ICTs FOR AGRICULTURAL EXTENSION: A STUDY IN BAGALKOT DISTRICT OF KARNATAKA STATE, INDIA

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ABSTRACT
Information is one of the key inputs in agriculture. Providing agricultural information to farmers is primarily vested with the government agencies and is also carried out by private agri-business companies and NGOs. Among the different types of communications/medias accessible for transfer of agricultural information mobile, TV, radio, newspaper, fixed phone and internet are prime ones. In the study, ownership pattern of media reveals that 91.9 per cent of the farmers owned TV connection followed by mobile phone (77.9%) and seems to have decisively edged out radio (26.7%). Though, radio was owned by 26.7 per cent of farmers, but was rarely used. Ownership of newspapers was limited to 7 per cent of farmers, but most of the farmers opined that reading newspapers at the village grocery store or tea shop. Fixed line phones were confined to 3.5 per cent of farm holds. Farmers received agricultural information from a wide range of sources such as District/block level agriculture/horticulture offices, Krishi Vigyan Kendra’s, daily local language newspapers, agri portals, television, friends and relatives, helpline, farmers’ cooperatives, radio, private input agencies and dealers and mobile phones. Among these, most farmers (61.6%) approached private input dealers followed by Friends, neighbors and relatives (50%) and were also important and reliable sources of information. Despite several constraints, 46.5 per cent of farmers getting information from government agencies, 15 per cent are in touch with Krishi Vigyan Kendra’s, 10.5 per cent accessing information from extension activities, 7.0 per cent from newspapers, 4.7 per cent from magazines and only 3.5 per cent of the farmers reported using TV for seeking agricultural information despite high ownership and regular broadcast of agriculture programs. Few farmers (1.2%) were dependent on helplines. Among new ICTs, mobile phones were widely available in the study area but were mostly being used for post sale inquiry rather than information for increasing production efficiency.

Keywords: Agriculture, ICT, Information, Krishi Vigyan Kendra, Bagalkot.

1. INTRODUCTION
As is true for most sectors, information is one of the key inputs in agriculture. In India, the task of providing agricultural information to farmers is primarily vested with the Public Extension System. A network of the Indian Council of Agricultural Research (ICAR) Institutes, State Agricultural Universities (SAU) and Krishi Vigyan Kendras (KVKS) spread across the country, is responsible for developing, refining and disseminating the latest technologies to farmers. In addition, extension activities are also carried out by state agriculture departments, private agri-business companies and NGOs. Mass mediated broadcasts and telecast supported by trained agricultural extension personnel at the field level form the backbone of the agricultural extension system in India. For example, All India Radio (AIR) in the late 1950s and Doordarshan in 1966. The National Commission on Farmers has noted that knowledge deficits constrain agricultural productivity in India. It also added that the use of Information and Communication Technologies (ICTs) for agricultural extension is one way of addressing the information needs of farmers. With the help of ICTs, agricultural extension is expected to become more diversified, knowledge-intensive and demand-driven and thus more effective in meeting farmers’ information needs (Zijp, 1994). At present scenario, Mobile, TV, radio, newspaper, fixed phone and internet are chief communicating Medias accessible for transfer of agricultural information to farmers. Against this backdrop, this study conducted to know the agricultural information seeking behavior and the reasons for seeking agricultural information through certain sources/media by the farming community.

2. METHODOLOGY
The study area i.e., the Bagalkot district extends over an area of 6575 sq. km., which is about 3.5 per cent of Karnataka state’s total geographical area. It comprises 6 blocks namely Badami, Bagalkot, Bilagi, Hunagund, Jamakhandi and Mudhol. The study was conducted in KVK adapted villages which covers (in the present study) 5 blocks except Jamakhandi. Further, villages from each block were selected randomly to meet the objectives of the study. The detailed
sampling plan of the study is given in Table 1. In-depth interviews were conducted with 86 farmers. As in the rest of the country, most of the farm land in the area is legally owned by men. However, as women often contribute more towards agriculture in some parts of the state due to heavy male migration, it was decided to include as many women as possible in the sample. Out of these 86 randomly selected respondents, 17.4 per cent were women and the rest (82.6%) were men.

