

# Communicating with smallholder farming families – a review with a focus on agro-dealers and youth as intermediaries in sub-Saharan Africa

KR Sones, GI Oduor, JW Watiti and D Romney

**Address:** African Soil Health Consortium, CABI, Nairobi, Kenya.

**\*Correspondence:** GI Oduor. Email: [g.oduor@cabi.org](mailto:g.oduor@cabi.org)

**Received:** 28 April 2015

**Accepted:** 28 July 2015

doi: 10.1079/PAVSNNR201510030

The electronic version of this article is the definitive one. It is located here: <http://www.cabi.org/cabreviews>

© The Author(s) 2015. This article is published under a Creative Commons Attribution 4.0 International License (CC BY 4.0) (Online ISSN 1749-8848)

## Abstract

The CABI African Soil Health Consortium (ASHC) aims to improve the livelihoods of smallholder farmers through better access to practical information about integrated soil fertility management. The next phase focuses on two types of intermediaries to reach smallholder farmers: agro-dealers and youth. This review reflects this focus and is therefore biased towards recent publications relevant to these intermediaries and also the impact of gender on provision of and access to agricultural information. There is a consistent demand for information on new varieties, pests and diseases, use of pesticides and fertilizer, as well as weather, credit and markets. The most frequently used sources of information are still the more traditional ones. Extension services, family, friends and neighbours, and agro-dealers are all important face-to-face sources of information. Radio dominates as the main mass media source. Local agro-dealers are often included by smallholder farmers among the most frequently used sources of information and they enjoy a degree of trust. There has been considerable investment by donors in extending and strengthening agro-dealer networks over recent years, including more emphasis on their roles as sources of information and advice. A new type of tech-savvy young entrepreneurial farmer is emerging who is more likely to wield a smartphone than a hoe. This is especially important against a background in which, despite the median age in African being just 19.7 years, the average age of farmers is estimated to be over 55. Family farming is receiving renewed emphasis. During its phase 2, which will run from 2015 to 2019, ASHC will share its experiences, successes and failures, and lessons learned in working with agro-dealers and youth intermediaries. In this way it aims to help others to communicate their key messages more effectively including via these intermediaries.

**Keywords:** smallholders, farming, families, intermediaries, agro-dealers, youth

## Introduction

This review was originally written to provide background information to support a grant application to the Bill & Melinda Gates Foundation for phase 2 of the Centre for Biosciences and Agriculture International (CABI) African Soil Health Consortium (ASHC). That grant application was successful: ASHC phase 2 commenced in July 2015 and will run for 4 years.

ASHC aims to improve the livelihoods of smallholder farmers through better access to practical information about integrated soil fertility management (ISFM).

The grant application focussed on two types of intermediaries to reach smallholder farmers: agro-dealers and youth. This review reflects this focus and is therefore biased towards recent publications relevant to these intermediaries and also to the impact of gender on provision of agricultural information.

## Demand for Information

There is widespread consensus in the literature that Africa's smallholder farmers' information needs have not and still are not being adequately met.

Writing in 1995, a Nigerian author noted: 'The non-provision of agricultural information is a key factor that has greatly limited agricultural development in developing countries' [1]. Ten years later Ferris and Robbins [2] argued that 'in most African countries lack of accurate and relevant agricultural information by small-scale farmers is a major factor constraining efforts to improve the agriculture sector'. More recently, Obidike (<http://www.webpages.uidaho.edu/~mbolin/obidike.htm>) noted that Nigerian farmers still face constraints in trying to access agricultural information including: lack of access to roads for regular visits by extension officers, poor attitudes of some extension staff, poor radio and television signals, lack of electricity supply in most villages, lack of funds to purchase newsletters or leaflets on agricultural information; illiteracy and inability of radio and television stations to broadcast agricultural information programmes in local languages. The situation in other sub-Saharan African countries is broadly similar.

A 2014 study of the information needs of rice farmers in Morogoro Region, Tanzania found that 82.5% of respondents wanted information to improve their rice farming. Of these, more than 80% wanted information on marketing, weather, credit, new seeds, storage, planting and pests and diseases [3].

