

ICT Use from Rural Extension Environment in Acre State of Brazil¹ Uso de Tecnologias da Informação e Comunicação na Extensão Rural do Acre

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Abstract

The impact of a rising information society does not occur uniformly in both urban and rural areas. In Amazon Region, the related to information and knowledge access citizens exclusion occurs by several factors, among then the isolation and lack of basic structure in rural communities. In that context, the information and communication technologies (ICT) use has a social role to play in the rural communication process. This paper analyzes the use and appropriation of TICs by rural extension technicians in Acre state, and its impacts in the technicians' communication in rural communities. The result of the study showed that the radio is still the most powerful tool to disseminate information in rural communities and there is a significant presence of mobile phones among smallholders, even with a poor infrastructure and mobile telephony services coverage in rural communities. To know the ICT used by extension technicians and its main applications may contribute to the development of communication strategies that promote greater interaction between these professionals and rural areas residents helping to improve the integration between country and city.

Keywords: ICT; Rural Development; Rural Extension

Resumo

O impacto do crescimento da sociedade da informação não ocorre uniformemente, seja em territórios urbanos ou rurais. Na Amazônia, a exclusão de cidadãos com relação ao acesso à informação e ao conhecimento é marcada por diversos fatores, entre eles o isolamento e a falta de infraestrutura básica em grande parte das comunidades rurais da região. Neste contexto, o uso de Tecnologias da Informação e Comunicação (TICs) tem papel fundamental no processo de comunicação com as comunidades rurais. Este artigo analisa o uso e apropriação de TICs por técnicos da extensão do Acre, e o seu impacto na comunicação destes profissionais com comunidades rurais. Entre os resultados, o estudo mostrou que o rádio ainda representa uma poderosa ferramenta para disseminação da informação em comunidades rurais. A pesquisa também evidenciou a presença significativa de telefones móveis entre agricultores familiares do Acre, mesmo com precária infraestrutura de redes de comunicação móvel nos espaços rurais. Conhecer as TICs utilizadas por técnicos extensão rural e suas principais aplicações pode contribuir para a definição de estratégias comunicacionais que promovam maior interação entre estes profissionais e moradores do meio rural ajudando a melhorar a integração entre campo e cidade.

Palavras-chave: TIC; Desenvolvimento Rural; Extensão Rural

Introduction

Advances in information and communication technologies (ICT) have propelled fundamental changes across the world: enabling innovation, connecting people and communities, and improving standards of living. ICT are considered a valuable tool used to achieve economic and social equality by reducing poverty and have proven to be an important catalyst for increased productivity, market competitiveness, and economic

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and social modernization (GTIR, 2011). In general livelihoods of poor rural communities, the presence of ICT improve the access to credit, educational activities, health cares services and rural business activities (Richardson, 2007). Analyzing the social structure of the power constructed around the digital networks of communication, the social scientist Manuel Castell, conceptualizes this event as a new information age, and points out that “the generation of wealth, the exercise of power, and the creation of cultural codes came to depend on the technological capacity of societies and individuals, with information technologies as the core of this capacity.” (Castell, 1998, p.367, cited by Hilbert, M., 2010).

However, the impact of a rising information society does not occur uniformly in both urban and rural areas. This dynamic increase the isolation of communities in developing countries that face the barriers presented by the “digital divide,” perpetuating patterns of inequality and excluding citizens from participating fully in the global market economy.

Civic engagement, information poverty, and the Internet worldwide studies identify global divides as a reason for the discrepancy of Internet access between industrialized and developing societies (Norris 2001). Other researchers, analyzing the geography and opportunities of the Internet, emphasize that the term “digital divide” involves distinct factors as “low rates of Internet access and usage: age, education, income, race, ethnicity, and urban and rural disadvantage.” (Mossberger, Tolbert & Franco, p.34, 2012)

According to the International Telecommunication Union (ITU), an ICT organization of the United Nations, there are still considerable differences between developed and developing nations. Despite the continued expansion of global Internet access, promoting universal access to the digital world is still a big challenge for developing countries. In Latin America, Internet average access penetration increased from 15.7% across the region in 2007, to 39,9% in 2011 ranging from 67% in Argentina, 59.9 % in Chile, and 56.1% in Uruguay—all countries which enacted national policies to promote universal access (ITU, 2011).