Table 1: Sampling Plan of the Study

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the District</th>
<th>Blocks</th>
<th>Villages</th>
<th>Total number of Respondents</th>
<th>Male Respondents</th>
<th>Female Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bagalkot, Karnataka State, India</td>
<td>Bagalkot</td>
<td>Sorakoppa</td>
<td>17</td>
<td>11</td>
<td>06</td>
</tr>
<tr>
<td>2.</td>
<td>Bagalkot</td>
<td>Nakargundi</td>
<td>02</td>
<td>02</td>
<td></td>
<td>00</td>
</tr>
<tr>
<td>3.</td>
<td>Badami</td>
<td>Neelagund</td>
<td>08</td>
<td>07</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Badami</td>
<td>Kalas</td>
<td>01</td>
<td>00</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Badami</td>
<td>S.N. Timmapur</td>
<td>01</td>
<td>00</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Hunagund</td>
<td>Kodihal</td>
<td>05</td>
<td>05</td>
<td>00</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Hunagund</td>
<td>Turamari</td>
<td>09</td>
<td>08</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Bilagi</td>
<td>Siddapur</td>
<td>32</td>
<td>29</td>
<td>03</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Mudhol</td>
<td>Kulali</td>
<td>11</td>
<td>09</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total no. of respondents</td>
<td>86</td>
<td></td>
<td>71</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

3. RESULTS

Agriculture is largest employment generating sector and a major source of livelihood for more than three fourth of the farm families in the Bagalkot district. It is mainly attributed to poorly developed manufacturing and services sectors in the district, away from the state capital (554 km) and dominance of the sugarcane industry as many as 9 sugar factories in the district. Farmers in the study area cultivate minimum two crops in a year due to irrigation facility. It was mainly attributed to flowing of three rivers namely Malaprabha, Ghataprabha and Krishna of Krishna basin system and its irrigation network through canal system, recharge of ground water (bore wells) through back water of Almatti reservoir and check dams/barrages constructed across the rivers.

An analysis of the age of the respondents indicates that only 23.3 per cent belong to the middle age category (between 35 and 45 years of age). Due to increasing urbanization, farm operations in the study area are carried out by people who are not able to find full time gainful employment outside the village due to low levels of education or lack of opportunities. The majority of respondents (68.6%) were above the age of 45 years. Further, only 34.9 per cent of the respondents had no formal education. This is a reflection of the miserable good literacy rate (65.1%) in the study area. (District literacy rate: 69.39%, State literacy rate: 55.98%), which is nearer to the national average of 74.04 per cent. It also indicates that use of ICTs in the study area may not be constrained due to lack of formal education among the users, especially if there is adequate and appropriate content in the local language (Kannada).

The sampled villages presented a wide diversity in terms of crops grown, productivity, accessibility to input agencies and market, scale of operations, etc. Farmers in Bagalkot, Bilagi and Mudhol blocks were engaged in “Farmers Participatory Seed Production of Groundnut (Groundnut follows maize/pearl millet/sunflower/vegetables in previous season) of different classes of seed chain during rabi/summer season due to assured water supply, congenial environment such as weather and fertile soil, more importantly proximity to either the Krishi Vigyan Kendra or Agricultural Research station (ARS), Baglkot and Mudhol. On the other hand, farmers in Hunagund blocks were constrained by the lack of irrigation facilities, dry weather, absence of input agencies and resultant low yields. The farmers of Badmi block lies in between above two situations.

Despite this wide variation, an overwhelming majority of the respondents (Figure 1) in the study area were small (45.3%) and medium (43.0%) farmers together constitutes 88.3 per cent. This indicates a high degree of land fragmentation. In such cases, agriculture is a less lucrative livelihood option in the absence of crop diversification and value addition. Land fragmentation plays a major role in low levels of agricultural productivity due to sub-optimal usage of inputs and resultant low overall returns.

Furthermore, 20.9 per cent of the respondents in the study area had no assured source of irrigation water and were fully dependent upon rain water for cropping. This was especially the case with villages in Hunagund block where a lot of damage to crops had been reported due to erratic rainfall. Shrinking natural resource base and land fragmentation have
been identified as two important challenges to Indian agriculture. The water resource base for an average farm holding has declined considerably during the last fifty years due to inappropriate and unscientific use of water resources. Consequently, the future agricultural growth will have to come via yield enhancement through intensive but more judicial and scientific use of natural resource and from rain fed areas (Sulaiman and Van den Ban, 2000). These twin factors explain farmers’ (especially small holders) reluctance to seek agricultural information in villages with no irrigation facilities.

