ICT Initiative of SAARC Agriculture Centre in the SAARC Region

Abstract

South Asia is the home of nearly 1.42 billion people-one-fourth of the world population, living on 2 percent of the world's income. Nearly 50 percent of its people live below poverty level- at less than a dollar a day. Most farmers operate on small farms. About 80 percent of the farms have an average size of 0.6 ha. Average farm size in some countries is much less than the region's average.

Agriculture in the SAARC countries forms the major economic sector that provides livelihood to about 70%-80% of the population, employs about 60%-70% of the work force, and contributes between 24% and 50% to GDP. With continuing population growth and a fixed land base, small farms are getting smaller. Much of the small farms are perhaps too small to be productive and supportive of sufficient livelihood for the families that they support. The small-farm agriculture in the SAARC region is therefore unable to compete in the global market. The impact of trade liberalization on small farms apparently seems to be adverse as they are to compete with the developed country's highly subsidized agricultural produce.

Technological revolutions in the last few decades and the consequential changes in the agriculture systems accelerated its cropping intensity in the current century. The developments in Information Communication Technologies (ICTs) and the Internet in particular have revolutionized the entire Agriculture field, generating new market, changing the structure of the Agriculture distribution channels and re-engineering all processes. ICT in Agriculture sector is of special significance and plays a vital role due to the transformations relating to the delivery of services as well as agricultural products. Accordingly, various high tech information and communication technologies are in use in the agriculture sector around the world. These technology ranges from the agricultural product development, marketing, distribution to training agriculture sector personnel etc. The demand for agricultural information is now stronger than ever before. Worldwide, Information and Communication Technologies (ICTs) have become invaluable tools for agricultural research and development.

SAARC Agriculture Centre (SAC) proposes that ICT needs to be conceptualized in its many facets, perceptions, and in its manifold impact in farming societies. SAARC Agriculture Centre (SAC) has been striving to foster such research partnerships among institutions and other stakeholders in the SAARC region. The Centre initiated ICT based Network and developed regional networking of stakeholders through Information and Communication Technology (ICT) and establishment of specialized agricultural knowledge system. SAC empowers farmers providing market information and forecasts. Agricultural research has greatly contributed to increased food production in the member countries of SAARC.

This Centre plays a vital role in identifying the gap in livelihood means, poverty, awareness etc. between the urban and the rural area of the SAARC region. This paper tries to highlight some of the areas where the SAARC member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) should concentrate so that all the members can become beneficiary of agricultural information through ICT based information system. The paper discusses different technology usage from the perspective of agricultural research, extension, product processing and marketing. The findings reveal potential growth of the agriculture sector in SAARC countries through the use of ICT.

1. Introduction of SAARC Agriculture Centre

The Centre, in its old form, SAIC, started functioning in Dhaka from 1989. It served to network relevant information Centre in the member states, exchange regionally generated technical information. The Centre was given an enhanced mandate and a new nomenclature 'SAARC Agriculture Centre (SAC)'.

The Vision

Farmers in the South Asian region are empowered and adapted to more knowledge-based agriculture.

The Mission

To provide timely, relevant and universal access to information and knowledge resources to all the agricultural practitioners of the SAARC Member Countries to achieve their respective goals through networking agricultural knowledge and information systems by adopting the appropriate information and communication technologies, management practices and standards.

The Goal

Goal of the Centre would be to promote agricultural Research and Development (R&D) as well as technology dissemination initiatives for sustainable agricultural development and poverty reduction in the region.

2. Introduction to SAARC AgriNet

The last decade has witnessed digitization of information resources by many agricultural institutions in the SAARC region, and making these digitized information available in a variety of forms of Information and Communication Technologies (ICT). Especially during the last five years or so, several important information and knowledge systems have emerged from government, NGO and private sector initiatives that are highly relevant for agricultural development in SAARC countries.

Information explosion in the form of portals, electronic journals, digital libraries, electronic discussion forums, knowledge networks, information repositories etc. has accelerated the speed of transfer of results of research and scholarship across nations. Essentially these digital information services and information systems use the Internet technologies and are characterized by dynamic delivery of information. This information explosion nonetheless poses increasing difficulty to potential users especially in accessing relevant information in usable format from innumerable, scattered sources.

