Assessment of Information and Communication Technologies in Afghan Agricultural Extension

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The primary purpose of the assessment was to inform project efforts and build organizational knowledge. The results have been positive in this regard, and we therefore provide the document to others with the aim to inform organizations seeking to employ information and communication technologies in Afghan agricultural development.

While we have attempted to be as thorough and objective as possible, the information in this report is not based on systematic field tests and surveys, but rather but rather interviews, case studies, and literature reviews. Consequently, we refrain from making concrete recommendations. Rather, this report should be viewed as an introduction to information and communication technologies for agricultural development in Afghanistan. Readers should also be aware that the project landscape as well as the ICT landscape in Afghanistan is changing very rapidly. Consequently, the information herein is highly time-sensitive and should be corroborated before utilization. The statements expressed herein are solely that of the authors, and do not necessarily represent the International Programs Office, the College of Agriculture and Environmental Sciences, the University of California Davis, or the United States Department of Agriculture.

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Table of Contents

A. Rationale
B. Executive Summary
C. Background
D. Challenges and Opportunities
E. The ICT Landscape
   1. Regulatory Institutions and Policy
   2. Electricity Services
   3. Mobile Phone Services
   4. Radio Services
   5. Internet Services
   6. Social Media Services
F. Summary of Initiatives
   1. Governmental Initiatives
      a) Dewae
      b) MAIL Agricultural Knowledge Bank
      c) Perennial Horticulture Development Project
      d) Radio-in-a-Box
      e) RONNA
      f) Afghan Vouchers for Increased Productive Agriculture (complete)
      g) Horticulture and Livestock Project (complete)
   2. Non-Governmental Initiatives
      a) Digital Green
      b) Plantwise
      c) Radio Azadi
      d) Way to the Village/Farmer Talk
      e) Alternative Development Program-Southwest (complete)
   3. Private Firm Initiatives
      a) Rozaneh
      b) Think Renewables
      c) Ustad Mobile
   4. University Initiatives
      a) E-Afghan Ag
F. Key Stakeholders
   a) Capacity Building and Change Management Program
   b) Cisco Networking Academy
   c) Dewae
   d) Food for Life
   e) Impassion Afghanistan
   f) Livestock Market Information Early Warning Systems
   g) Malomat
h) M-Paisa
i) PAYWAND
j) The Killid Group

H. Promising Options for Use of ICT in Afghan Agricultural Extension
1. Approaches
2. Collaborators

I. Conclusions
J. References
Rationale

Afghanistan is well suited for use of information and communication technologies (ICT) in agricultural extension, but no coherent bodies of knowledge regarding the ICT in Afghan extension landscape currently exist. This assessment aims to inform organizations seeking to employ ICT in agricultural development in Afghanistan about current players and recourses, past efforts, and potential keys to success.

Executive Summary

Although more than 80% of Afghans are farmers, little or no agricultural extension support is available in Afghanistan, promoting unproductivity, hunger, and poverty. Following decades of war, infrastructure remains largely undeveloped due to difficult geographic and security situations. Nevertheless, the communications sector is relatively well-developed, making ICT a reasonable option for improving access to agricultural information for both farmers and regional extension agents. Among a handful of existing agricultural ICT projects, there remains a dearth of services providing production information to Afghan farmers and extension agents. These circumstances present the opportunity to deliver needs-based production information to farmers and extension agents in the field. Mobile phone and radio communications are the most promising for agricultural extension. However, major challenges remain, including unreliable electricity, widespread rural illiteracy, and lack of computer skills among potential staff. Furthermore, as international project support is progressively withdrawn, adapting to the current state of ICT and the existing needs of stakeholders in Afghanistan will be key to the sustainability of any new initiatives. Promising options include reformatting existing Internet resources (i.e. RONNA, Paywand, e-Afghan Ag) for SMS and radio delivery in collaboration with well-established stakeholders in various sectors (i.e. Ministry of Agriculture, Salam Watandar, Paywast). Early involvement of such collaborators will help ensure the situational appropriateness and sustenance of such an initiative.
Summary of Challenges and Opportunities

Various opportunities make Afghanistan a great fit for ICT-based extension efforts:

- The geography is very difficult to navigate, making remote communications a more reasonable option.
- The current lack of travel budgets for district extensionists to meet in person with farmers (International Executive Service Corps 2012) makes remote communications the next best alternative.
- Few agricultural ICT services currently exist; increased competition would drive up quality and drive down prices of services (Cisco 2012).
- In-country organizations are seeking to outfit district extension (DAIL) offices with Internet access, equipment, and ICT training (International Executive Service Corps 2012), creating an important opportunity to integrate reliable ICT services into these extensionists’ portfolios.
- ICT could allow extensionists and farmers to share their knowledge and discoveries with the wider community, helping meet the great need for production of local scientific knowledge and content (MAIL 2012b; Hamdard 2012).
- Prolonged war has generated a generational knowledge gap among farmers, extension agents do not have access to updated information, and even material taught by universities may be more than 30 years old. ICT would enable access to updated information.
- ICT is typically well-received by youth, who compose a significant majority of the Afghan population (65% are under 25 years) (USAID and Gharib 2013).
- Illicit crops currently lack comparable alternatives with respect to reliable sales (MAIL 2012b), often because markets (particularly value-added markets) (ibid) are unknown or unavailable to farmers; ICT offers the opportunity to connect market stakeholders.

Likewise, some challenges exist, including:

- Security remains fragile, threatening ICT infrastructure and individuals who share information across ICT channels.
• Tariffs remain among the highest in the geographic region due to a combination of poor security, high energy costs, and pro-market policy (Lokanathan 2012) (see Regulatory Institutions and Policy section).
• Electricity is not generally available in rural areas (see Electricity Services section).
• Technology and network access remain limited (Hamdard 2012).
• Illiteracy rates are very high (Ministry of Education 2008). This makes SMS impossible for most, even while voice services remain costly (see Mobile Phone Services section).
• About 62% of Afghans are in poverty or highly vulnerable to falling into poverty (IFAD 2010). This makes paying— even for beneficial services— unviable for most households.
• Infrastructure necessary for ICT functionality (towers, lines, etc.) remains very limited in rural areas.
• Land productivity is low in many areas, limiting the benefit:cost ratio for paying for extension services (MAIL 2012b).
• Widespread corruption discourages trust or investment in institutionalized systems (Cochran Afghan Fellows 2013).
• The workforce is largely untrained, and even the most qualified individuals (such as Ministry of Agriculture personnel) have limited ICT skills (MCIT 2012).
• The significant digital gender apartheid limits women’s access to and understanding of ICT technologies (Wilcox 2013), thus reducing the potential user base and impact.
• The country lacks international trade relationships and economic integration (Fick and Lockhart 2010), thus limiting market opportunities and subsequently the cost:benefit ratio of paying for extension services.
• Existing extension projects are expensive, uncoordinated, and run by a myriad of donors (International Executive Service Corps 2012).
• Afghans culturally prefer receiving information from personal contacts than scientific or institutionalized sources (like databases, libraries, etc.) (Wilcox 2013).
Background

Thirty-five years ago, Afghanistan was producing a gamut of agricultural goods, including nuts, fresh and dried fruits, leather, cotton, and wool. The country also became renowned for its carpet and embroidery production, which was fed by crop and animal agriculture. Exports at the time were valued at 600 million USD (FAO 2013). Protracted war and violence has left Afghanistan in a very different situation, with more than 35% of the population unemployed, and an equivalent amount living in poverty (CIA World Factbook 2013). Nevertheless, as Afghanistan seeks to rebuild itself, agriculture continues to hold perhaps the greatest potential in creating national and international socio-economic stability. Unfortunately, the dramatic instability faced by rural families has made illicit production of drugs an attractive alternative to the products traditional grown in Afghanistan; these unlawful crops promote the cycle of violent extremism. Fostering legitimate agriculture would encourage economic growth and create jobs, as well as slow a major source of funding for extremist groups. Some of the most promising opportunities for agricultural export include fruits (such as grapes, pomegranates, and melons), nuts (including almonds and pistachios), spices (such as saffron and cumin), and animal products (such as leather and wool) (Fick and Lockhart 2010).