A study of smallholder women farmers in Eastern Cape Province, South Africa found their main information needs related to weed control, especially after manure application; pests and diseases of crops and livestock; poultry feeds, predators and theft; soil fertility and seed dormancy [4].

Work done during the 2000s in Southwestern Uganda found that priority information needs of farmers concerned markets, post-harvest, seed management, natural resources management, soil analysis using local indicators, crop and livestock pests and diseases, and fertilizer management and application [5].

In Kenya in 2013, priority information needs were listed as credit, new varieties of crops, diseases, water and fertilizer [6].

### Intermediaries and Dissemination Channels

It is estimated that there will be about one billion mobile phone subscriptions in Africa by 2015 [7]. Despite these advances in information and communication technology (ICT), especially such huge increase in penetration of mobile phones in rural Africa, this has yet to make the inroads many envisaged in addressing the information gap. Recent studies of preferred sources of agricultural information tend to rank information delivered via mobile phones and especially the internet as relatively minor sources, behind more traditional sources such as face-to-face contact with family, friends, neighbours, extension services and agro-dealers.

For example, a 2014 study in Tanzania found that none of the farmers surveyed used the internet as a source of

agricultural information [3]; a similar study in Kenya also found no use of the internet [6]. The Kenya study also found that mass media, especially radio, was much more frequently used as a source than mobile phones. There is, however, evidence that mobile phones are being used to complement traditional face-to-face contact: for example, Maasai herders in southern Kenya exchange information with each other via their mobile phones about forage conditions [8].

A study undertaken for ASHC in 2015 by the Netherlands-based Royal Tropical Institute in Mbeya and Arusha regions of Tanzania found that the most important sources of information for farmers, in order of importance, were family and neighbours, the yearly NaneNane agricultural fair, product labels, public extension, research institutes and private extension (mostly by agro-input companies). With the exception of information produced by companies promoting specific products, written materials such as leaflets and posters were found to be 'very rare' at the farmer level. Neither the internet nor mobile phones emerged as important channels for information for either farmers or public and private sector intermediaries (CABI, unpublished).

Building on work done during ASHC phase 1, phase 2 is focused on two types of intermediary to channel information to smallholder farming families: local agro-dealers and youth. The following sections therefore focus on these intermediaries, and also on differences in ways men and women access agricultural information and inputs.

### Agro-dealers as Intermediaries

Due to the limited number of extension workers in African countries, local agro-dealers are often farmers' primary points of contact for both agro-inputs and technical farming advice.

The number of farmers served by each extension worker is 950 in Kenya [9], 2500 in Uganda [10] and 3420 in Kaduna State, Nigeria [11]. In a report for the World Bank, the Rockefeller Foundation suggested that 'agro-dealers have... become the most important extension nodes for the rural poor' [12]. In Kenya there are about 10 000 agro-dealer shops [13] but just 5500 extension workers [14].

Through the Alliance for a Green Revolution in Africa's, Agro-Dealer Development Programme, more than 10 000 agro-dealers have been trained to provide the farmers who visit their shops with advice on new cultivation techniques and good agricultural practice. The project operates in 11 African countries, including Ghana, Mali, Mozambique and Uganda. The agro-dealers are encouraged to set up demonstration plots, establish information centres and organize input exhibitions as methods of delivering practical information to farmers. They also have a role in creating awareness of issues, such as pest-management techniques, that may arise in the course of

the growing season. Training emphasizes the need to provide farmers with the products they need, not those the agro-dealers want to sell, if they are to retain their customers in the long term [15].

Other development actors, such as Agmark, have also supported various interventions to strengthen agro-dealers in East Africa. This included providing training to agro-dealers on technical knowledge of products so that this could be passed on to farmers at point of sale. Innovations such as establishment of demonstration plots near agro-dealers' shops proved effective in creating demand for inputs such as improved seed and fertilizer [16].

A 2009 survey carried out by National Survey of Kenya showed that 74% of respondents for whom farming contributed significantly to household incomes considered farm supply vendors to be 'somewhat or very trustworthy' sources of farming information (<http://www.audiencescapes.org/country-profiles/kenya/communication-and-development/agricultural-issues/agricultural-information/ag>).