This is also the challenge that the SAARC Agriculture Centre faces in its every effort to provide access to information to its users ranging from ministries to various institutions / organizations to the end-users (farmers) in different member countries of the SAARC. In particular, the challenges for the Centre in the digital era are: How to manage digital information for the users of the SAARC region? How to provide access to networked information that is relevant for stakeholders? How to enhance coherence and collaboration in agricultural knowledge and information systems in the SAARC countries?

3. Need for networking

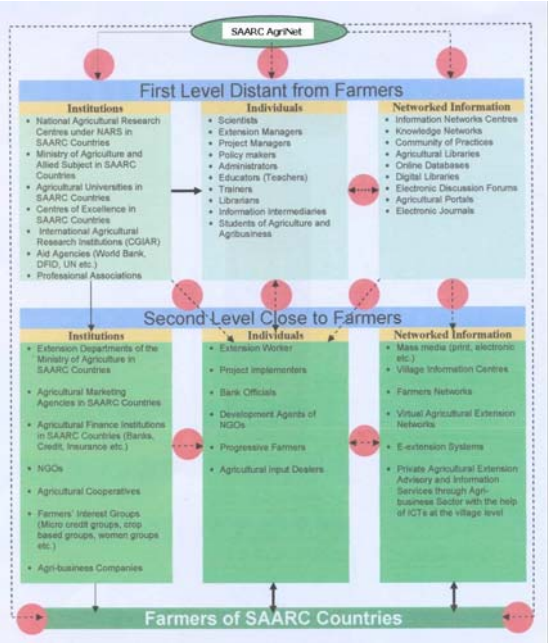
In order to strengthen the efforts of National Agricultural Research and Extension Systems of the countries in the information management and knowledge sharing, for effective transfer of technology to the farmers, there is the need for networking of the information systems of the member countries. This would require improving the coherence and collaboration of information and knowledge systems of the countries. Realizing this need, the Centre initiated the SAARC AgriNet Project to establish efficient information networking which will address the gaps and inconsistencies of the current the agricultural information and knowledge systems.

4. The Conceptual Framework of SAARC AgriNet

The term "SAARC AgriNet" is used to denote the Regional Agricultural Information Network of SAARC Agriculture Centre to realize the first objective of 'establishing regional information network on agriculture and allied discipline'. SAARC AgriNet (www.saarcagri.net) is a network for `individuals', `institutions' and `information' in the field of agriculture and allied subjects in the SAARC region. Individuals - covers farmers, scientists, extensionists, educationists, policy makers, administrators, development agents, agri-entrepreneurs. Institutions - covers organization in the field of research, extension, education, marketing, finance, networks, NGO, business institutions / agencies in agriculture. Information - covers networked information and knowledge resources in or on agriculture relevant to SAARC Member States. SAARC AgriNet operates through the Internet, Web Technologies and any other new ICTs that emerge from time to time.

The development of SAARC AgriNet will build on the significant networking foundation already in place. This infrastructure can be generally divided into access to telecommunication networks (the conduits) and

access to information (the content) via these networks. The evolving network will not be a single network. Such a structure is neither feasible nor desirable in the age of decentralized and distributed networks or at a time when repositories of information and knowledge are similarly decentralized and distributed. Rather, SAARC AgriNet will most likely be an interconnected network of individuals, institutions and networked information resources in the field of Agricultural Research, Extension and Development (ARED) in the SAARC Member countries. The following diagram describes the type of linkages and flow of information in SAARC AgriNet and also highlights the areas of action by red circles.



The degree of interconnection will be highly dependent on the technology used which will, in turn, be determined by commonalties of services, governance, geography or a combination thereof. And the nature of access to the content is dependent on the nature of content, the level of its use, the delivery format and the intended audience.

A region wide network like SAARC AgriNet will seek to enhance the network conduits and access to contents. It will also seek to provide access to the conduits and content for agricultural practitioners now isolated from the networked world, ensuring them a basic level of network participation, with a marked increase in access to information and knowledge. SAARC AgriNet can enhance existing agricultural knowledge and information system of SAARC region and assist in developing new services for resource sharing.

