

## **An FAO e-mail conference on agricultural innovation systems and family farming: The moderator's summary**

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### **Executive Summary**

From 4 June to 1 July 2012, the UN Food and Agriculture Organization (FAO) hosted a moderated e-mail conference on "Ensuring the full participation of family farmers in agricultural innovation systems: Key issues and case studies". It was a highly successful global dialogue, with a very stimulating discussion. About 560 people subscribed to the conference, of whom 114 people (20% of the total), from nearly 50 different countries, wrote at least one of the 242 messages that were posted. Greatest numbers came from people in India, Cameroon, Italy, Uganda, Nigeria, Ghana, Kenya, the Netherlands, the Philippines, Zambia, Brazil, Sri Lanka, Switzerland and the United States of America respectively. Almost 80% of messages came from people living in developing countries. Regarding their occupation, 26% of messages came from people working in research institutes; 20% in universities; 17% in non-governmental organizations; 16% in Government ministries or bodies; 9% in the private sector; 7% from people working at FAO or development agencies and 5% from independent consultants and farmers. The large volume of messages and the tremendous enthusiasm with which people discussed the various issues highlights that the topic of agricultural innovation systems and their potential impact on family farming is currently of major interest.

This document first describes the background to the conference, why it was held and the process leading up to it, and then summarizes discussions on the issues that received most attention in the conference. These issues were:

- 1. Farmer innovations:** Due to changes in farming conditions and circumstances, farmers continually innovate over time. These innovations are rarely documented, even though they could be of major benefit to other farmers. There was clear agreement that they should be documented, and several ongoing initiatives were described. While farmers are experimenting and innovating independently, closer links with formal scientific research were called for to allow independent scientific validation of the merits of the innovations and to allow the scientific community to learn from and build on the farmer innovations.
- 2. Farmer organizations:** The importance of farmers organizing themselves in order to be fully integrated in agricultural innovation systems (AIS) was emphasized. It was argued that their empowerment through collective action in farmer organizations (FOs) would provide family farmers with a wide range of different advantages in key areas of AIS. It was also argued that, although important for other considerations, organization of farmers might be of unique importance in AIS. Participants noted that organization of farmers has not always been successful in practice and that, although FOs are very important, specific individuals ('champions') can also play a key role in AIS.
- 3. Access to market:** There was agreement in the conference that the availability of market opportunities is of crucial importance for adoption of innovations by family farmers. Market access provides incentives for farmers to produce more and to use innovations. Smallholder farmers need, however, to overcome a number of challenges to take advantage of emerging market opportunities. The importance of using the value chain approach was highlighted.
- 4. Research and extension:** The importance of both research and extension was underlined in the conference. In AIS, participants maintained that research and extension had to become more demand-driven and that their roles and functioning needed to change so that research organizations, extension agencies and farmers were more closely interlinked and that there was better communication and coordination between them. To achieve this, it was argued that the system of incentives for researchers should be changed and that dedicated brokering might also be necessary.

**5. Risk associated with innovation:** An important underlying theme running throughout the conference was that resource-poor family farmers wish to minimize risk and that this has a major impact on their adoption of innovations. If wishing to support AIS and ensure that AIS benefit resource-poor family farmers, this key issue needs to be addressed and understood. Participants proposed a number of strategies to deal with this issue.

**6. Women farmers:** There was consensus in the conference that greater recognition should be given to the central role that women farmers play in agriculture, rural development and food security and that equal and full attention should be given both to men and women farmers to enable them to participate in, and benefit from, AIS.

**7. Youth:** The conference also highlighted the importance of young people for agriculture and family farming and that farming needs to be made more attractive to prevent them moving to non-agricultural activities. To do this, emphasis should be placed on farm profitability and entrepreneurship development. Social/cultural issues are also important and the perception of farming for youth needs to be improved. Wider use of information and communication technologies (ICTs) in farming can also help to increase the appeal of agriculture to young people.

**8. ICTs:** The positive role that the rapid and revolutionary developments in ICTs can play to ensure that family farmers may fully participate in AIS was probably the single issue that attracted most attention throughout the conference. Particular focus was given to mobile phone technologies which, albeit not without challenges, can be used successfully for different purposes in AIS, such as bringing farmers closer to markets; linking farmers to each other and to extension agents; giving farmers improved access to technical knowledge; and for documentation of farmer innovations. The role of radio was also underlined, because of its wide acceptability, availability, low cost and use of local languages.