Currently, only about 10% of farmers receive any sort of information on agricultural production, and 15% of herders have access to veterinary services. Furthermore, even the quality and delivery of these extension services are weak and inadequate (MAIL 2012b); extension agents have no information access, and even material taught by universities may be more than 30 years old. Afghan extension agents have expressed great need for access to reliable, updated extension information (Cochran Afghan Fellows 2013; Priorities Identification Workshop Participants 2014). When compared to the robust support network provided to farmers by developed country extension services, this description makes clear the truly dire situation Afghan farmers face in merely feeding their own families. Nearly all of Afghanistan’s 34 provinces contained rugged terrain, and lack transportation infrastructure and stable electricity (Euromonitor 2012). Additionally, extensionists lack travel budgets (International Executive Service Corps 2012), and the rural areas remain insecure and often violent. This combination of circumstances makes face-to-face agricultural extension seem an unlikely prospect. Information and communication technologies, used in concert with credible and reliable information sources, may offer a unique opportunity to overcome these formidable challenges. Nevertheless, Afghans
traditionally prefer personal sources of information to institutionalized or standardized ones (Cochran Afghan Fellows 2013). This makes extensive education on accessing, adapting, and applying the information provided an indispensable part of any ICT initiative (Wilcox 2013).

The population data of Afghanistan is controversial and very likely unknown, given that the only population census ever executed in Afghanistan (1979) was aborted due to security problems (MAIL 2012b). The CIA World Factbook reports approximately 31.8 million people in July 2014. Afghan government statistics suggest much lower numbers ranging between 24.3 and 27.3 million (MCIT 2012; Afghan Central Statistics Organization 2014). Consequently, percentages and numbers given here may clearly vary based on actual population (Hamdard 2012). About 49% of the population is female, and 65% is under the age of 25 (USAID and Gharib 2013).

The ICT Landscape

Regulatory Institutions and Policy

The Afghan telecommunications sector is overseen jointly by the Ministry of Communications and Information Technology (MCIT) and the Afghan Telecom Regulatory Authority (ATRA). MCIT designs and implements sector policy. ATRA oversees license provision, renewal, and modification; regulatory compliance; and consumer interests (Lokanathan 2012). Relevant policies to this assessment include (Lokanathan 2012):

- Telecommunications Services Regulation Act -the ‘Telecom Act’-(2005) mandates:
  - Non-discriminatory entry of service providers and operators to the market. This includes allowances for 100% foreign ownership of telecommunication companies and 100% profit transfer out of the country.
  - All operators with Significant Market Power (SMP) must provide interconnection where needed. Interconnection rates have to be cost-based and non-discriminatory. While there are no operators with SMP yet, this rule is being enforced for all operators.

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1 An SMP operator holds more than 25% of a telecommunications market in the geographic area in which it is allowed to operate (OECD 2005).
• Tariff regulation for operators with SMP, including publishing and filing latest tariffs with ATRA, and obtaining ATRA approval for new services or changes to tariffs. Again, while no Afghan companies currently have SMP, all operators are being required to submit their tariffs.
• Regulation of competitive process and anti-competitive practices.
• Granting of ATRA with dispute resolution power.
• Universal service charge of 2.5% of gross revenues for GSM operators and 1.5% to LFSP operators.
• Basic quality of service standards and associated fines for non-compliance, as determined by ATRA.

- Open Access Policy (2012) ensures access to shared and scarce resources through the principles of non-discrimination, transparency and cost-based pricing. It particularly addresses the access to the National Optical Fiber Cable (OFC) currently owned by Afghan Telecom, a national provider. ATRA will define service quality guidelines and propose a tariff plan for Afghan Telecom. ATRA conducts market analyses periodically to ensure that no abuse of SMP has occurred with respect to shared infrastructure.

- Telecom Development Fund (2008) is administered by ATRA and aims to establish connections in isolated regions, particularly in rural and insecure areas. ATRA identifies projects, requests proposals, and assigns the contract/license to the selected operator.

Other government strategies to promote telecommunications include (Shareef, Dzhusupova, and Janowski 2011; Lokanathan 2012):

- e-Government (2006) includes, among others objectives, the improvement and creation of websites for government agencies and seven national universities, the establishment of an ICT center of excellence (Kabul IT-Park) to foster high-technology business, and improvement of ICT training and digital literacy.

- m-Government (2012) promotes the use of mobile applications throughout the government for better public service delivery and program management. It also includes an innovative grant program to assist ministries in implementing mobile-based solutions.

2 Global System for Mobile communications (GSM) is an open digital cellular technology used for transmitting mobile voice and data services (GSMA 2013).
3 Local Fixed Service Provider.
Electricity Services

Although a prerequisite for nearly all forms of communication technologies, electricity remains an infeasible luxury for most Afghans. While the Afghan Energy Information Center reports that 36% of Afghans have 24-hour electricity, this mean is skewed upward by urban centers, where the average sits at 70% (Flak 2012). Based on a total population of 31 million (CIA World Factbook 2013), only about 25% of rural households (which compose more than 75% of the total population) have access to electricity. Although vast solar, wind, gas, and thermal resources imply that Afghanistan could produce up to 23,000 MW, existing Afghan power stations can only produce about 500 MW. Additionally, Da Afghanistan Breshna Sherkat (DABS), the national power utility, reports that only about half of this is actually produced due to resource shortages and poor facility maintenance. Consequently, Afghanistan relies heavily on power imports from neighbors, as well as costly, inefficient diesel generators (Flak 2012). Given the time and expense of even the most feasible improvement plans, this situation is unlikely to change in the near term (ibid).

Mobile Phone Services

As of December 31, 2012, MCIT reported that more than 88% of the Afghan population lives in a mobile phone coverage area. About 63% of rural people and 94% of urban dwellers use mobile phones, for a total of 19.67 million mobile phone users in country (72%) (MCIT 2012). Generally areas without mobile phone service are those beyond the outskirts of provincial capitals (Sharifi 2013). Although electricity is not the norm in rural areas, mobile phone users charge their devices with vehicle motors, generators, and other sources of energy (ibid). Since mobile phones first became available in 2002, the cost of ownership has decreased by about 97% thanks to pro-market policies (Lokanathan 2012) and healthy competition between providers (Hamdard 2012). This cost decrease has enabled rapid adoption of mobile phone technology. Because of their ubiquity, mobile phones have particular potential for distributing information (Wilcox 2013), especially to literate individuals, such as extension agents (Cochran Afghan Fellows 2013).
As of 2012, 48% of Afghan women own a mobile phone, and 32% have access to a family member’s phone (USAID and Gharib 2013). These are striking increases from 2002, when 0% of Afghan women owned or had access to mobile phones (ibid). Nevertheless, there remains significant gender discrimination regarding cell phone access: about 9% of women report that they cannot afford the service; the remaining 11% lack permission from their family (ibid). This suggests that some portion of those who share phone access may also be restricted in the degree and type of information and/or communication access that they are permitted.