![Land Ownership Pattern](image1)

Fig. 1: Land Ownership Pattern

Medias owned by the respondents in the area was documented to understand the communication behavior and ownership pattern. A look at the media ownership pattern (Figure 2) reveals that 77.9 per cent of the households owned at least one prepaid mobile phone connection. It was due to the wide network, competitive rates, prepaid and incoming call facility, mobility and less paper work. But, none of the respondents was aware of any mobile based agri-information service. It was also found that the respondents had not received agricultural information on their mobile phones (either as voice call or SMS) from input agencies, government departments and others except KVK since 2011 that to restricted to those farmers who are in touch with KVK for one or other crop production activities. In the study area, mobile phones were primarily being used by the respondents for maintaining social networks (contacting relatives and friends) and for emergencies. This indicates that while mobile phones are increasingly available to lower income groups, they are being used to improve the communication with family and friends (social use). Similar results have been obtained from studies in other developing countries (ICD, 2005: Molony, 2008; Kameswari, 2011).

![Media Ownership Pattern](image2)

Fig. 2: Media Ownership Pattern
Among the conventional mass media, television was found in most households (91.9%) and seems to have decisively edged out radio (26.7%) as the ubiquitous and popular medium in the rural areas. This shift can be attributed to the visual nature and diversified content that affords multiple gratifications. It was also found that television was mostly used for watching movies, stories, religious programs (i.e., entertainment) and news. Male farmers reported watching Krishi Darshan “when they have time”. This confirms Toyama’s (2010) contention that “the sum total of television’s development impact comes now here near expectations and that it had not been consistently beneficial to national education or agriculture. Whatever television’s potential, society has failed to apply it consistently towards development on a large scale”.

Radio was owned by 26.7 per cent of farm families, but was rarely used. Respondents felt that television provided all the content available on radio with an additional advantage of visuals. Hence, it appears that the gratifications afforded by radio have been subsumed by television. This change, however, is ironic in the context of the present study as radio was instrumental in heralding the Green Revolution in India and some high-yielding varieties of rice popular at that time were referred to as “radio rice” by farmers. Ownership of newspapers was limited to 7 per cent of farm families due to their high cost. But men often reported reading newspapers at the village grocery store or tea shop. Fixed line phones were confined to 3.5 per cent of farm families due to lack of infrastructure, the nature of billing and extensive paperwork. Computers with internet connection were available in none of the families in the study area. It is mainly attributed to technological cost and infrastructural limitations. This indicates that an internet based system for providing agricultural information would be feasible only under an effective institutional structure and arrangement that facilitates communal usage through intermediaries.

Farmers in the study area have a wide range of sources and channels to receive agricultural information. These include district/block level agriculture/horticulture offices, KVK (Farm Science Centre), daily local language newspapers, television, friends and relatives, helpline, farmers’ cooperatives, radio, private input agencies and dealers and mobile phones. People often relied on more than one source/channel for information. Among these, most farmers (61.6%) approached private input dealers (seed and pesticide suppliers)/middlemen for information. This heavy dependence on middlemen is attributed to the absence or inaccessibility of formal institutions to farmers. In rural areas, middlemen input dealers not only provide credit at times of need, all inputs required in the farm (seeds, fertilizers, pesticides) and but also platform for a ready market to the farmers. As a result, private input dealers and the farmers often have a reciprocal arrangement in the absence of other institutions in rural and remote areas.

Despite several constraints, a sizeable percentage of farmers (46.5%) reported getting information from government agencies (agriculture/horticulture departments). Government agencies were also ranked as highly reliable due to technical know-how and lack of personal agenda. Friends and relatives were also important and reliable sources of information (50%), especially in rural areas. In the study area, 15 per cent of the respondents are in touch with KVK and mainly attributed study is being conducted in the operational area of the KVK where activities carried for a couple of years. About 10.5 per cent accessing information from extension activities, 7.0 per cent from newspapers, 4.7 per cent from magazines and only 3.5 per cent of the farmers reported using TV for seeking agricultural information despite high ownership and regular broadcast of agriculture programs. Few farmers (1.2%) were dependent on help lines (Kisan Call Centre Toll free number: 1551) and reason behind that is they have attended in one such training conducted by District Agricultural Training Centre.

![Fig. 3: Sources of Farm Information](image-url)
It was observed that information seeking behavior and sources used by the farmers followed a distinct pattern. Farmers made no effort to seek new agricultural information in villages where agriculture was constrained by structural and environmental factors (Hunagund and Badami). In these villages, farmers followed a traditional cropping pattern and relied on information passed on by their peers or elders. The uncertain nature of the enterprise discouraged them from seeking and using the latest know-how and constant attempts were made to find alternative sources of employment (migration to urban areas). These villages also witnessed very little presence of public extension agencies and their activities were limited in scope and number. In these villages, input dealers were the main source of agricultural information.