In summary, SAARC AgriNet aims to help the agricultural community of SAARC Member countries move one step closer to realizing a better life through agricultural development.

5. Beneficiaries

SAARC AgriNet understands that the potential use of ICTs can take information and knowledge directly to the farmers. This cannot be thought of avoiding farmers accessing information directly. Keeping the potentials of ICTs in view, SAARC AgriNet will follow a farmer-centric approach in its development. Emphasis on tools and services that address the farmers' needs will be made throughout the development of SAARC AgriNet.

SAARC AgriNet believes that besides land, water, labour, capital etc., the information and knowledge are vital resources for agricultural development. It is axiomatic that 'informed farmers' are better farmers. And 'knowledgeable farmers' are the successful farmers in a competitive world. SAARC AgriNet at the regional level believes that empowering farmers with knowledge can take place through empowering agricultural extension departments, other government departments, agricultural universities, NGOs, marketing agencies, agricultural input suppliers like seed companies, fertilizer companies, pesticide companies, mass media etc. in each SAARC Member State who are the front liners in the transfer of information and knowledge on the latest technologies and problems. This, however, does not preclude poor and subsistence farmers and their information needs. In fact SAARC AgriNet puts these farmers at the forefront in identifying, organizing and disseminating information and knowledge. Based on this premises the beneficiaries of SAARC AgriNet are as follows:

(i) Primary beneficiaries: scientists, extensionists, educationists, policy makers, administrators, development agents, information / knowledge providers, agri-entrepreneurs and students.

(ii) Secondary beneficiaries: Farmers, farmers' groups, farmers' cooperatives, commodity specific groups and rural groups.

6. Specific Objectives

The capacity to access information and to convert it into useful knowledge is of paramount importance for the agricultural development in the SAARC Member countries. In order to realize this objective, SAARC AgriNet has the following specific objectives:

1. To develop web-based information network that will bring in the synergy of the potential collaborators of the SAARC Agriculture Centre.
2. To establish a gateway mechanism to improve access to agricultural information, relevant for researchers, extensionists, policy makers, educationists, students and agribusiness entrepreneurs and through them to the end-users, the farmers in the SAARC region.
3. To capture, organize and disseminate information, wherever it is available, that is relevant to agricultural development in the SAARC region.
4. To design and introduce value added services that are based on the ever-changing information needs of the users.
5. To improve use-friendly access to the Center's information services on the website that will lead to increased relevance's and use of information.
6. To expose and train the staff of the Centre on the tools and technologies related to web development and networking.
7. To enhance network activities with the participation of collaborative institutions in sharing information and knowledge resources.

7. Outcomes

The potential outcomes of the SAARC AgriNet project are a set of tools and services that will help users to access relevant information and share knowledge with others. The specific outcomes are:

1. A dynamic website of the SAARC Agriculture Centre.
2. An improved access to relevant sources of information such as institutional repositories, information and knowledge networks, digital libraries, databases, electronic journals, discussion forums etc.
3. An easy mechanism for content management on the website through web page templates.
4. Services in the forms of electronic newsletter, success stories, frequently asked questions, information on research projects etc.
5. A mechanism to update the information needs of the users from time to time through online feedback forms.
6. Creation of discussion forums to improve communication of current concerns in agriculture and allied subjects.
7. Adoption of agricultural metadata standards in agreement with other information systems for increased relevance and use of information.
8. The staff of the Centre will have the essential skills on web technologies, network administration and management of digital resources.
9. Meetings with the key network collaborators to identify areas of cooperation, types of information and knowledge resources that can be shared and to reach an agreement on the technical standards and intellectual property rights (IPR) and copyright issues.

8. Development of SAARC AgriNet

SAARC AgriNet website (www.saarcgri.net), developed on the open source software tools, such as Joomla, HTML, PHP, is used for creation of web pages and application programmes to design value-added information services on the website. MySQL database software is used to create different database services on the website. SAARC AgriNet also made use of strengths of web-based applications of development partners to create discussion forums and e-mail -based newsletter services etc. Home Page of AgriNet Website Figure A.

