public services, 2001-ongoing" <http://www.ciet.org/en/documents/projects/200621012547.asp>

(Down loaded on June 2008)

Hallberg, Kristin and James Bond. 1996. "Revolutions in Technology for Development". The document is available on the world wide web at <http://worldbank.org/html/fpd/technet> (select NETWORKING and THINKTANK)

Prabha, Chandra, Lynn Silipigni Connaway, Lawrence Olrzewski, and Lillie R. Jenkins. 2007. "What is enough? Satisfying Information needs." *Journal of Documentation* 63(1): 74-89.

Sen, Amartya. 1999. *Development as Freedom*. Oxford: Oxford University Press.

Tilman, David, Kenneth G. Cassman, Pamela A. Matson, Rosamond Naylor & Stephen Polasky. 2002. "Agricultural sustainability and intensive production practices" *Nature* 418(8 August): 671-677)

Vanclay, F & Lawrence, G. 1994. "Farmer rationality and the adoption of environmentally sound practices; A critique of the assumptions of traditional agricultural extension". *The Journal of Agricultural Education and Extension*, 1(1): 59 - 90

Zakar, Muhammad Zakria. 2007. "Development of Farmers Competencies through Information Technology in the District Sheikupura." An unpublished project report submitted to HEC by the Department of Sociology, University of the Punjab, Lahore.