While SMS services are affordable, the cost of phone calls remains formidable for most Afghans. As of 2014, it cost about 3 Afghanis (AFN) (0.054 USD) per minute to make a phone call (Roshan 2014). Given the 2013 average per capita income of ~24,400 AFN (World Bank 2014), 1 hour of phone calls per month would cost about 8.9% of user salary. In terms of the 2011 American average per capita income, that would be like paying 394 USD per hour of talk time out of a 53,143 USD annual income (World Bank 2014). In combination with rampant illiteracy, these costs may limit the feasibility of mobile phone-based agricultural extension efforts in Afghanistan. Nevertheless, the novelty of mobile phones makes many people more willing to front the cost of calls (Cochran Afghan Fellows 2013), suggesting that at least initially these costs may be less of an obstacle than they may appear.

In addition to a form of communication, mobiles are a source of entertainment for Afghans. Street vendors offering music and game packages for download via Bluetooth or mobile memory cards are common. These vendors may be an important opportunity for dissemination of mobile-based extension content, including audio, video, and images. Additionally, the popularity of such services implies that Bluetooth and removable memory cards are widely used by Afghanistan.

In addition to two fixed line operators (Hamdard 2012), there are five exclusively-mobile operators in Afghanistan (Gonzalez Palau 2011; Salaam 2014):

- Afghan Wireless (AWCC) (3.5 million subscribers, 20%)
- Roshan (5.6 million subscribers, 32%)

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4 1 USD = 57.58 AFN. Xe.com, November 21 2014.
- MTN Afghanistan (4.5 million subscribers, 26%)
- Etisalat (3.5 million subscribers, 20%)
- Salaam (~700,000, 4%)

Roshan is currently the largest telecommunications providers in the country, providing mobile GSM service across all 34 provinces of Afghanistan, 230 districts, and all major cities (Roshan 2014). Roshan is the largest taxpayer and one of the largest employers in Afghanistan (Cisco 2012). Salaam, a service of the Ministry of Telecommunications and Information Technology, was launched in 2013 and markets itself as an approachable and low-cost option for mobile services, including 3G.

The establishment of infrastructure associated with mobile communications has given insurgent groups a point of leverage. Damage and destruction of mobile towers and electrical generators have been frequently used as a statement by rebel groups; during the 2009 presidential elections alone, the Taliban blew up 18 Roshan towers (Himelfarb 2010; Lokanathan 2012). Taliban has also been known to demand shutdown of mobile services in an effort to thwart international military activity. Consequently, towers are generally turned off at night in the southern and eastern parts of the country, where the Taliban presence is strongest. Nonetheless, this obstacle has been at least partially overcome by providing compensation (both monetary and electrical) to nearby communities that protect towers (Himelfarb 2010).

Radio Services

During the past 30 years of war, BBC Persian long-range AM radio broadcasts served as the singular source of news for most Afghans (Azizi 2011; Sharifi 2013). This long-standing source, in combination with the affordability and accessibility of radio technology, has embedded radio deep in the rural Afghan culture as a trusted source of news and information (Sharifi 2013). Today, while a rapidly developing (MCIT 2014c) television media movement has begun to gain attention in urban areas (Siddiq and Page 2012), radio remains the principal and often only source of news and entertainment for rural Afghans. Currently, 83% of rural Afghan households own a functional radio (compared to 73% in urban areas), and 80% of rural people listen to the radio (65% in urban areas). Men (83%) are more likely to listen to the radio
than women (69%) (The Asia Foundation 2012). While electricity is the exception in most rural communities, radios can be powered on batteries, which are inexpensive and widely available (Sharifi 2013). Radio also sidesteps the widespread illiteracy (90% of women and 63% of men) of rural Afghanistan.

As of 2010, there were over 175 radio stations in Afghanistan (Azizi 2011), including about a dozen international broadcasters and the national provider, Radio Television Afghanistan (RTA) (CIA World Factbook 2013). RTA has superior reach into rural areas (Azizi 2011); the international stations, including BBC (London), Azadi (Prague), and Bayan, among others, also enjoy a wide reach via AM channels, and have established various FM stations in recent years. The aforementioned broadcasters transmit sophisticated international news segments interspersed between programs designed for rural Afghan audiences in colloquial language.

Local radio stations have experienced substantial investment from development imperatives. The main driving force here has been the US media organization Internews. Internews helped establish more than 40 local FM stations, has trained hundreds of radio station staff (Siddiq and Page 2012), and has provided programming materials through a distribution service. In combination with innovation and commitment, this has resulted in at least a few successful stations. Some of these stations provide SMS services to people outside of coverage areas; this has proved valuable in emergency situations. Unfortunately, commercial investment remains limited, making it a struggle for these stations to break even without investor support (ibid). This problem is at least partially based in the very low numbers of local businesses looking to advertise. Consequently, radio programs appear and disappear every few months, and rural audiences are often unaware of the shows airing or their schedule (Cochran Afghan Fellows 2013).

Thanks to its low cost, accessible technology, wide reach, and non-literate approach, radio technology is by far the easiest way to disseminate information to rural populations (Cochran Afghan Fellows 2013). Nevertheless, radio is not without its detractors; some feel the lack of visual input makes information conveyed by radio impossible for uneducated populations to grasp (Wilcox 2013). Furthermore, the grass-roots approach that makes local radio stations so
approachable also has its challenges; their relative vulnerability has seemingly created security
issues that have perhaps thwarted or deterred more radio-based extension efforts (Ayesha 2011;
Effective Civil Partnerships n.d.). Furthermore, radio-based extension projects are for the most part unreported, making their methodology and results impossible to analyze. Finally, radio broadcasters typically work with only an Internet-connected computer and a personal mobile phone (Cochran Afghan Fellows 2013), suggesting that they may be underprepared to accommodate their own success.

Internet Services

To date, the Afghan government has licensed 51 internet service providers (ISPs) (ATRA 2013; MCIT 2012). At least 33 are in operation (Hamdard 2012). Nevertheless, Internet penetration remains at just 5% (~1.5 million users) in Afghanistan (Internet World Stats 2014), and about 5.6% of Afghans (up from <1% in 2012) go to the Internet for news and information (The Asia Foundation 2012; The Asia Foundation 2014). These statistics are likely due to a combination of high illiteracy and exorbitant service costs (Lokanathan 2012). Indeed, MCIT (2014a) recently announced that 1MB Internet service is now just 67 USD per month, down from 97 USD in 2013, 300 USD in 2012 and 5000 USD in 2002 (MCIT 2012). While these improvements are vast, an average per capita income of less than 40 USD per month keeps internet access far out of reach of the vast majority of Afghan households. Nonetheless, as with other telecommunications, the Internet is progressing quickly. The installation of a 4810 km national fiber-optic backbone (up to STM-64\(^5\)) was begun in 2007 via funding from World Bank and the Afghan government (Hamdard 2012). The project is being implemented in three phases, and upon completion will connect all 34 provinces to 5 international neighbors (Lokanathan 2012). To date, this cable fully connects 20 provinces, partially connects 5 provinces, and connects Afghanistan to Iran, Pakistan, Tajikistan and Uzbekistan (MCIT 2014a). Upon completion, the optical fiber cable (OFC) will connect all 34 provinces to the three main Internet routes in the region (the Trans-Siberian Fiber, Trans-Euro/Asian Fiber and the SE-ME-WE-4 undersea cable system). Given this strategic geographic location, the OFC could collect significant revenues from North-South transit tariffs (Lokanathan 2012). Concomitantly, Internet

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\(^5\) The highest transport hierarchy with a bit rate of ~10 Gbit/s.
usage, particularly of Facebook, is increasing rapidly: 1 in 3 Afghans reported the Internet as their primary source of information during the 2014 presidential elections (The Asia Foundation 2014).