**9. Innovation brokers:** AIS are complex systems with many potential actors. To make AIS work better, participants saw a key role for innovation brokers, described as the “lubricants of the innovation engine”. There was much discussion about who the innovation brokers could be and who should pay for these services. There seemed to be consensus that innovation brokers did not have to be specialized organizations and that different kinds of AIS stakeholders could potentially play this role. Discussion about payment indicated that this was a difficult question with no straightforward answers.

## **1. Background to the e-mail conference**

In December 2011, the UN General Assembly in New York declared 2014 to be the International Year of Family Farming and invited the UN Food and Agriculture Organization (FAO) to facilitate implementation of the International Year, in collaboration with its partners. Among its initiatives for the International Year, FAO is planning to publish a major study on family farming and agricultural innovation systems (AIS) in 2014 as part of its State of Food and Agriculture (SOFA) series.

As part of its initial preparations for this major study, FAO organized a number of initiatives. The first was an Expert Consultation on AIS and family farming that took place at FAO Headquarters on 19-21 March 2012 (FAO, 2012a). About 40 people from 14 countries participated, consisting of invited experts and FAO staff from Headquarters and its regional offices. They provided guidance and inputs on developing the study, specifically covering areas such as the state of agricultural innovation and key issues and gaps in knowledge on agricultural innovation. A highly participatory approach was used throughout the three-day meeting to encourage full engagement of participants in discussions (FAO, 2012a).

The second initiative was an e-mail conference on "Ensuring the full participation of family farmers in agricultural innovation systems: Key issues and case studies", which took place from 4 June to 1 July 2012. Its aim was to build on the results of the Expert Consultation and to broaden the discussion to a bigger and more global audience, focusing on the issues that determine whether family farmers can fully participate in, and benefit from, AIS and on what policy-makers can do to ensure fuller participation of family farmers in AIS. The e-mail conference gave participants the opportunity to discuss these issues, as well as to share case studies and lessons learned from practical experiences in agriculture (where the term 'agriculture' includes the crop, livestock, forestry, fishery and aquaculture sectors). The conference was organized by the FAO Research and Extension Branch (OEKR) and moderated by John Ruane from OEKR.

A few days before the conference began, the moderator sent a short Background Document (FAO, 2012b) to the conference subscribers. The document explained why FAO was hosting the conference; provided definitions of some key terms relevant to the conference; presented key issues that had been identified at the FAO Expert Consultation as having a major impact on whether family farmers can benefit from AIS [i.e. organization of farmers; characterization of actors in AIS; research; extension and advisory services; access of farmers to markets; the private sector; funding and investment; measuring the impact of interventions to strengthen AIS to benefit family farmers]; and provided specific guidance to participants about the questions that they should address in the conference.

In the opening message to the conference, the moderator welcomed the participants to the conference and briefly reminded them of some of its main guidelines, i.e. that participants should introduce themselves briefly in their first posting to the conference; they are assumed to be speaking on their own behalf and not on behalf of their employers; and messages should not exceed 1000 words.

Section 2 of this document presents the moderator's summary of the main issues that were discussed during the conference. Section 3 gives a brief analysis of participation in the conference – including where the participants come from and what kind of work they do.

## **2. Summary of the main issues discussed in the conference**

During the 4-week conference, a total of 242 messages were posted and sent out to all the subscribers. They are available on the web, in chronological order, at <https://listserv.fao.org/cgi-bin/wa?A1=ind1206&L=AIS-L&O=D&H=0&D=0&T=1> and the message archives are searchable, with a 'free text' search button on the right hand side of the webpage. They are also available as a single PDF, at [http://www.fao.org/fileadmin/user\\_upload/oekekr/pdf/aismsgs.pdf](http://www.fao.org/fileadmin/user_upload/oekekr/pdf/aismsgs.pdf) (1.2 MB). Messages were numbered from 1 to 242 in order of posting to allow easy cross referencing in the conference. Some of the individual messages are referred to in this document, where the number of the

message is provided within brackets. These messages, as well as all the others posted in the conference, can be read in their entirety through the web links provided earlier in this paragraph.

It was an extremely rich and inspiring discussion, where participants considered a wide range of issues that are relevant to AIS and family farming. In this short summary document, it will not be possible to do justice to and describe all the ideas, experiences and specific lessons learned which abound in the messages. The purpose here is to summarize discussions on the main issues that received most attention in the conference. These nine issues are summarized in Sections 2.1 to 2.9.