On the other hand, in villages where agriculture was profitable either due to favorable structural and geographical conditions (Bagalkot, Bilagi and Mudhol) or crop diversification, farmers were proactive in seeking up-to-date and diverse kinds of information. In these villages, farmers reported seeking information on new varieties, production practices in integrated manner (nutrient/pest), market prices and extension activities. In villages that mainly produced groundnut seeds in tie up system with KVK/ARS, Bagalkot and Mudhol (UAS, Dharwad), it was noticed that the farmers used mobile phones for getting information on package of practices (land preparation to sale of the seed).

4. DISCUSSION

Media ownership patterns in the study area indicated a wide range and high availability of mobile phones and television. Farmers have distinct reasons for using different media. Mobile phones are primarily used for fulfilling social needs (contacting friends and relatives). Television is mostly used for entertainment (pleasure) and escape after a hard day’s work. Use of television for fulfilling cognitive needs is occasional (news programs) or rare (agriculture programs). It was also observed that needs fulfilled by a certain medium in the past are now being met by a new medium which affords additional gratifications due to advances in the technology. This is one of the reasons for a change in media ownership and usage patterns (for example; radio to television in rural areas). Print medium mainly fulfilled cognitive needs but it was confined to men due to its high cost and the norms surrounding the use of public space where it was mostly available.

Farmers in the study area have access to a wide range of sources for seeking agricultural information. These range from interpersonal sources (friends and elders) to new ICTs (mobile phones). Despite wide ownership, some media like television or mobile phones were rarely used for this purpose. Similar observations were made by Molony (2008) in Tanzanian context and Kameswari (2011) in Himalayan region of India.

Trust and the interrelated nature of informal institutions in rural areas play an important role in determining the choice and use of sources. Most of the farmers in the study area seek agricultural information from middlemen, who also acts as input and credit suppliers. Backdrop of this is, the middle man happens to be a person known to the farmer personally and is therefore, seen as trustworthy. He usually belongs to the same area or village or has a relative in the village and the farmer may sell his produce to conform to village norms or maintain good relationship. Hence, the middleman satisfies cognitive, social and integrative needs (multiple gratifications) of farmers besides being their creditor, buyer of produce and supplier of farm inputs (seeds, fertilizers and pesticides).

Despite their poor track record, the trust implicit in face to face interactions and the government machinery results in frequent use and reliance on the public extension system for seeking agricultural information. While friends and relatives are ranked high on trust, farmers do not always prefer to seek information from them (especially when faced with a new problem) as they are not able to give new information (i.e. satisfy cognitive needs) due to the similarity in their socio-personal attributes.

The study also indicates that an information deficit does not necessarily lead to information seeking behavior. It depends on the income derived from the activity itself (agriculture) and the value that information can add to that enterprise. Agriculture in India is limited by several factors like infrastructure, credit, inputs, market, etc. and information is just one of the many inputs that a farmer needs in order to make it a profitable activity. Most of the ICTD initiatives address only the information needs of the farmers. As a result, farmers are not able to leverage new/additional information and transform it into tangible benefits (increased income or enhanced productivity). This limitation of ICT initiatives is also highlighted by successful cases like e-Choupal which address the entire agricultural supply chain (Annamalai, K. and Rao, S., 2003).

5. CONCLUSIONS

Information is one of the key inputs in agriculture and information deficits constrain agricultural productivity in India. The present study discussed the agricultural information seeking behavior of farmers in the northern part of Karnataka state, India. It tried to explain the reasons behind use of certain media—including ICTs—by the farmers over other
available sources. It was observed that, though farmers have access to a wide range of sources, they mostly relied on middlemen, and local and official sources for agricultural information. Among new ICTs, mobile phones were widely available in the study area but were mostly being used for post sale inquiry rather than information for increasing production efficiency. In the rural Indian context, the availability of ICTs does alter the reciprocal relationship between the seller (farmer) and the buyer (middlemen). In the absence of formal and effective institutions, the middleman is also the supplier of farm inputs and credit to the farmers and this skewed relation limits the advantage that can be derived from use of ICTs. This study indicates that the possible advantages from use of ICTs in rural areas are offset by an absence of other input agencies; interventions in other parts of the country indicate that the entire agricultural supply chain can be made more efficient by use of ICTs. Hence, rather than negating the possible benefits that can be derived from the use of ICTs in agriculture sector, this study points to issues that need to be addressed simultaneously.

REFERENCES