Five mobile service providers (MTN, Roshan, Etisalat, Salaam, and Afghan Wireless) now offer 3G service (Gonzalez Palau 2011; MCIT 2012), which is used by almost all laptop owners in Afghanistan. Those with smart phones are also able to route computer Internet connectivity through their mobile devices. Both 3G technology and the fiber optic cable are expected to further reduce the cost of internet access (ibid.). Nevertheless, Internet literacy remains very limited; many Afghans are unaware of even basic functions (i.e. search engines) and use Internet access almost exclusively for social media (see below).

Social Media Services

Afghans—in particular young people— are very interested in social media. Limited Internet accessibility implies that only educated, employed Afghans participate in social media at the moment. However, as home, work, and mobile Internet access become increasingly more affordable, the Afghan presence in social media forums will increase. Facebook is currently by far the most popular social media outlet, and many times the only Internet service Afghans know how to use. Many organizations and government entities host Facebook pages. Twitter and LinkedIn are also commonly used. Bulk SMS-based social networking is also available through Paywast to users of AWCC, MTN, Etisalat, and Afghan Telecom (Paywast 2012). Paywast also offers advertising, among other services.
Summary of Initiatives

Completed, current and anticipated ICT extension initiatives in Afghanistan employ mobile phones, Internet, radio, video, social media, and computers. A summary of these projects is found in the table below in alphabetical order. Projects are then categorized by implementing sector (Government, NGO, Private, or University) and described in greater depth; where cross-sectoral collaborative implementation occurs, the project is listed under the implementing sector named first in the table. Within each category, projects are alphabetized, with current projects preceding completed projects.

Surprisingly, very few projects have utilized ICT to address agricultural development. For those projects that have been undertaken, information regarding what has worked well and what has not is difficult to glean; international funding marches on regardless of project status, and likewise ends at the appointed time indiscriminately of the success of the project. To boot, impact and lessons learned are frequently not well evaluated or recorded. Conflicting anecdotal project evaluations highlight the importance of local and up-to-date input when assessing any project’s reach and effectiveness.

The lack of initiatives which fully engage with ICT to address the agricultural extension needs of Afghans has not gone unnoticed—fully half of those projects listed below of which ICT is central to their approach are new or prospective. Furthermore, while relatively few efforts currently employ ICT for agricultural extension, both ICT literacy/access and extension as separate topics are well addressed. These projects hold obvious sway over future initiatives to employ ICT in extension; as such, they are described in the Key Stakeholders section below.
<table>
<thead>
<tr>
<th>Program Name</th>
<th>Years Active</th>
<th>Implementing Organization and Sector</th>
<th>Donor Organization and Sector</th>
<th>Reach</th>
<th>ICTs Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghan Vouchers for Increased Productive Agriculture</td>
<td>Completed in 2011</td>
<td>MAIL and Office of Foreign Disaster Assistance (Government)</td>
<td>USAID and UKDID (Government)</td>
<td>Northern, western, and central regions</td>
<td>radio, mobile</td>
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<tr>
<td>Alternative Development Program-Southwest</td>
<td>Completed in 2011</td>
<td>Tetratech (Private)</td>
<td>USAID (Government)</td>
<td>Farah province</td>
<td>radio, television</td>
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<tr>
<td>Capacity Building</td>
<td>2014+</td>
<td>Prosperity Group and Paywast (Private)</td>
<td>Unknown</td>
<td>Unknown</td>
<td>mobile, internet</td>
</tr>
<tr>
<td>Dewae</td>
<td>2013-2017</td>
<td>MCIT and other ministries (Government)</td>
<td>World Bank (Government)</td>
<td>Whole country</td>
<td>Mobile, internet, computer</td>
</tr>
<tr>
<td>Digital Green Afghanistan</td>
<td>2014+</td>
<td>Digital Green (NGO)</td>
<td>Gates Foundation (NGO), DFID, Indian Government, Ford Foundation, Vodafone Foundation, Deshpande Foundation</td>
<td>Multinational</td>
<td>video, computer</td>
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<tr>
<td>Horticulture and Livestock Productivity Project</td>
<td>Complete</td>
<td>MAIL (Government)</td>
<td>World Bank (Government)</td>
<td>unknown</td>
<td>radio</td>
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<td>MAIL Knowledge Bank</td>
<td>Ongoing</td>
<td>MAIL (Government) and e-Afghan Ag (University)</td>
<td>USDA (Government)</td>
<td>Worldwide</td>
<td>internet</td>
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<td>Perennial Horticulture and</td>
<td>2006-2015</td>
<td>MAIL (Government)</td>
<td>EU (Government)</td>
<td>Worldwide</td>
<td>internet</td>
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<td>Development Project II</td>
<td>Start/End</td>
<td>Owner</td>
<td>Supporter</td>
<td>Reach</td>
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<td>Plantwise Afghanistan</td>
<td>2012-present</td>
<td>CABI (NGO)</td>
<td>EU and various European</td>
<td>Worldwide</td>
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<td>governments (Government)</td>
<td>internet</td>
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<td>Radio Azadi</td>
<td>1985-1993,</td>
<td>Radio Free Europe (NGO)</td>
<td>US Congress (Government)</td>
<td>60% of the population</td>
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<td></td>
<td>2002-present</td>
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<td></td>
<td>radio</td>
<td></td>
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<tr>
<td>Radio-in-a-Box</td>
<td>2005-2014</td>
<td>Agricultural Training</td>
<td>Commanders’ Emergency</td>
<td>National (~100 stations)</td>
<td></td>
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<td></td>
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<td>Program (Government)</td>
<td>Response Program and USDA</td>
<td>Radio, mobile, computer</td>
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<td></td>
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<td>(Government)</td>
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<td>RONNA</td>
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<td>ISAF (Government)</td>
<td>ISAF (Government)</td>
<td>Worldwide</td>
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<tr>
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<td>prospective</td>
<td>Medea Group Ltd (Private)</td>
<td>unconfirmed</td>
<td>Whole country</td>
<td></td>
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<td>mobile</td>
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<td>Way to the Village/Farmer Talk</td>
<td>2003-present</td>
<td>Salam Watandar (NGO)</td>
<td>USAID (Government)</td>
<td>Whole country</td>
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<td>radio</td>
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<td>Think Renewables content library</td>
<td>Prospective</td>
<td>Think Renewables (Private)</td>
<td>Self (Private)</td>
<td>Kabul, seeking to expand</td>
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Government Initiatives

The line between governmental and nongovernmental initiatives is often blurred in development scenarios. Consequently, only projects enacted by a governing body (national or foreign) have been included in this section. Nevertheless, foreign government funding lies behind nearly all of the projects listed in this report. As international forces begin to withdrawal from Afghanistan, projects that are established and grow within the Afghan government structure are becoming increasingly relevant to the country’s ability to independently sustain much of what has been developed to date.