## **2.1 Farmer innovations**

The importance of farmer innovations was highlighted right from the beginning (e.g. Messages 1, 12, 31, 40). Many participants underlined that due to changes in farming conditions and circumstances, farmers continually innovate over time, a process that is triggered by “the macro- and micro-environmental changes that a farm family faces each day” (133). It was also pointed that even when farmers import innovations, they will often adapt them to their own specific environment (41).

These innovations are rarely documented, even though they could be of major benefit to other farmers in the same region or country or indeed to farmers in other countries who might be facing similar challenges. There was therefore clear agreement that farmer innovations should be documented. Several initiatives which are actually doing that were described (e.g. 7, 10, 29, 45, 96, 129). Many of them use information and communication technologies (ICTs) as part of the process (see Section 2.8 for more details). For example, Digital Green documents farmer innovations in India using video and then shows the videos at villages to share the knowledge with other farmers (174, 188).

Another example is the Grameen Foundation in Uganda that, using a team of 800 community knowledge workers around the country, captured farmers’ local innovations using smartphones and shared them with farmers and other stakeholders through various channels of communication (10, 28, 175). They learned some important lessons from this exercise (28), i.e. that documenting local innovations needs an effective two-way communication system between farmers and research/extension workers; an effective way of verifying the information provided by farmers (some practices may be detrimental); that the message should be kept as original as possible when capturing, processing and documenting the innovation; that participating farmers should have access to the final documentation and innovations from other farmers to keep them motivated; and that information collected should not be used for commercial purposes (otherwise farmers may demand payment for their participation and false information may be given just to get money).

While farmers are experimenting (‘trial and error’) and innovating independently, several participants argued also for closer links with formal scientific research in order to allow independent scientific validation of the merits of the innovations and to allow the scientific community to learn from and build on the farmer innovations (e.g. 38, 45, 59, 80, 118, 160). Thus: “There is need to get specific localized knowledge, practicalities and realities of farming in smallholder agriculture when redesigning innovations and this cannot be over-emphasized. A call for farmers’ integration into scientific long term projections is paramount” (127).

There was some discussion, without consensus, regarding whether the resources spent in documenting farmer innovations were excessive compared to those spent supporting use of innovations for farmers (118, 128, 138, 145, 146).

## **2.2 Farmer organizations**

Repeatedly throughout the conference the importance of farmers organizing themselves in order to be fully integrated in AIS and to benefit from the empowerment their collective action provided in key areas of AIS was emphasized (e.g. 3, 44, 77, 164).

It was argued that their collective action through farmer organizations (FOs) would provide family farmers with a wide range of different advantages in AIS, enabling them to:

- benefit from the negotiating power it provided in buying farm inputs and selling farm produce (55);
- benefit from value chains [“Farmer organizations help to leverage the weight of farmers within the value chain” (37) and “the majority of strong farmer organizations have been built around the value chain approach” (105)];
- access rural credit without having to pay exorbitant interest rates (55);
- share storage facilities and transport possibilities, so that post-harvest losses can be reduced (55);
- communicate with extension agents in a collective and cost effective way (3);
- document farmers traditional knowledge (31);
- access funds dedicated to AIS support (176, 198).

It was also argued that, although important for other considerations (such as food security programmes), organization of farmers might be of unique importance in AIS (27, 35). Thus, “transaction costs are just too high to work with individual farmers and both for extension, input supply and milk marketing, the benefits from organizing smallholder farmers in groups are just enormous. Besides, innovations are (socially) much better acceptable within groups and of course the economy of scale also counts” (35).

A couple of participants also highlighted the role of higher-level FOs in AIS-related governance issues, e.g. playing a mediator role regarding funding (176), underlining the need to strengthen national, sub-regional and regional farmer federations (198).

Participants noted, however, that organization of farmers has not always been successful in practice. FOs may be established only because there is a project and funding (236), their leaders may be corrupt [“Farmer organizations and associations have also failed to make a difference because they are selfish and corrupt” (46)] and may not really represent the farmers [“voting in representatives who will truly talk and work on behalf of the ordinary members is not straightforward. Often, externally funded projects tend to select (even co-opt) representatives that fit their own criteria, but might not be the best from the viewpoint of the farmers themselves” (29)]. Their small scattered units of production may also make it difficult for farmers to form valid associations (88).