Rural areas of Latin America and the Caribbean show a variety of scenarios that require different government policies to increase ICT access. Macro policies must recognize this diversity and take cues from local level experiences and

recommendations. The development of ICT programs and projects enable policy makers to test specific solutions to specific problems, which can be used as a basis for broader areas. At the same time, there are communities in the world that have never used a telephone, and still have no electricity in their homes.

Factors as social needs and environmental differences promote unequal access to ICT. The global economy is distributed asymmetrically excluding large areas and population groups (Castell, 2000). Thus, ICT have a social role to play by providing information to poor people in developing countries and increasing levels of social and economic life. To guarantee that the information age will be global and inclusive, policymakers should address ways to bring benefits to the poorest populations. This requires actions not only related to ICT access, but must also include other issues such as the price, bandwidth, speed and quality of the services, minimal operators skills, content, and language.

ICT in Rural Technician Services

To define new communication strategies for the Acre State program Rural Technician Assistance (ATER) to organizations and rural communities is fundamental to examine the available accessibility to ICT and to determine what technologies are more appropriate to strengthen these services and to improve the rural livelihood standards. Considering these aspects, this study investigate the effect of the of ICT use by agricultural rural extension for small farms in Acre state and answer the questions about alternatives to connect professional populations through the use of ICT in Acre State, and also rural extension services appropriation ICT and their contributions to rural development with positive impact for rural smallholders.

The term of ICT and ICT4D

ICT is a term “currently used to denote a wide range of services, application, and technologies, using several kinds of equipment and software.” (Modise & Lekoko & Thobega, 2012). ICT is considered a group of interrelated technologies (electronic devices) for accessing, processing and disseminating information (ITU, 2010).

The use of ICT has contributed substantially to the spread information, technology, and has empowered human beings in different parts of the world (GRTL, 2012). According to technology scholar Araba Sey, “ICT projects continue to reveal

much about the potential of ICT, but little about how this potential can be translated into widespread reality. With each new ICT emerging from the developed world, new hope arises as to how it can transform the fortunes of the poor people in developing countries. Print media, radio, television, video, telephones, and the Internet have each played their part in this vision; none has proven to be the panacea to poverty in all its forms.” (Sey, 2011).

Another new and important field to consider is the information and communication technologies for development (ICT4D). Researchers in this area investigate digital divide problems and the potential of ICT to contribute to human development as was recommend at the World Summit of the Information Society (2008). Authors of this field want to know how ICT4D have contributed to developing countries. One of the main challenges of the methodological and theoretical landscape regarding ICT4D is that the multidisciplinary field is new and is still evolving its conceptual approaches (Prado, 2012; Romam, 2004; Warschauer 2003).

Tim Unwin, University of London professor, in his edited book Information Technology for Development (ICT4D) focused on how ICT are being used to reduce poverty, suggests that “two critical areas are essential for an understanding of the significance and potential of ICTD4 in the world today: the character of contemporary development, especially its intersection with ideas about ‘globalization,’ and the implications of whether we are indeed living in a new type of information or knowledge society, transformed by a particular kind of technology.” (Unwin, 2009)

Strategies to provide ICT use

Several digital governmental policies in Brazil to encourage the development and intensive use of ICT have been implemented in the last decade. These policies have promoted social inclusion and play a key role in the fight against poverty, allowing citizens to access information and knowledge. Brazilian digital inclusion programs intend to make the benefits of ICT available to all citizens in order to fill the gap of digital exclusion and to promote digital literacy between urban and rural areas of the country. Brazilian policies related to digital inclusion conform to the United Nation’s Millennium Development Goals (MDG), which include measurable goals on the access

to telephones and the use of computers as indicators of digital inclusion to be achieved by the year 2015 (IPEA, 2004).

The statistics show that from 2010 to 2011, the number of Internet users in Brazil increased 13.9% from 37.9 to 43.2 million. The growth of the number of Internet users is attributed to the rise of home computers with Internet access. Within a year, the total number of active Internet users at home increased 20.7%, from 29.1 million to 35.1 million (IBOPE, 2011).

Another alternative to increase the access to ICT is Brazil's Federal Government National Broadband Plan (PNBL), which predicts an even greater increase in the pool of Internet users in the country. The goal is to commoditize the provision of broadband access and promote growth of the capacity of the country's telecommunications infrastructure and to provide millions of Brazilians living in isolated locations the benefits of connectivity by expanding Internet coverage in rural areas. For developed nations, the impact of fixed-line broadband penetration is equally important to economic growth.