Dewae

Dewae was approved in June 2013 (Jansen 2013) as part of the e-government/m-government initiatives (see The ICT Landscape, Regulatory Institutions and Policy) and is managed by the Ministry of Communications and Information Technology and the Afghan Information Management Services (AIMS). Dewae seeks to support the development of mobile solutions to challenges in service delivery, program management, and performance management (MCIT 2014b). Existing challenges are proposed by individuals or entities; others (individuals or entities, including those outside Afghanistan) may then propose a basic (Idea) or detailed (Practice) mobile application solution during one of the annual open application periods. Accepted proposals are awarded grants of up to 80,000 USD by AIMS for development; a total of 187 awards will be granted in 5 rounds. The second round of awards were granted in November 2014 (MCIT 2014a). Sustainability of the solution is an important component of the application. Two projects to date directly address agricultural systems: one proposes improved extension services to farmers, and a second aims to give the public access to food product expiration information. The project contact in MAIL is the head of the ICT department, Mr. Stanikzai. (Mohammad Rafi 2013).
MAIL Agricultural Knowledge Bank

In response to suggestions from MIS and USDA, MAIL began pursuing the concept of establishing an in-house Internet-based extension knowledge bank in early 2013. The knowledge bank is housed in the National Data Center servers (http://mail.gov.af/en/page/extensions) (Hughes 2013). A provisional workgroup was formed in August 2013 and officially appointed by the Deputy Minister in October 2013. As of August 2014 the project had 9 full-time employees, office space within MAIL, and a portion of the MAIL budget. Nevertheless, outputs have been limited due to the lack of training and leadership of the full-time staff. Importantly, the work group official Terms of Reference recognizes the role of student interns from Kabul University in the working group, marking a crucial first step toward collaborative extension between the university and MAIL. The e-Afghan Ag team has been working closely with MAIL on this endeavor, including providing training and material transfer. MAIL has expressed interest in eventually linking a mobile extension platform and/or call center to the material available on the Internet knowledge bank. As of late 2014 the Knowledge Bank began a formal collaboration with Digital Green to prioritize video development.

Perennial Horticulture Development Project

The PHDP focuses on improvement of germplasm and nursery production of tree crops in Afghanistan. The project’s website provides free access to three online manuals related to nursery development and tree crops in Afghanistan, available in English, Dari, and Pashto (PHDP/MAIL 2012).

Radio-in-a-Box

The Agricultural Training Program has sought to augment the reach of the Afghan government agricultural extension service by placing educated Afghans (or American native Dari/Pashtun speakers) at district centers (Effective Civil Partnerships n.d.; Anonymous 2013). These agricultural trainers are armed with tools such as Radio in a Box (RIAB) (Effective Civil
Partnerships n.d.); however, access to updated technology equipment is limited, so the implementers often seek third party support (Anonymous 2013). The radio stations are managed by military personnel (ibid). Every station is different, but typical programming includes music, news, public announcement, and education programming and takes listener calls (ibid). There is currently very little agricultural programming, but managers are seeking to integrate more. Radio scripts approved by the SECDEF, Public Affairs Office, or U.S. country team are utilized (ibid). Advertising is through limited flyers and word of mouth; frequently these stations are the only ones airing in the region (ibid). Security has been a challenge to this project, as insurgent threats resulted in a significant decrease in topic requests and feedback (The World 2010), and some evidence suggests that RIABs can be readily converted into IEDs (Hughes 2013). Radio stations’ degree of success and lifespan vary; they typically last between 6 months and 3 years (Anonymous 2013). The long-term goal is to pass on these radio stations to the Afghan government after the American withdrawal in 2014 (ibid).

RONNA

The RONNA website aims to provide a central platform for information-sharing and collaboration between the many governmental and non-governmental actors in Afghanistan. It hosts a broad range of information related to Afghan reconstruction and development efforts, including a special archive devoted to agricultural education and training. Any organization or institution can upload materials to the site, and RONNA contains hundreds of bilingual lesson plans, Power Point presentations, and other training materials in topics ranging from horticulture and agronomy to value chain analysis and natural resource management (RONNA/ISAF 2013). The open-access nature of this site generates a large volume of online materials of variable quality that must be vetted by the user. RONNA houses an extensive archive of radio scripts in Afghan local languages on many agriculture and livestock topics, many of which appear to have been used by Radio Azadi (see Radio Services section).
Afghan Vouchers for Increased Productive Agriculture (complete)

The AVIPA project conducted some of its agricultural relief and stabilization training via radio. A phone-in option enabled farmers to contact district extension agents and university experts (International Relief and Development 2013).

Horticulture and Livestock Project (complete)

This project, implemented by MAIL, included bi-weekly radio programs covering agricultural extension projects in Dari and Pashto (MAIL 2012a; Ayesha 2011). As part of the monitoring and evaluation of this program, an ICT-based geo-locations output monitoring system was designed, piloted, and subcontracted to Afghan Information Management Services (AIMS) (AIMS 2013; MCIT 2012).

Non-Governmental Organization Initiatives

With few exceptions, agriculturally-focused NGOs in Afghanistan are funded by the United States government. While USAID-funded projects will continue to work in Afghanistan indefinitely, many other American government sources of funding (i.e. USDA) will come to an end along with the withdrawal of the American presence in Afghanistan.

Digital Green

Digital Green trains rural community members as video production teams. These teams of three individuals then work within the community to capture agricultural knowledge and share it throughout the community. Digital Green posts all videos online and maintains a complex Internet-based analytics system to help users determine which videos were most helpful, popular, and etc. More recently, Digital Green has implemented quality control checks to ensure that information captured on video is approved by local extension agents as best management practices. Digital Green works in various countries in south Asia and Sub-Saharan Africa and is will begin a pilot program in Afghanistan in late 2014/early 2015. The organization is seeking in-country collaborating organizations which offer significant expertise and connections in rural
areas. As of late 2014 they began collaborating with the MAIL Knowledge Bank on video development.

**Plantwise**

Plantwise was established in Afghanistan in 2012. The program trains ‘plant doctors’ who then hold weekly ‘office hours’ in rural public locations to assist farmers in identifying samples of plant pests and diseases (Faheem 2013). The results and ‘prescription’ are recorded and drive the development of fact sheets on the same (in English, Dari, and Pashto) (ibid), which can be found in the Plantwise online knowledge bank (CABI 2013). As of 2014 there are 52 plant doctors hosting 27 Plantwise clinics in Afghanistan. 30 fact sheets have been produced in English and Dari and are available via the Plantwise website. After approximately 5 years of such data collection, Plantwise expects to be able to predict future agricultural events throughout the country (Faheem 2013).

**Radio Azadi**

Radio Azadi claims to reach 60% of the Afghan population with 12 hours of broadcasting per day in Dari and Pashto (RFE/RL 2013). Although programming focuses on news and entertainment, Radio Azadi appears to broadcast educational programming on agricultural topics as well. In 2012 Radio Azadi began using interactive SMS service to allow listeners to access bilingual content on mobile phones as well as give feedback and suggestions on programming. In 2011 they added an IVR component. The SMS service was established via an agreement with Etisalat, and is free of charge to Etisalat subscribers (unavailable to non-Etisalat subscribers) (RFE/RL 2013).