An interesting point that arose is that there may also be regional specificities regarding FOs. For the Eastern Europe and Central Asia region, where there has been an overall shift from collective to individual land tenure in post-socialist countries, one of the conclusions from a recent FAO expert panel discussion on AIS in the region was that “cooperatives and farmer organizations can have a role to play but it was recognized that there is still mistrust among the actors and farmers themselves in post-socialist countries” (221).

Although FOs are very important, some participants also underlined the key role that specific individuals (‘champions’) could play (29, 37, 60, 70, 208), e.g. “one should not underestimate the role of individuals within each stakeholder group (farmers and farmer organizations included) to champion innovation dynamics, get interactions going and overcome obstacles and tensions. Such individuals, often referred to as innovation champions, are really the movers in innovation dynamics. Scouting them, then supporting them is an important task (requisite?) for anybody interested in fostering innovation” (29). The inspiration provided by a single journalist/farmer in the Philippines is a good example (147).

### **2.3 Access to market**

There was agreement in the conference that the availability of market opportunities is of crucial importance for adoption of innovations by family farmers.

The topic was mentioned in some early messages, but came firmly to the fore in the second week when participants (e.g. 79, 84, 90) emphasized the importance of having a market for products. Thus,

one participant wrote “This is the issue I was waiting for. All other aspects (which methods and media, who pays who does not pay, etc.) are secondary. What we need is an integrated approach, that looks holistically at the farm/livelihood. Where/which is the market? The family members themselves? The village? The traditional middlemen? The nearby town? A supermarket chain? A foreign market? Fair trade or conventional one?” (86). The importance of policies to link farmers to markets was therefore emphasized by many people in the conference (e.g. 54, 213).

For the farmers, a key issue is “show us the market” (98). In the absence of a market, farmers lack the incentives to produce more food and participants reported their direct experiences of such situations in Africa (76, 84, 90, 98). On the other hand, when a market is assured, this fosters technology adoption as “the farmer can invest wholeheartedly because risks such as market price volatility are reduced and the time wasted in searching for markets is saved” (76). Successful examples were cited, involving maize farmers in Kenya and cassava farmers in Uganda (76) as well as yellow maize farmers in Togo (105), where contracts were signed with farmers before the harvest and it was guaranteed that they would sell their produce.

However, in order for smallholder farmers to take advantage of emerging market opportunities, a number of challenges need to be overcome, including:

- lack of valid farmer associations (e.g. 88, and see Section 2.2);
- lack of access to market information (88); a challenge also illustrated by the case of beef cattle farmers in Indonesia (65). The potential positive role that ICTs can play in this area was highlighted by many people (e.g. 149, and see Section 2.8).
- lack of roads and rural infrastructure (e.g. 5, 88); a challenge also mentioned for Nepal (25) and West Africa (223).
- poorly functional local markets with large seasonal price fluctuations (88); a scenario also described in the Philippines (24).
- poor service by agricultural traders (88). The problem of farmers being exploited by middlemen was mentioned for Indonesia (65) and Uganda (94) and participants called for policies which would protect farmers.

A number of participants highlighted the importance of using the value chain approach to allow farmers to benefit from market opportunities (36, 71, 94, 105, 181).

## **2.4 Research and extension**

The themes of research and extension were raised very often throughout the entire length of the conference and were often discussed together. The importance of both research and extension was underlined in the conference. In AIS, participants maintained that research and extension had to become more demand-driven and that their roles and functioning needed to change so that research organizations, extension agencies and farmers were more closely interlinked and that there was better communication and coordination between them.

For research, improved linkages with farmers and extension services would mean that farmers would be able to access, and benefit from, the work of researchers while researchers would be able to learn from, and build upon, farmers’ knowledge and innovations. In order to do this, it was argued that the system of incentives for researchers should be changed, so that it was not simply based on academic achievements (e.g. 19, 31), i.e. where “researchers are working on experimental farms to publish papers and climb the career ladder” (150). The problem, however, is that the current system does not encourage researchers to engage more with farmers and include them in their work. Thus: “engaging in demand-driven research in partnership with many stakeholders is considered risky, scientifically aleatory (few publications, usually not along disciplinary lines, published in journals which are typically not very prestigious, etc.). Can this be changed? For many research institutions, this is very tricky, as it means going against a whole system. Finding the few margins where there is more freedom to operate is desirable but not always possible. And it usually comes at a cost for those who

do it!" (29). Many initiatives to bring farmers and scientists together are, nevertheless, ongoing (e.g. 103).