The study, “Economic Impacts of Broadband, Information and Communications for Development,” states that an increase of broadband access in developed countries of 10 subscribers per 100 inhabitants corresponds to a 1.2% increase in per capita GDP growth (Qiang & Rossotto, 2009).

Mossberger, Tolbert, and Franco highlighted that to promote digital citizenship requires regular and effective access to the Internet, hardware and software and technical skills to use the technology, as well as “information literacy”³ or critical-thinking skills to evaluate and utilize the information online. Considering the social and geographical aspects, Brazil has a challenge to face and solve. (Mossberger, Tolbert & Franco 2012)

Brazil is the fifth most populous and largest country in the world, with 200 million inhabitants, in an area of 8.514.877 km². The country is divided in five regions that show a cultural diversity, different ecosystems, and economic growth. Over then 40% of the population is concentrated in the Atlantic coastal region, where the industrial centers of the country are located. On the other hand, the North and Northeast

³ Mossberger, Tolbert & Franco (2012) conceptualizes the “information literacy” the ability to use the technology.

regions show the highest poverty levels of the country (IBGE, 2010). There are approximately 16.3 million Brazilians (8.5% of the total population) living below the poverty line⁴, 8.67 million in urban areas and 7.59 million in rural areas. Northern (35.7%) and Northeast (35.4%) regions present the highest concentration of people below the poverty line (IBGE, 2010).

According to annual survey on ICT usage in households and by individuals conducted since 2002, less than half of the Brazilian population (45%) have Internet access. Brazil shows a disproportionate number of Internet users live in urban areas versus rural areas. In urban areas, 50% of the population has Internet access, while in rural only around 18%. In regions of the country where economic problems are more severe, the number of Internet users is lower (North 36% and Northeast 32%). The Brazilian Southeast (53%), Center-West (51%) and South (50%) present higher percentages of users. Internet access is related to social conditions and the economic power of the population (ICT Households, 2011).

Although Brazil shows different levels of ICT access between regions, and urban and rural areas, the chances to promote the population access to digital technologies are increasing gradually. The globalization and the growth of technologies in the 21st century are contributing to reducing the digital divide in remote areas that for decades were left without connectivity because their geographical location and distance away from urban centers. To implement ICT in the agriculture sector, the myth that ICT are not relevant in the rural environment must end. The lack of connectivity and literacy is still a barrier for rural producers to take advantage of ICT. In addition, it is important to identify and consider the different characteristics and interests of the various groups that represent the rural population and their respective economic activities (Hopinks, 2011). Sharing successful experiences through on-site visits, publications, videos, and attractive, and easy-to-use web portals are some of the alternatives to gain access to this information.

The digital inclusion process in Brazil has happened thanks to programs developed by the government, private sector, non-governmental organization and social initiatives in urban and rural areas of the country.

⁴ It means a monthly income not superior to R\$ 70,00 (U\$ 35.00) per person or member of the family.

The rural community context of Acre State

Located in the Brazilian Northwest, in the Western Amazon, Acre State has a population of 733,559 inhabitants, 532,270 (72.6%) living in urban areas, and 201,280 (27.4%) in rural areas (IBGE, 2010). About 17,000 indigenous people are living in the state (Acre em Números, 2011). With the territorial extension of 152,581.38 Km² distributed in 22 municipalities. The illiteracy rate in state is 12.7%, being 12.7% in urban centers and 27,7% in rural areas (IPEA, 2010).

The conditions of rural communities in Acre show varied levels of development. Signs of development include schools, roads, electricity, and communication networks. In Acre, there are 25,187 properties characterized as familiar agriculture (familiar manpower or a maximum of four employees working in the property), this corresponds to 85% of the total rural proprieties in the state. The familiar agriculture activity occupies 83% (82.889) of the people working in rural areas and generates 69% of the gross value of agricultural production (VBP) of Acre State (IBGE, 2006).

An overview about Rural Extension programs in Acre State

The rural extension services are committed to improving the growth of the agriculture in developing countries, especially to smallholders in the Amazon region, where subsistence agriculture is still predominant. This kind of agriculture is recurrent in other tropical less developed countries in Asia, Africa, and Latin America. Study about information services in rural communities in Nigeria, concluded that “the success of rural development programs depend on the effective use of information in daily activities. Information services are multidimensional and serve socially as a binding among different groups of rural dwellers.” (Harande, 2009). Rural extension services are a way to facilitate the expansion of new technology, information, and knowledge within rural area residents, and helps ensure that dissemination of information occurs.