**Path to the Village/Farmer Talk**

Way to the Village and Farmer Talk are radio shows aired several times weekly by Salam Watandar (SW) (Maimanagy and Kadrie 2013), a now-independent radio broadcaster formerly part of Internews (Internews 2013). Recordings occur in Kabul and are transmitted live to
partner radio stations in all 34 provinces (Maimanagy and Kadrie 2013), making SW one of the most wide-reaching stations in the country. While the station covers a wide variety of topics, agriculture and gender issues are current priorities (ibid). Both shows are hosted by agricultural experts which return ‘missed calls’ from farmers (to save the farmer phone charges) and field their questions on their air (ibid). These shows furthermore report on weather, agricultural news, and MAIL activities and commitments (ibid). SW makes a point to discuss MAIL’s commitments to farmers with the farming community, and collect feedback from farmers on whether these commitments have been kept (ibid).

Since the inception of these two shows in 2011, records have been kept of agricultural events and issues reported by farmers to SW, as well as what the experts at SW recommended in each case (ibid). Based on this data, SW reports that agribusiness and small farm marketing concepts are nearly absent from the rural Afghan culture; most farmers only expect to ‘survive’ and do not consider production in terms of profit (ibid). SW identifies the introduction of such concepts as the most pressing need for their audience. Additionally, SW is seeking to create an agricultural map of Afghanistan based on the database of agricultural events over the past two years, in order to begin to predict future events (ibid).

**Alternative Development Program-Southwest (complete)**

The Alternative Development Program-Southwest supported production and value chains of licit crops to reduce dependence on opium production in Farah, Nimroz, Uruzgan, and Helmand provinces between 2008 and 2011. As part of a key partnership with the provincial governor of Farah, ADP-SW developed television and radio social messaging campaigns spearheaded by local government.
Private Firm Initiatives

The greatest potential of private initiatives lies in their capacity to economically self-sustain, in contrast to NGO and most government and university initiatives, which rely solely on donor funds.

Capacity Building

Prosperity Group offers various services, including agricultural project implementation, environmental impact assessments, irrigation assessment and planning, and renewable energy systems. As part of their capacity building effort, Prosperity has contracted Paywast (see Social Media Services) to send bulk-SMS to farmers 1-4 times/month on topics such as new technologies, weather forecasting, crop calendars, and diseases. The service is accompanied by community-level field demonstrations of new technologies, where kitchen garden drip irrigation kits are distributed free of charge. Discounts on product purchases are provided to subscribers. As of December 2014 Prosperity Group was seeking farmers interested in subscribing.

Rozaneh

Rozaneh is a smartphone-based mobile extension effort currently under development by the Medea Group, Ltd., which also owns Kuza Doctor and Backpack Farm, both of which are based in Kenya. The team hopes to launch the first phase of the product in early 2015 (Zedeck 2013a; Zedeck 2013b). Smartphone technology remains uncommon in Afghanistan, particularly in rural areas.

Think Renewables

Think Renewables markets e-library (equipped with a variety of content in English and local languages) and conferencing equipment to benefit Afghan NGOs. As of April 2014 e-Afghan Ag materials—also publicly available on the e-Afghan Ag website—were added to the content of the e-library equipment.
University Initiatives

**E-Afghan Ag**

E-Afghan Ag is a website initiative managed by University of California Davis (UC Davis 2013). The project was initially funded by USDA; as of 2014 it was merged with the Afghan Agricultural Extension Project II, funded by USAID. The project supplies Afghanistan-specific agricultural production information to those providing extension services to farmers in Afghanistan. Information is organized by both crop type and province and is presented as downloadable manuals, fact sheets, images, power points, and videos. Geographic, natural resource, market, and cultural orientation information are also provided. Though mainly a one-way information delivery system, e-Afghan Ag permits questions and feedback via both the website and its Facebook. Through these channels, users can send pictures and questions from the field for identification and advice by UC Davis experts. The target audience for this site is primarily English-speaking government and NGO intermediaries; indeed, in contrast to other initiatives (such as PAYWAND), even the project name and website layout has been designed to appeal to left-to-right English readers (Altai Consulting 2012). Nevertheless, the website has been identified as the most promising complement to the MIS intranet system that MAIL intends to begin using (ibid). Complete translation to Dari and Pashto, as well as significant marketing under a culturally appropriate name, would be keys to the success of such an effort.

**Key Stakeholders**

While relatively few efforts to use ICT for agricultural extension exist in Afghanistan, both extension and ICTs are popular development initiative topics. These projects hold obvious sway over future ICT extension efforts. Computer training, database compilation, and ICT access efforts are particularly important in that they help add ICT to the toolkit of agricultural extensionists. This, in turn, fosters organic growth of sustained, independent, needs-driven ICT extension services. As such, extension stakeholders and ICT stakeholders are listed below, along with contacts from the ICT extension stakeholders described in the previous Summary of
Initiatives section. As needed, some organizations are further described in the paragraphs that follow, listed alphabetically.
<table>
<thead>
<tr>
<th>Organization or Initiative</th>
<th>Activity (Sector)</th>
</tr>
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<tbody>
<tr>
<td>AAEPII</td>
<td>Extension support (NGO)</td>
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<tr>
<td>Altai Consulting</td>
<td>Assessment of projects and services (Private)</td>
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<td>ANGeL Centers</td>
<td>Computer literacy for university students (NGO/University)</td>
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<td>Brotheran Ahmad Khishke</td>
<td>Livestock supply (especially young chicks)</td>
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<td><strong>Capacity Building and Change Management Project</strong></td>
<td>Capacity building and improved technology access in MAIL and DAILs (NGO)</td>
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<td>Cisco Networking Academy</td>
<td>Computer networking training (Private/University)</td>
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<tr>
<td>Dewae</td>
<td>Mobile solutions for Afghan government (Government)</td>
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<td>Digital Green</td>
<td>Video extension (NGO)</td>
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<td>e-Afghan Ag</td>
<td>Online extension (University)</td>
</tr>
<tr>
<td>Etisalat</td>
<td>Mobile services (Private)</td>
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<tr>
<td><strong>Food for Life</strong></td>
<td>Improve data collection and access (Government)</td>
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<tr>
<td>iMMAP</td>
<td>GIS services for NGOs (NGO), including agricultural information</td>
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<tr>
<td>Impassion Afghanistan</td>
<td>Mobile and social media solutions (Private)</td>
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<tr>
<td>Kabul Agricultural Institute</td>
<td>Training (University)</td>
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<tr>
<td><strong>Livestock Market Information and Early Warning Systems</strong></td>
<td>Market and crisis information network (University)</td>
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<td>Ministry of Agriculture, Irrigation, and Livestock</td>
<td>Government extension services, Facebook page (Government)</td>
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<td>MAIL Knowledge Bank</td>
<td>Online extension information (Government)</td>
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<td>Medea Group Ltd.</td>
<td>Mobile extension services (Private)</td>
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<td>Malomat</td>
<td>Market intelligence (Private)</td>
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<td>M-Paisa</td>
<td>Mobile payment services (Private)</td>
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<td>Noor Agro Group</td>
<td>Agricultural Supply</td>
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<td>Novin Intelligent SMS</td>
<td>SMS services (Private)</td>
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<td>People in Need</td>
<td>Agricultural curricula development for vocational and high schools</td>
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<td>Paywand</td>
<td>Market and weather data</td>
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<td>Paywast</td>
<td>Bulk SMS and other mobile services (Private)</td>
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<td>Plantwise Afghanistan</td>
<td>Rural extension support</td>
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<td>Salam Watandar</td>
<td>Farm radio broadcasting</td>
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<tr>
<td>Tech Times Afghanistan</td>
<td>National ICT newspaper</td>
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<tr>
<td>Timur Shahe shirkat</td>
<td>Livestock supply (especially young chicks)</td>
</tr>
<tr>
<td>The Killid Group</td>
<td>Magazine and radio (Private)</td>
</tr>
<tr>
<td>Think Renewables</td>
<td>e-library and conferencing equipment</td>
</tr>
<tr>
<td>Ustad Mobile</td>
<td>Education through mobile technology</td>
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<td><strong>Women in Agriculture (AAEP)</strong></td>
<td>home garden field schools (NGO)</td>
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Afghan Next Generation e-Learning (ANGeL) Center