For extension, participants highlighted the need to move to more interactive, demand-led and market-oriented extension services, where extension agents would play a greater facilitatory role (e.g. 89, 198). The role of ICTs, particularly based on the mobile phone but also radio, were seen as playing an important, and increasing, role in facilitating communication between family farmers and extension agents (e.g. 20, 167). It was noted that agricultural innovation may also be influenced by recent institutional changes regarding extension, such as the emergence of regional and global extension networks (198).

For both research and extension, participants argued that there had been substantial under-investment in the past (e.g. 213). For example, in some countries the extension services are virtually non-existent or seriously overstretched (e.g. 19, 20, 53, 87). Another issue that participants raised on numerous occasions (e.g. 20, 66, 74, 150, 181) was that there was a tendency for agricultural research and extension to focus on better-off farmers living in more advantaged areas and that incentives were needed to counteract this.

In order to really get research, extension and family farmers to work together, it was argued that dedicated brokering and facilitation might be necessary (e.g. 119). Changing the mindsets of researchers, extension agents and farmers to enable them to collaborate was cited as one of the critical issues for AIS (e.g. 38, 43, 51). One participant described the challenges that farmers, extension agents and researchers faced in a EuropeAid-financed project in West Africa, noting that the challenges were successfully overcome through a patient trans-disciplinary approach, a process which however required time and money (179).

## **2.5 Risk associated with innovation**

An important underlying theme running throughout the conference was that resource-poor family farmers wish to minimize risk and that this has a major impact on their adoption of innovations.

As mentioned in many messages (e.g. 70), smallholder family farmers are not a homogenous group. They can be roughly divided in those that are market-oriented with an entrepreneurial and risk-taking mindset and those that focus on household food self-sufficiency, who also sell surpluses and aim at low risk production (e.g. 139, 205). Risk-reducing strategies are one of the main differentiators between small/medium family based farms and large commercial farms (e.g. 54, 74) and the more family farmers are resource-poor, the more they are risk adverse (41). Several examples of this risk aversion were provided in the conference (e.g. 49, 95), such as Lebanese farmers favouring local over improved hybrid varieties because, although not very productive, they are not input-demanding and the market price and demand is somewhat constant thus minimizing risk (236).

If wishing to support AIS and ensure that AIS benefit resource-poor family farmers, this key issue needs to be addressed and understood. Adopting an innovation implies an increase in risk because of the possibility of non-materialization of expected benefits (41) and because, in the beginning, farmers have to learn to manage all the aspects related to the innovation (148). In some cases, it also means changes in their capacity to manage other risks (148). Technicians, managers and policy-makers often do not realize that risk associated with innovation may exist and that it is a critical issue for resource-poor family farmers (148). It was postulated that policy measures which attempt to alleviate the perception of financial cost and risk by farmers have favoured technical innovation everywhere (41).

Participants proposed a number of strategies to deal with this issue. AIS should pay more attention to low cost innovations as this would make them more attractive to resource-constrained family farmers (e.g. 3, 16, 38). Contracting farmers, whereby they have a guaranteed market and financial return, also reduces risk (e.g. 76). Improvement in market information and transparency may help too (54).

Farmers should also be provided with basic business skills which will help them to clearly analyze the resources they have and the financial risk they face in investing in a given farming activity (94).

## **2.6 Women farmers**

There was consensus in the conference that greater recognition should be given to the central role that women farmers play in agriculture, rural development and food security and that equal and full attention should be given both to men and women farmers to enable them to participate in, and benefit from, AIS.

Several participants pointed out that women farmers are responsible for most of the food produced in their part of the world (e.g. 56, 94, 107). For example, in Africa it was estimated that women grow 80% of the staple food, account for over 70% of the agricultural workforce and 80% of local food processing (74).

However, women farmers do not have the same access as male farmers to AIS-related resources, services and knowledge, such as extension services (69, 74), education (107, 142), microfinance (107), land (92, 142) and income (142). For example, “you will find more men in agricultural training or listening to radio stations than women but when it comes to actual farming activities more women are involved. There is need to close this gap to ensure agricultural production improves” (94).