Because the geographical differences in cultural, social, and economic environments, rural extension in Brazil requires different actions and proposals for each Brazilian region. When local government policies are first debated in the communities where they will take place, this vetting process presents a higher chance to represent the real needs of this population. Federal en state governments as well private companies,

cooperatives, and non-governmental organizations contribute to an increase in the number of stakeholders who will be able to access the rural extension services.

Thus, both federal and state governments are able to hire rural extension services through public bids providing a range of services to meet the specific needs of the community. According to National Policy for Technical Assistance and Rural (PNATER), sustainable rural to develop integrated actions to promote social inclusion and establish the agroecology as a fundamental principle of their actions. The methodological process is based on interactive knowledge production, obtained through multi and interdisciplinary participative actions. Nowadays, there is a great diversity on the formation of the technicians operating in the rural extension and technical assistance in the region. It was possible by the involvement of NGOs and private institutions as ATER service providers, and increased the range of the assistance to small stakeholders to other areas such as rural settlements and extractive reservation areas.

Basic infrastructure and different individual skills needed to ICT adoption

The characteristics of rural communities vary according to the environment where they are located and the influence they have from other areas. Recent studies about the impact of mass media on traditional communities of the Brazilian Amazon observed that many of the traditional cultural and social activities were being transformed as a consequence of the high penetration of television. Some of these changes were promoted by the “Luz Para Todos” (Light for All), a Brazilian federal program with the goal to promote electricity power to rural communities in Brazil.

In Acre, approximately 39,000 rural families benefited from the program in their homes. The program brought significant changes in the way of life of the small stakeholders by providing access to television, refrigerators, computers, and rural cell phones. Also, electric power allowed the combination of technologies (i.e. electric mills) to improve the agriculture production systems in several municipality of the state (Light for All, 2011). However, electricity is still a problem in remote areas of the Amazon.

According to a research report by the Ministry of Mines and Energy, 4.8% of the smallholders assisted by “Light for All” returned from season work in the urban areas to the countryside after the arrival of electricity power. With energy at home, 16% of the

residents of rural areas have bought a freezer, 79% have bought a TV, and 73% now have a refrigerator at home (Light for All, 2010). Basics needed are fundamental to improve the quality of life in rural environments and must be met before ICT access can meet their demands for new information.

To increase the use of ICT in rural areas of Acre technical skills of the potential users must improve. Mossberger, Tolbert, and Franco (2011) suggest that regular access to Internet and access to hardware and software raise the chances of acquiring information literacy or critical-thinking skills to evaluate and to use the information online. In addition, basic literacy and educational competence are important to enhance the capacity to navigate the Internet. Public places in rural areas such as computer labs in schools and telecenters can provide the necessary skills for rural dwellers learning about ICT. Individuals who are functionally illiterate or unfamiliar with the logic of digital technologies may find it harder to engage the technologies available. (Prado, 2009; Proenza et al., 2001).

Survey to evaluate ICT access in the Acre State regions

The research started in April 2011, with visits to the Seaprof offices located in Baixo and Alto Acre micro-region. The first goal was to review the availability and use of ICT by Seaprof ATER technicians. Eight offices were visited in the municipalities of Senador Guiomar, Plácido de Castro, Capixaba, Xapuri, Brasileia, Epitaciolândia, Assis Brasil and Acrelândia from the region of Baixo and Alto Acre . The second step was an online survey administered through the use of the Google Survey platform. The survey was sent by e-mail to 50 rural extension technicians The survey was intended for professionals from the regions of Baixo Acre, Alto Acre, Purus, Tarauacá, Envira and Juruá.

Online survey and interviews

Thirty-three people completed the online survey, with a gender breakdown of 61% female and 39% male. The majority of them work in the region of Baixo Acre (58%), Alto Acre (39%), Purus (21%), Tarauacá/Envira (15%) and Juruá (18%). This number exceeds 100% because some technicians work in more than one region. The number of respondents corresponds to Seaprof/Emater (27%), CIGA (18%), Consulplan

(15%), CTA (22%), CPI-AC (9%), Pesacre (3%), SOS Amazônia (3%) and COOTAC (3%) (Attachment 1, figures 1 to 4). These technicians confirmed that the use of ICT was useful, providing faster responses and important improvements to the quality of their services in the rural communities. Their offices are provided with landline telephones and computers with Internet access. Email is the most common tool used daily during their professional activities (Figures 5 and 6). Among the most common technologies observed by the ATER technicians in the smallholder dwellings were the TV (48%), radio (42%) and mobile phone (30%) are present (Figure 1).