ANGeL university learning centers are funded by USAID. These centers give students and faculty access to digital library systems and e-learning resources, such as online journals and academic papers (USAID 2013). There are currently eight ANGeL centers at universities throughout Afghanistan (Beebe 2010); Kandahar University’s ANGeL Center opened most recently in 2010. IT skills instruction and an International Computer Driver’s License (ICDL) curriculum are available at the centers and online. This program supports instruction in information technology, English, and e-learning for Kandahar University faculty and students (USAID 2013).

Capacity Building and Change Management Program (CBCMP)

The CBCMP program was initially funded by USDA (2011-2014) and now operates under USAID, implemented by IESC and VEGA. Unlike most projects in Afghanistan, CBCMP is fully embedded in MAIL. As part of CBCMP’s efforts to increase the effectiveness and efficiency of the Afghan Ministry of Agriculture, Irrigation, and Livestock (MAIL), they have worked to improve the MAIL ICT system. Results include: automatic generator to address unstable electricity (fuel and maintenance provided by MAIL); recruitment and training of local staff in all provinces; training staff in digitizing records; and installation of a fiber optic cable to increase bandwidth and decrease cost. The CBCMP invested in IT hardware at the DAIL level on the condition that MAIL fund an IT position at every DAIL as of 2012, and through 2014 expanded the automated systems, Internet connectivity, and IT training to key DAILs.

Cisco Networking Academy Program

This e-learning program was established through a partnership between UNDP, Cisco Systems, MCIT, and the International Telecommunication Union (Cisco/USAID/UNDP Networking Academy Alliance 2006). The program was introduced and initiated in Kabul in 2002. Trainings have taken place at Kabul University’s Faculty of Computer Science, the MCIT Telecommunications Training Center, the Ministry of Women’s Affairs, the American
University of Afghanistan, and in Khost, Mazar-e-Sharif, and Herat provinces (Cisco Academy 2013). The program teaches IT skills and qualifies students to pursue various industry-standard certifications in IT management.

**Food for Life**

Food for Life, Component 1 of the Agriculture and Rural Development (ARD) Cluster of the Afghan National Priorities Program, proposes to increase by 35% the farmers who have access to ‘evidence based, up-to-date, accurate, and relevant market information’ as well as ‘develop effective food security interventions and emergency response.’ For 2013-2015, their efforts will be focused on improving and disseminating national databases of agriculture-related information. The Strengthening Agricultural Economics, Market Information, and Statistical Services (FAAHM) project, funded by the EU and FAO through 2012, is working toward establishing agricultural statistics, market supply and price updates, an early warning system, a survey program, and a land cover dataset. Climatic and weather data was collected through the Agro-Meteorological Project (funded by FAO and USAID) through 2012; the Afghan government is looking to continue this project. The USAID-sponsored Famine Early Warning System Network (FEWSNET) keeps stock of climatic, crop, water, livelihood, and food commodity conditions; this project was handed over to the Afghan government in 2010 and will continue under USAID funding. The Management Information Systems (MIS) project provides MAIL leadership with decision-making databases, including provincial and national planning and monitoring and evaluation information. It also records crop production, market, climatic, and import-export data. Taken as a whole, the success of these initiatives will be a key step toward providing necessary agricultural extension information to Afghan farmers. (MAIL 2012b)

**Livestock Market Information System and Livestock Early Warning System (complete)**

The LMIS/LEWS program was designed to disseminate livestock market and forecast information via SMS for portions of Afghanistan (GL-CRSP n.d.; LMIS 2013). The target audience included producers, wholesalers, and traders. LMIS/LEWS was USAID funded and
implemented by UC Davis and Texas A&M. Funding ended in 2010, and the concept has not been continued by MAIL (Altai Consulting 2012).

**Malomat**

Malomat was taken over from the IDEA-NEW program (funded by USAID) (IDEA-NEW 2012) by Roshan in 2011 (Cisco 2012). The service provides real-time supply, demand, and pricing information via SMS and IVR for 30 commodities. Growers and traders can post and exchange alerts. Customers pay regular message or airtime charges and can opt to subscribe to regular alerts. Services are provided in Dari, Pashto, and English (Cisco 2012). As of 2012, Malomat reported serving just under 600 farmers and 20 traders with information on 30 commodities. Wilcox (2013) finds that this service is little known and virtually unused by Afghan extension agents. At the same time, local extension agents report relying on the service for their own market value reports (Cochran Afghan Fellows 2013). No independent external impact study has been conducted (Lokanathan 2012).

**Ministry of Agriculture, Irrigation, and Livestock (MAIL)**

The Afghan Ministry of Agriculture, Irrigation, and Livestock has demonstrated a sincerity and commitment to results in recent year that was previously not observed. Progressive, internationally-trained Afghans are increasingly placed in high-level positions as the previous generation retires. Early and complete engagement with MAIL is essential to the sustenance of any extension project. MAIL hosts a Facebook page, which is regularly updated with photos and news bytes on Ministry activities. As of May 2014 the page had about 2,400 ‘Likes’.

**M-Paisa**

M-Paisa is a mobile money exchange network launched in Afghanistan by Vodaphone Global in 2006. Traveling long distances to carry out loan transactions has been a constraining factor on farmers seeking microloans. Consequently, to help promote microlending, M-Paisa specifically targets microfinance clients, including small farmers, to facilitate mobile loan repayment.
(Roshan 2011). Services are available via SMS and IVR in Dari, Pashto, and English, and operates on Roshan, the largest mobile network in the country (Roshan 2013). M-Paisa established a partnership with the First Microfinance Bank of Afghanistan to facilitate repayment through M-Paisa. Similarly, an agreement with the Agricultural Development Fund (ADF) allows members of the Eastern Region Fruit Growers Association (EFGA) to repay loans through M-Paisa (Roshan 2011).

**PAYWAND**

The PAYWAND website is implemented by DAI and MAIL and funded by USAID and MAIL. It provides value-added data on market prices, meteorology, trade flows, value chains, productivity, and geography (MAIL 2012b). This data is derived from MAIL, the Afghan Ministry of Finance, and other sources. PAYWAND includes all the agricultural market information available in Afghanistan, and can be accessed in English, Dari, and Pashto (USAID and MAIL 2012). PAYWAND was originally created independently of MAIL but has recently been integrated into the MAIL website.

**Tech Times Afghanistan**

Tech Times, the first ever ICT newspaper of Afghanistan, was launched in November 2014 by MCIT during the distribution of second term awards of the Dewe project. The newspaper will aim to increase customer awareness of local and international companies working in the ICT sector. The newspaper will be available in Pashto, Dari, and English, with approximately 10,000 copies in circulation across Afghanistan and relevant foreign offices.