Giving less weight to women farmers than men farmers in AIS might mean that the innovations developed favour men [e.g. because men and women might have responsibilities for different kinds of crops (79, 104, 217)]. It could also mean that women farmers are not able to benefit from, and participate in, adoption of innovations (107). Change is therefore needed so that female farmers can fully participate in AIS (e.g. 16, 69, 83). Thus: “the contribution of women farmers needs to be given far more attention than is now. Gender sensitization of all actors in AIS and gender mainstreaming in the systems need to be given priority so that women farmers can become full and rightful actors in AIS” (51).

Numerous initiatives to redress the situation were cited. For example, women organizations can help (30, 47, 170) and the successful case of Vidiyal, a self-funding women farmers organization in southern India was described. In Cameroon, women farmer organizations were reported to achieve good production but access to knowledge was cited as a problem (47). In Indonesia, where older male farmers traditionally tend to make the important decisions regarding farming activities, farmer field schools (FFS) were allowing women and youth to be more fully engaged than before (34). In Pakistan, women open schools (WOS) are used as a tool for educating women, initially focusing on pesticides but later expanded to a wide range of activities (102, 159). They are flexible, with mothers able to bring their children, and have now become a regular feature of FFS in Pakistan (102).

## **2.7 Youth**

The conference also highlighted the importance of young people for agriculture and family farming (e.g. 111, 207, 232). They carry out the main manual work in rural areas, thus improving family farm and agricultural productivity. However, the global trend is that the rural youth are moving to urban areas and switching to non-agricultural activities (e.g. 30, 67, 135, 139, 185), often encouraged to do so by their farmer parents (73, 185, 236). The major consequence of this “time-bomb situation” is that “most of the future farmers (food producers)” are lost altogether (73). The knowledge and innovations which are normally transmitted orally from the older to the younger generation are also lost (52, 73).

The conference emphasized that concrete measures needed to be taken to make farming more appealing to the youth. It was argued that the main thing that will attract them is profitability and that linkages to markets and entrepreneurship development should be prioritized (73, 77, 132, 139, 143). Higher income generating systems, such as irrigated horticulture crops or high value export-oriented



commodities should have greatest appeal (77, 79, 132). A relevant case study from Zambia, focusing on potential entrepreneur farmers and involving many young farmers was described (90).

While economic returns are key, social/cultural dimensions should not be ignored if young people are to remain in agriculture, and the way they perceive agriculture needs to be improved (143, 242). Their perception is obviously influenced by the way society as a whole perceives agriculture and farmers, and this is often in a negative sense (e.g. 185, 218, 233). Thus, “in numerous countries, both in Europe over the last decades, and in Sub-Saharan Africa and Latin America today, when one speaks about farmers, it is often in a pejorative way” (185). For example, in many countries, the farmer’s professional status is not well defined or does not exist (185). So, “farmers should be given a higher status and more respect” (233).

It was proposed that business-oriented training materials prepared specifically for young farmers, using textbooks and pamphlets as well as electronic media, would be useful (e.g. 115, 119, 123, 132, 137). Education of students in the field was also emphasized (e.g. 22, 207, 232), and the case of Agricultural Family Schools in Brazil was described, where students alternate stays at the school, where they study agriculture-related issues, with stays back home on their farm (207). It was noted that knowledge gathered by students through their education may later be transmitted and used by their farmer parents with positive impacts (207, 242).

Given their interest in ICTs, participants also proposed that the wider use of ICTs, such as mobile phone technologies, in farming would act as a stimulus for youth to remain in farming (158, 170, 203, 205).

## **2.8 ICTs**

The positive role that the rapid and revolutionary developments in ICTs can play to ensure that family farmers may fully participate in AIS was probably the single issue that attracted most attention throughout the conference.

Many participants described the current and potential impact of mobile phone technologies, especially the use of short message service (SMS, or “texting”), in AIS. Particular attention was given to their use to facilitate farmers access to markets, through provision of market price information directly to farmers (e.g. 171) and communication with traders and input suppliers (e.g. 134); facilitate communication with extension agents (e.g. 134, 158, 167, 169, 222); and allow farmers direct access to relevant agriculture-related information, such as weather forecasts, disease/pest diagnosis etc. (e.g. 134, 158). Mobile technologies can also enable farmers to access microfinance (158); receive information and provide feedback about AIS-related government policies (158); and transfer money (184).