Fig.A (Home Page of SAARC AgriNet website)

9. ICT Activities of SAC in the Region

I. Web Portal based Agriculture Dissemination

Web is being used as a very powerful tool for creating, storing and dissemination of information. The portal can provide all basic information and knowledge support to accomplish jobs. Electronic sharing and management, event management, announcements, discussion and news services, web mail checking and a bundle of services can be provided through intranet portal. It can be used as a common connection point from where a list of services can be made available.

One of the major functions that SAC is the establishment of an interactive website (www.saarcagri.net) that provides information on specific organizations in different SAARC countries. The website needs to be periodically updated to provide access to general information on agriculture organizations, activities, results, and links to other organizations including NGOs, International Agricultural Research Centers (IARCs), SAARC Regional Centers, UN organizations (e.g., FAO).

All activities of SAC have been put in the AgriNet website such as e-Agriculture discussion forum; Membership Online; Search Database; CD-ROM Search Services; Audio Visual Services; SAARC Journal of Agriculture; Publications; Newsletters; Library and Information Services; SAARC Agricultural Institutions Links; Information Sharing like success stories; Sharing Projects; Statistical Databases; SAARC Agriculture Policies; Documents; SAARC News Views and Ideas; Scientist & Institutions Databases, etc. including SAC and SAARC region agricultural activities. It is worth mentioning that all the publications of SAC were converted into PDF format, which is a remarkable achievement on the part of dissemination of knowledge and information for the benefits of SAARC countries.

SAC information network would seek to build on the approaches and experiences of other similar networks in order to create a regional network of locally based knowledge centers, engaged in production and exchange of practical information for development.

II. Information, Networking & Library

The Centre has developed web based library management software and also the Centre's library resources are available on the website: www. saarcagri.net.saclibrary. It povides online metadata with abstract service of Agricultural Ph.D. Dissertations. Also, SAC library is providing information and literature support to the researchers, professionals, teachers, and students from different institutions of the SAARC countries. The major collections of the SAC Library are agriculture and allied subjects. The collections of SAC Library have more than 4500 volumes of books and bound periodicals, 300 titles of periodicals, annual reports and 15 daily newspapers on different subjects. The selection and collection of books and journals of the SAC's Library is to get all important agriculture and allied discipline, both local and foreign.

III. E-Newsletter, Publications and SAJ Archive

The Centre has published more than 50 publications in different areas of agriculture. A quarterly bulletin provides news on research and development activities in the member countries through the website. The coverage of the e-Newsletter may include areas like biodiversity, climate change, agri-business, market intelligence, safety of food etc. The circulation of the e-Newsletter may be increased manifolds by adding it to the Website in PDF format. Similar other publications like Statistical Bulletin of the SAARC Agricultural Data are of invaluable importance to the scientists, administrators, development workers and planners. SAC needs to continue such publications. Also SAARC Journal of Agriculture provides an outlet for publishing and disseminating advanced scientific knowledge and information covering a wide variety of subjects on agriculture and allied sciences.

VI. Audio Visual Media Production and Reproduction

SAC has adopted two pronged strategy: (i) Collection of Video Films on Success Stories from agricultural organizations from SAARC Member Countries, and (ii) Production and Reproduction of Success Stories on Transfer of Technology from SAARC Member Countries. Videos on Success Stories collected and produced in collaboration with agricultural Institutions / Universities in SAARC Member Countries are presently available in our video library. All the Agricultural Institute can make use of these Video Films for mutual benefit and sharing of technologies. The Centre also produced and dubbed 35 videos on agriculture from the SAARC region. Digital Audio Visual Services was established through the

creation of a `Video Lab' within the premise of the Centre

V. CD ROM Search Services through E-mail

SAARC Agriculture Centre (SAC) is working to disseminate information related to agriculture and allied subjects to the researchers, planners, developers, policy makers, extension workers, educators and students of the SAARC member countries. Agricultural Bibliographic Information Service (ABIS) is one such effort which is intended to help agricultural researchers of SAARC member countries to find bibliographic references and abstracts from a variety of major CD-ROM databases in the world such as AGRICOLA, BEAST, BIOLOGICAL ABSTRACTS, CAB ABSTRACTS, CROP, FSTA, HORT, PARASITE, PARASITOLOGY, PLANT GENETIC AND BREADING, PLANTGENE, TREE, VET etc.