The answers about how rural extension technicians communicate with smallholders revealed an evident penetration of the mobile phones in rural areas, as 67% ATER technicians use the mobile phone. Old mass communication strategies such as radio were considered powerful tools to communicate and spread information in rural communities, as 54% of ATER technicians used radios to send messages and communicate with smallholders.

There are many radio stations in the cities of the Amazon region, specifically radio programs which send daily message to people who live in rural communities close to the cities or in the inner part of the forest. These messages have a variety of content and the radio programs have a huge audience in rural communities. In general each region has a specific radio station.

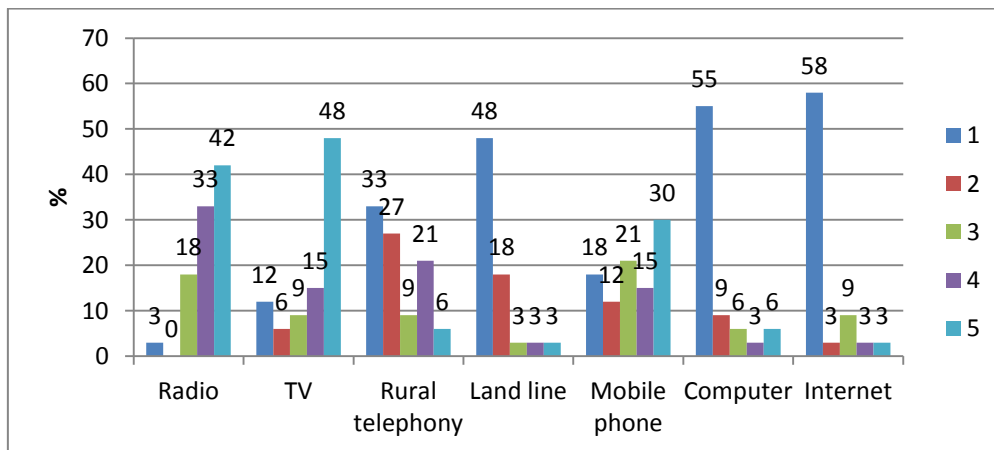


Figure 1. Common technologies in the smallholder dwellings observed by the ATER technicians in the online survey: A – total number of users and B – percentage. Selected in a scale of 1-5. Being (1) the less frequent and (5) the most frequent.

Oral communication is evident as an early practice between ATER technician and smallholders, when 64% of them confirmed that they sent messengers as a way to

communicate with people from rural communities. Smallholders used to visit the rural extension office when they came to the cities. It is an opportunity to talk with them or send a message to the community about an event, meeting, or some other specific reason. Less than half of the interviewees (42%) said that the majority of the people in the rural communities has a mobile phone, others (12%), said that less than half of people (42%) have a cellphone, and only 3% said that nobody has a cellphone. The different levels of cell phone coverage in the micro-regions of Acre where ATER technician develop their activities could have influenced in their answers.

Mobile phones were considered useful to contact the community leaders for meetings, planning, or emergency calls. Also, 73% of the technicians considered the cellphone as an ICT used to contact smallholders. (Figure 2).

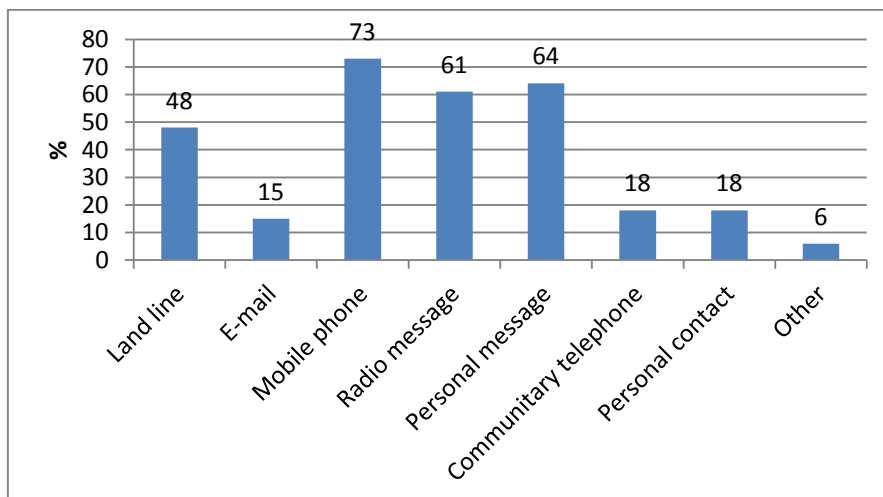


Figure 2. Main tools and methods used by the ATER technicians to communicate with the smallholders, observed in the online survey: A – total number of users and B – percentage of users.