Participants cited several examples where they are currently being used, such as in Tamil Nadu, India, where women farmers send pictures of sick sheep by SMS to the veterinary university to diagnose problems (170); use of SMS to help farmers identify fake agro-inputs in Uganda (161); use of a fertilizer voucher scheme in Nigeria where farmers receive fertilizer and seed allocations by phone (158); a series of initiatives in India to provide market price and other kinds of information using SMS, video clippings and voice messages to farmers’ mobile phones (171); and initiatives in the livestock sector in Kenya, such as the use of SMS for disease reporting and abattoir disease surveillance and of Icow, a mobile phone application allowing farmers to get information about veterinarians, other service providers and market information (149).

There are, however, also challenges in using mobile technologies (e.g. 167, 175, 180, 235). Illiteracy among farmers can be an issue (e.g. 167, 169), so it was proposed that extension agents should help them to use the mobile phone. For small farmers, price of a mobile phone can also be prohibitive in many countries (e.g. 180). One solution proposed was for the farming community to share a phone (175). Network coverage is also poor in many countries (e.g. 167, 183, 196). Given the importance of

ICTs for AIS, participants underlined the key role that policy makers can play in providing an enabling environment for the wider use of ICTs (e.g. 20, 158, 183, 193).

Apart from mobile technologies, participants also emphasized the role that other ICTs, such as television (26, 87) but especially radio, can play. It was argued that radio was particularly useful for small farmers in rural areas because of its low cost, its general availability and acceptability, its use of local languages and appropriateness also for countries with low literacy rates. There was consensus about the importance of radio as an integral part of the extension system (e.g. 13, 20, 63, 81, 153, 207, 232) and its potential benefits when combined with other ICTs, such as mobile technologies (e.g. 189). Participants also cited interesting examples of the use of radio to document smallholder farmer innovations, with subsequent publication of the radio scripts on the web (220); and to allow successful communication between farmers and researchers in the Democratic Republic of Congo (53) and Brazil (106, 207).

## **2.9 Innovation brokers**

As described in the Background Document (FAO, 2012b), there are many potential actors in AIS, including the media, faith-based organizations, telecommunication companies, schools, the private sector (exporters, middlemen, traders, transportation, processing, banks and finance, pension funds, microfinance, supermarkets, insurance companies), producer organizations, research organizations, extension and advisory services, universities, tertiary and vocational education institutions, policy think tanks, individuals (farmers, women, youth, farm labourers, politicians), co-ordinating bodies, foundations, non-governmental organizations, governments and civil society organizations.

As seen in earlier Sections of this document, many messages in the conference were dedicated to specific issues regarding individual actors in the AIS. Others, instead, considered the whole system. Thus, “it is the nature of this actor aggregates (including the relevant technologies, ideas and institutions) which determine the efficiency of AIS. The broader and more complete the actors are organized as a community around specific food and agriculture systems, the better AIS can be built in a sustainable way” (37) and “the core idea of innovation systems is interaction, collaboration, but also often negotiation among multiple stakeholders” (119). Or, “we cannot call it a system as long as actors are on their quiet and peaceful islands” (150).

To make the whole system work better, participants saw a key role for innovation brokers, described as the “lubricants of the innovation engine” (119). They said they were “vital in linking multi-stakeholders in the different value chains” (129) and that “the more innovation brokers we have, in more organizations, the more innovation will be possible” (151). Based on his experiences as an innovation broker, one participant argued that decision-makers might need to be exposed to innovation brokering before they really appreciated its value (209).

There was some discussion about whether innovation brokering was simply a new way of describing the kinds of tasks and services that extension services typically provide, i.e. that people were just “reinventing the wheel” (131). However, there seemed to be agreement that this was not the case as it fulfils a need that the existing advisors do not provide, such as connecting specific advisors with farmers and brokering connections with a very wide range of actors in sometimes very complex and long term innovation processes, which are not always only on farm level issues (e.g. related to funding or intellectual property rights) but concern a whole value chain (140). Several practical examples were cited where innovation brokers were used, such as in potato and sorghum value chains in Uganda (129) and in a series of agricultural research for development consortia in Africa (168).

Two issues that were much discussed were who the innovation brokers could be and who should pay for these services. Regarding the former, there seemed to be consensus that innovation brokers did not have to be specialized organizations and that different kinds of AIS stakeholders could potentially play this role (e.g. 151, 162, 168, 209). It was suggested that, in practice, a technically sound agronomist with facilitation training could do a good job (e.g. 151, 209). Experiences from 10 agricultural

research for development consortia in the Platform for African-European Partnership in Agricultural Research for Development (PAEPARD) indicated, however, that such people might be difficult to find (168). The PAEPARD experiences also indicated that it is essential for the broker to play an independent role within the consortium; that the broker should not be a member of the lead institution; and should also be acceptable to all the consortium members (168). A couple of participants noted that, rather than a single individual or organization, brokering might involve a network of individuals with different roles (163, 194).