**Ustad Mobile**

Ustad Mobile is free, open-source software that facilitates access to or creation of educational materials to be delivered via mobile technologies ranging from feature phones to tablets. Progress tracking and support services are available for a fee (Ustad 2014). Ustad is an excellent example of how the existing popularity Bluetooth and memory cards can be built upon.
Unfortunately the applicability of Ustad is still limited; most Afghans, particularly in rural areas, have basic ‘dumb’ phones. Furthermore, due to the variability of programming among feature phones, Ustad content will unpredictably not function on about half of feature phones available in Afghanistan, even when specifications are apparently met. Finally, successful transfer of content from the computer interface to mobiles requires technical skills beyond that of even well-educated government employees. Nevertheless, with some important software refinements and continued evolution of technology access, Ustad’s approach holds good potential.

Promising Options for Use of ICT in Afghan Agricultural Extension

Approaches

The use of ICT in agricultural extension must consider accessible and reliable technologies, as well as credible relevant agricultural information. Given the tenacious complexity of the challenges that Afghanistan faces, the successful use of ICT to complement governmental extension efforts will require appealing to the current strengths of the communications system in Afghanistan (mobile and radio services), rather than attempting to bolster its weaknesses (electricity access, literacy rates, poor infrastructure, etc.).

The use of multiple technologies and approaches (i.e. combining traditional extension methods with ICT-based ones) is a condition for success in ICT-based agricultural development initiatives (UC Davis ICT Team 2013). Such amalgamation is strikingly absent in the initiatives that have been executed or planned in Afghanistan to date. This may be attributable to the scarcity of national enterprise and local non-governmental organizations; in other developing nations, such as Ghana and Tanzania, locally-based groups have typically been those most inclined to employ various complementary technologies and services (Bell, Bohn, Santibanez, et al. 2013; Bell, Bohn, Teiken, et al. 2013). Nevertheless, socio-economic conditions and, subsequently, technology access are improving at great speed in Afghanistan. Such patterns suggest that we can expect imminent and swift further change in this recovering nation.

Although Afghans, and particularly the young generation, are highly attracted to technology, a lack of professional computer skills among even high-level Afghan government
employees remains a significant barrier to the success of ICT-based initiatives. Substantial training is necessary to help staff feel comfortable adding technology to the toolbox they use to address issues in agriculture. Importantly, such training will also ensure that government staff is able to employ ICT skills to adapt and implement future solutions, rather than relying on outdated solutions designed by others.

A combination of mobile and radio technologies, possibly complemented by Internet, social media, app, or voice services, is most likely to be successful in Afghanistan. These often-overlooked technologies of Bluetooth and mobile memory cards hold good potential; they are already popular, and furthermore, they utilize not only ICT but also the in-person interactions essential to building trust. This balanced approach is one of the keys to success in ICT initiatives.

On-demand information tends to be far more successful than bulk SMS pushes. For example, automated voice and/or SMS systems allow users to browse a bank of tips and production information to access exactly what information they need. It is particularly important in this case that the system tailor options available to the user at time of access based on the season, crop, and user’s region; reducing the options and degree of navigation necessary to arrive at the desired information is essential for farmers who may be unaccustomed to working with such technology; furthermore, it reduces the time required to access the desired information, and consequently how much the user pays for the service. Voices that are easy for the user to understand (i.e. employ local intonation and vocabulary) and match the topic at hand (i.e. women’s voice for crops typically tended by women) are essential in building trust of the user (Grewal et al. 2012). It is important to note that voice (versus keypad) navigation is typically easier for new users to grasp (ibid), although this also increases cost. A smartphone application could supply similar access to the knowledge bank of tips, although this technology is still not commonly accessible in rural areas. Whatever service is made available, a free trial period would help catalyze adoption (Cochran Afghan Fellows 2013), and the implementers should keep in mind that services adopted by DAIL agents will eventually win the trust and interest of farmers as well (ibid).
An excellent complement to a user-accessible knowledge bank would be on-demand expert consultation. Voice and/or SMS queries could be received by a mediator and routed to an appropriate expert. The mediator would then supply the response to the user (via SMS, callback, or radio broadcast, for example), and record the question and response for future reference. Thus, over time the mediator would increasingly be able to use the bank of FAQs to respond to queries, and need for expert consultation would concomitantly decrease (Boyera 2013). An existing knowledge bank such as e-Afghan Ag may be particularly useful in enabling the mediator to respond to queries quickly without expert consultation. SMS-to-email functions would be one option for communication between user and mediator.

In addition to mobile phones, radio holds great potential for reaching farmers directly (Sharifi 2013; Cochran Afghan Fellows 2013). Consequently, making extension material available to radio providers, such as Azadi Radio, Salam Watandar, and The Killid Group, may be a simple and effective approach to helping Afghan farmers improve production. Radio broadcasters may be excellent mediators for expert consultation programs. In exchange, these radio providers may be an excellent resource for MAIL of user needs and feedback information; furthermore, there would be the opportunity to advertise other services available online or on mobile phones (see above) via radio. In any case, standardization of radio transmissions, such that the station, schedule, and phone number are predictable, will be keys to success (Cochran Afghan Fellows 2013).

Collaborators

One possibility for establishment of mobile extension system is collaboration with an in-country mobile server (or several), such as that achieved by Azadi Radio (see Initiatives by NGOs section); the new national mobile provider Salam may be of particular interest. Rozaneh, Ustad Mobile, and Paywast may be good collaborators for ventures concerning smart, feature, and basic cell phone technology, respectively. Alternatively, RapidSMS (RapidSMS 2013) and GovDelivery (GovDelivery 2010) offer platforms for mobile services; Google has also been involved in automated SMS response projects (Innovations for Poverty Action 2011). Salam Watandar Radio, which has demonstrated a commitment to expanded and improved agricultural
radio programming, may prove an invaluable partner in reaching farmers and rural extension agents directly.

Regardless of the approach taken, keeping MAIL central to every step of the process will help ensure local ownership and endorsement of the project, thereby promoting its long-term sustainability. Key to MAIL’s successful involvement will be ongoing training and support in the skills needed to build and manage ICT-based extension systems that are user-friendly, credible, and needs driven. The CBCMP project (see Initiatives by NGOs section) in many ways addresses this aim; collaboration with the CBCMP team may therefore create beneficial synergy of efforts.

Conclusions

Afghanistan has faced a dizzying onslaught of international donors and actors working independently and often competitively within its borders over the past 13 years. Nevertheless, significant and unfulfilled needs remain in agricultural extension. Perhaps most astonishing is the paucity of attempts to utilize ICT to improve agriculture in Afghanistan, especially given the success of Afghan communications relative to other sectors and the attraction of young Afghans to technology. Nevertheless, new and prospective projects will be seeking to capitalize on the opportunities of ICT to overcome the geographic, financial, infrastructure, and security challenges to agricultural extension.

Given the tenacious complexity of the challenges that Afghanistan faces, the successful use of ICT to complement governmental extension efforts will require appealing to current strengths rather than attempting to bolster its weaknesses. Accessible and multiple technology initiatives hold the greatest potential for success. At the same time, adequate training in technologic proficiency will be necessary to ensure continued innovation. Such investments in capacity building will help pave the way toward an independent and effective Afghan national extension system.
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