When ask about the general benefits of ICT in rural communities, the main use of ICT is related to staying connected with relatives, friends and to facilitate emergency calls (Figure 3). Although it is not explicit, the welfare provided by staying in touch with relatives or friends is seen by the community as a common good and individuals fell proud to have access to the technology. The emotional well-being experienced by staying connected is important to motivate individuals to look for better living standards of life and new economic perspectives in their communities.

The use of ICT has provided new interactive and collaborative formats of communication in the urban and rural areas, promoting dialogue and the participation of people in several contexts of the society.

According to the interview responses, Internet access is limited to the urban centers of the municipalities. Few smallholders make use of the Internet, but they are conscious that there is huge amount of information that it could provide them. Thus, they frequently go to the rural extension offices in search of information to solve problems related to their productive activities, as well as access and compare local market products selling prices in the Internet.

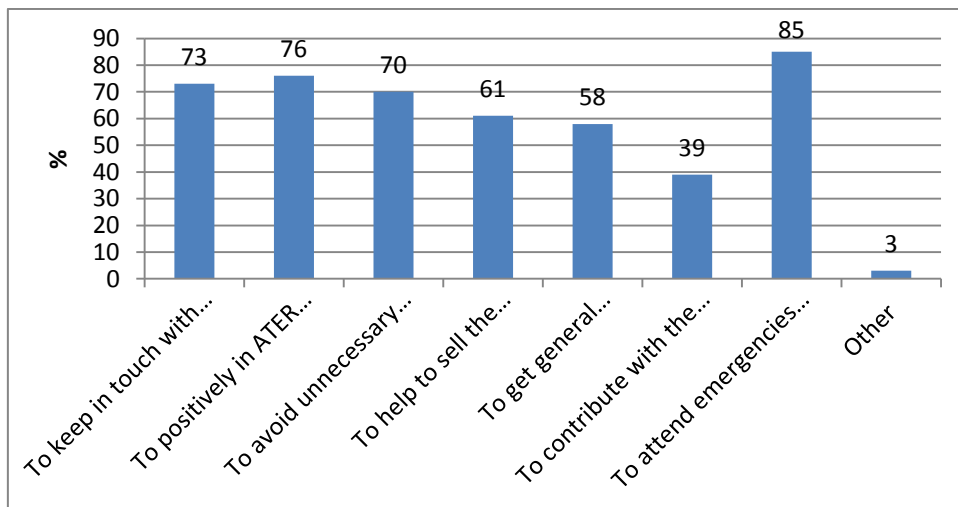


Figure 3. The importance of ICT in rural from the perception of ATER technicians. A – total number of users and B – percentage of users.

The survey revealed that in the search for solutions to solve problems related with their production activities and the need to be included in governmental programs are the two main uses of the internet to the smallholder (Figure 4).

Smallholders still do not have the necessary skills to access the Internet, they already depend of it. To have government financial support, they must be subscribed to online platform programs such as the National Program of Familiar Agriculture (Pronaf), Food Acquisition Program (PPA), Advance Purchase, and More Food. These programs incentivize the use of regional products to be delivered to people in conditions of food and nutritional insecurity and include meals served in schools. Internet access helps them to organize data and make constant contact with the headquarters of their services located in Rio Branco. According to the survey, the most frequent use of the Internet is to search for information about problems faced by the smallholders in their daily activities. (Figure 4). It increased the quality of the ATER services when

compared with isolated communities such as those located in the sub-regions of Tarauacá /Envira and Juruá.

During an interview conducted by telephone ATER technician identified the roads as the key to raising living standards in poor rural areas. However, there is expecting an increase in the research and participation of educational institutions in these municipalities to provide training, exchange information, knowledge, and technologies adapted for the region. Internet access on its own is not enough to promote the necessary changes to rural extension services.