SAC has initiated a programme of providing CD-ROM search service through e-mail to those who are engaged in research and development activities in agriculture and allied fields in the SAARC region. It may be noted that the Centre provided more than 42,000 CD-ROM search services in 2005, about 1, 05675 in 2006 and more than 200,000 in 2007 to beneficiaries in different SAARC countries.

VI. Network, Internet and E-mail Facility

Recently, SAC established Local Area Network with 50 nodes, which runs with Window 2003 Server Software. It is connected with various PCs and Internet connectivity at the speed of 128/128 kbps duplex full dedicated wireless through the Non Line of Sight (NLOS) method Linux Server getaway for accessing the internet and distribution to users through establishment of LAN at SAC.

VII. Computer and Communication of Information

This division renders its services to all of the divisions in creating database on agriculture, livestock, fisheries, forestry and allied disciplines on the regional basis. It preserves all SAC projects for future use and also for updating and revision. Establishment, extension and maintenance of the facilities to other division for effective and quick exchange of valuable information through modern communication facilities like e-mail and internet are also looked after by this Division. The Division was also is responsible for system analysis and design maintenance, purchasing and installation of necessary hardware and software for overall development of the Centre. This Centre developed a Computer Lab where computers with internet facilities are available and agriculture researcher can get free services of internet and e-mail etc.

10. Major Recommendations for the Agricultural Research and Development through ICT

1. ICT and its application should be extended in agricultural research and development in SAARC countries.
2. Interactive multimedia CDs may be used in stand-alone computer in the countryside's by introducing cyber extension systems.
3. ICT initiatives may be replicated and shared wherever possible across the SAARC Region.
4. Source of Information Centers like the ICT Centers should be established.
5. The application of low cost and need-based technologies may be encouraged.
6. Scientists/researchers and extension personnel should have the opportunity of free access to Internet.
7. Government must take steps to build three basic infrastructures in the rural areas: electricity, telephone, radio and TV Broadcasting and internet connectivity.
8. ICT policy should be implemented to its full extent as soon as possible.
9. Improving socioeconomic conditions of rural people ICT should be utilized in agro-based industries.
10. All data related to agriculture should be made available through 'one window'.
11. Daily market price of essential commodities can be made available through growth centre based web portal – Department of Agricultural Marketing should take initiatives.

11. Conclusion

This paper addresses some of the findings on the use of the internet and implementation of web-based systems in the agriculture sector. An analysis of the factors which impact upon the agriculture web portal implementation process, level of internet adoption and maturity and the levels of success of e-business activities in the agriculture sector are presented.

This ICT system aims at identifying major institutions that conduct research on agriculture and publish journals and provide information/data on agriculture. The findings reveal potential growth of the agriculture sector through the use of ICT.

The farmers and poor people in the rural areas of the developing countries are not getting full advantage of ICT revolution to enhance productivity and generate more income by value addition and marketing their products. ICTs can deliver useful information to the farmers in the form of crop care and animal husbandry, fertilizer and feedstock inputs, drought mitigations, pest management, irrigation, weather forecasting, seed sourcing, and market prices. Information on marketing and prices could help the farmers and rural entrepreneurs to augment their income.

One of the reasons for poor performance of rural development in the region can be attributed to slow the process of information transfer to the rural communities. Lack of timely information has been identified as the cause of slow adoption of technologies. The factors of slow process of information transfer depend on ICT infrastructure which is also depended on the infrastructure of electricity and telecommunications.

ICT can facilitate speedy, transparent, accountable, efficient and effective interaction between the public and private sectors, citizens, business communities etc. This not only promotes better administration and better business enforcement, but also saves money in costs of transactions in government operations

The SAARC Member States should take advantage of this sector. Tracking the demand for ICT required for personnel and as well as community development, transforms the information technology to serve as a tool that will expedite rural community development.

Please note – Author wishes to express that the references are internal to the author's place of work and cannot be listed here.