Regarding who should pay for the brokering service, discussion indicated that this was a difficult question with no easy answers. It was argued that for more market-oriented innovations, the value chain actors might pay (186). Several participants suggested that government should pay (e.g. 190, 220). However, it was pointed out that brokering services are rarely paid fully by the public sector anywhere in the world (205); that it is generally hard to get funding for brokering in AIS; that AIS actors are normally reluctant to pay when their own direct interests are not involved; and that research institutions, civil society organizations or farmer organization will rarely pay for external brokers (194). Since innovation projects are often led by research organizations, it was also argued that funding for innovation processes and brokering are not prioritized (197, 209).

## **2.10 Other issues**

Sections 2.1 to 2.9 summarize discussions on issues that received most attention from participants during the conference. A number of other specific issues relevant to AIS and family farming were also discussed, including funding mechanisms for agricultural innovation (e.g. 29, 58, 176, 197, 198, 209, 239); differential policies for different kinds of family farmers (70, 139, 150, 205); farmers' access to credit (e.g. 6, 105, 130, 139, 218); education (e.g. 202, 213, 232); incentives for farmers to share innovations with other farmers (131, 160, 220); and cost recovery for service provision (191, 201, 204, 216).

Many of the 242 messages posted also provided important insights into the general context and difficult realities within which family farmers have to work and which can greatly impact their ability to fully participate in, or benefit from, AIS. For example, in situations where farmers face land use conflicts (48), or unclear farm property rights (126), they will not prioritize innovation ["Innovations in family farms would only be meaningful when land use and associated issues are properly managed" (48)]; corruption is often a daily reality (32, 55); agriculture and rural development projects may be implemented without strong governmental regulation (199, 215) and by bodies who are perceived to be looking after their own interests rather than those of the family farmers (218, 233); policy-makers often do not give enough attention to agriculture (120, 213); and climate change is an increasing reality for family farmers (25, 71, 217, 236).

As written earlier, it is not possible in this summary document to do justice to all of the ideas and experiences that participants shared in the conference and readers are encouraged to consult the message archives to get a full overview there of the rich and productive discussions regarding these issues.

## **3. Participation in the conference**

Right from the beginning and throughout the entire 4-week period, there was a very active and enthusiastic exchange of messages from people all over the world and from a wide range of work areas. Despite the high volume of messages, almost none of the people who subscribed left the conference underway.

The conference ran from 4 June to 1 July. The conference was open for anyone to join and there were 558 subscribers. Of these, 114 (i.e. 20%) submitted at least one message. People were asked to introduce themselves in their first message and they typically provided their full work/home address and a description of their professional background and current occupation. Based on the address, an

analysis was carried out of participation by country, geographical area and work place. Note, the analysis is based on where people were living when they posted the message and does not indicate where they come from originally.

Of the 242 messages, 42% came from people living in Africa; 28% from Asia; 19% from Europe; 8% from Latin America and the Caribbean; 3% from North America and 1 message from Oceania. A total of 187 messages (i.e. 77%) were posted by people living in developing countries.

The messages came from people living in 48 different countries. The greatest number came from people living in India (34 messages); Cameroon (24); Italy and Uganda (17 each); Nigeria (12); Ghana (11); Kenya, the Netherlands, the Philippines and Zambia (all with 9 each); Brazil (7); and Sri Lanka, Switzerland and the United States of America (all with 6 messages each).

Participants in the conference also came from a wide range of work environments. Of the 242 messages, 62 (i.e. 26%) came from people working in research centres (58 in national institutes and 4 in CGIAR centres); 48 (20%) from people working in universities; 42 (17%) from people in non-governmental organizations; 39 (16%) from people working in Government ministries or bodies; 21 (9%) from people in the private sector; 15 (6%) from people working at FAO headquarters or in FAO offices around the world; 10 (4%) from independent consultants; 3 from farmers and 2 from development agencies (1% each).

#### **4. References**

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Abbreviations: AIS = Agricultural innovation systems; FAO = UN Food and Agriculture Organization; FOs = Farmer organizations; ICTs = Information and communication technologies; SMS = Short message service.

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