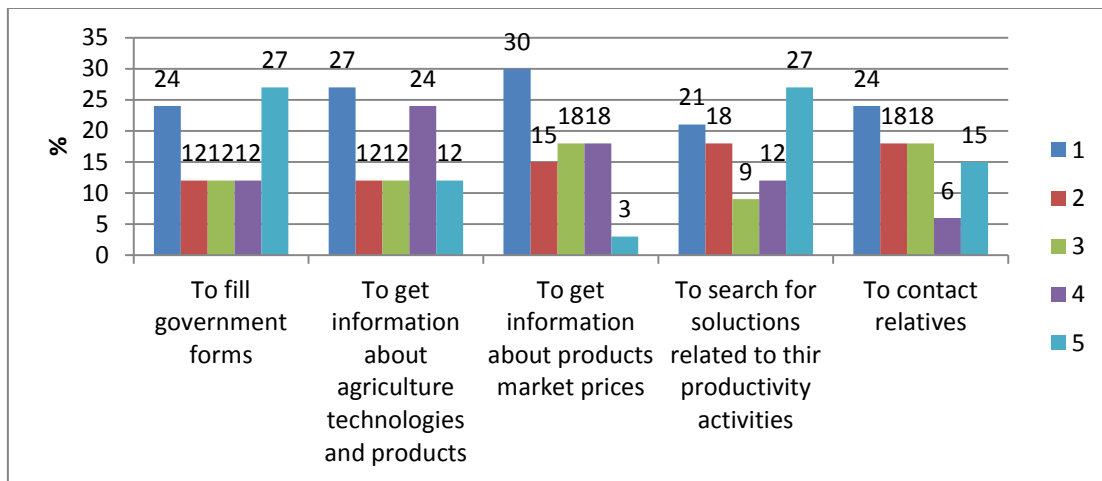


Figure 4. Smallholders demand in the Internet use. A – total number of users and B – percentage of users. Selected in a scale of 1 to 5. Being (1) the less important and (5) the most important.

Conclusion

The lack of ICT is not the main problem faced by the majority of the technicians of the rural extension in Acre State. They have already appropriated ICT in their work activities and use ICT to access the Internet, to solve problems related to work, involve smallholders in governmental platforms, and to connect with each other by email, among other activities. However, other factors related to the seasons, such as drought or excessive rain, are still a greater barrier for the technicians when trying to access small stakeholders’ properties: both river or land accesses become impossible to reach seasonally reducing the technician’s mobility and their contact with the smallholders. Internet access or a mobile phones could overcome part of this constraint, facilitating the establishment of a closer contact with the rural extension network.

The information flow is still poor in rural communities. It must be improved as a way to optimize the impact of the rural extension actions in the development of these communities. Also, it must be coordinated with the implementation of other support policies that do not relate to ICT.

Allowing the smallholders to better communicate and share information is important to build the Virtual Technological Network Information (Revitec). It will guarantee that the information shared will be available to all ATER technicians in the five micro-regions of Acre State. It is important to consider that rural communities in Acre State are not homogeneous and they face different levels of difficulties (e.g. road access, project financing, and economic activities) to increase their livelihoods standards.

This study suggests that the implementation of rural communication programs to promote the acquisition of digital literacy will increase the empowerment of rural communities by their participation in the digital world. Digital literacy can promote the development of new skills in the communities. Old technologies such as the radio are still powerful communication tools due to their popularity in rural communities and capacity to reach isolated areas in the rain forest.

Although smallholders do not have skills to lead with computers, they have already benefited from ICT, through ATER technicians, accessing governmental sites to subscribe in financial programs, looking for better prices of agricultural inputs, and for market prices of their agricultural products.

Successful use of ICT by ATER technicians is important to facilitate that the information obtained from ICT use can be passed to smallholders. It is also important to strengthen the ATER network in different sectors by sharing information among them. Through governmental programs, significant efforts have been made to guarantee that some communities in rural areas have access to ICT. These are small steps in helping to close the gap in ICT access in Acre State, mainly in isolated municipalities and rural areas. However, rural communities still have limited access basic needs such as electricity, education, health, and basic sanitation and a lot of work still need to be done.

This initial data should motivate governments and organizations to invest in more specific programs that facilitate ICT as platform to share knowledge and build capacity in rural environments. To uncover the most effective use of ICT, researchers

must continue to investigate economic, social, and cultural factors to complement the analysis of ICT adoption in Acre, considering the scarcity of literature in this field of study in the Amazon region of Brazil.

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