A 2013 study of information sources used by smallholder farmers in Kenya showed, not surprisingly, that agro-dealers were less used as a source of information the further farmers had to travel to reach them. When asked to rank information sources in terms of degree of trust, although agro-dealers came below government extension, radio, other farmers and family, they were ranked much higher than 'experts in agriculture' or non-governmental organizations [6].

In a 2014 study of preferred sources of agricultural information of farmers in Tanzania, agro-dealers were not identified as a preferred source of information. The top ranked sources were the family, radio, personal experience, neighbours/friends and extension officers [3].

A 2013 study in Ethiopia identified government extension, farmers training centres and other farmers as the preferred source of information on agronomic practices, conservation farming and early warning and weather. For market-related information, cooperatives and the private sector were also the preferred sources [17].

Thus, there appears to be evidence that agro-dealers can be successfully used as trusted conduits for delivering agriculture information to smallholder farmers. They have the additional benefits that they have local knowledge and can provide not only advice but also the necessary inputs and, in some cases, also act as conduits to output markets.

### **School Children as Conduits to Share Knowledge with Farmers**

Despite the median age in Africa being just 19.7 years ([http://www.un.org/esa/population/cpd/cpd2012/Agenda%20item%204/UN%20system%20statements/ECA\\_Item4.pdf](http://www.un.org/esa/population/cpd/cpd2012/Agenda%20item%204/UN%20system%20statements/ECA_Item4.pdf)), the average age of farmers is estimated to be over 55 [18].

In the early 2000s, the UK government Department for International Development (DFID)-funded 'Wambui project' developed and distributed a series of comic-style booklets aimed at primary school pupils in Kenya. Each contained stories based on management strategies for dairy cattle. An underlying hypothesis of the project was that primary schools could be useful conduits into rural communities. Project staff concluded the hypothesis was true: primary schools were effective and trusted routes for delivery of information to poor households and children could act as bridges between print materials and illiterate parents [19].

Another DFID-funded project investigated the sources used by smallholder Kenyan farmers to obtain animal health information. The most common sources cited were radio programmes, chiefs' barazas (community-level meetings) and farmers' school-age children. The project found that farmers valued information received via their children more highly if it originated from external sources than from the children's teachers. It was concluded that channelling extension messages through schoolchildren, or via radio, could effectively overcome the problems of reaching illiterate farmers [20].

### **Young Adults as Conduits to Share Knowledge with Farmers**

It is widely acknowledged that traditional farming is unappealing to today's rural youth in Africa who regards this as a livelihood choice of last resort [21]. There is evidence, however, that a new generation of young, tech-savvy farming entrepreneurs is emerging who is equipped with smartphones and active in social media. Their focus tends to be on intensive cultivation of crops with a short growing cycle that show a quick return [22].

Younger household heads who engage in farming are more open to new crops and technologies that produce higher yields and also to post-harvest value addition and more profitable ways of marketing their produce. As a result they tend to earn higher incomes from their agricultural activities than older farmers. These younger farmers are likely to be actively seeking out and acting upon information and advice on better and more profitable practices [23].

The findings of work done in the cocoa sector in Nigeria support this idea: Adeogun *et al.* [24] suggested that younger farmers would most likely be willing to spend more time to obtain information on improved technologies compared with the old farmers.

In Africa, as elsewhere, young adults are generally better educated, more literate and more at home with ICTs than their older family members. This suggests that young adults could act as conduits for agricultural information and knowledge, linking development communicators with farming families.

#### 4 CAB REVIEWS

In recent years there has been a renewed focus on family farming: the Food and Agriculture Organization (FAO) declared 2014 the International Year of Family Farming. Family farming is primarily based on family-labour with division of labour between men, women and youth.

Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA) suggest that the youth could act as the intermediary in the use of the new ICTs to support family farming. As key family members, the capacity of the youth has to be strengthened to support other members of the family, but also for them to utilize the innovations in their own farms. CTA provides training targeted at youths to enhance their ITC skills, support their innovations and encourage them to share their ideas to improve family farms [25].

A 2014 study undertaken in Nigeria reported that more than 60% of respondents – who were typically 53-year old, male arable farmers – strongly agreed that youth should mobilize and sensitize peers and people for innovation dissemination. They perceived youth roles in innovation dissemination and utilization as being very important [26].

#### **Differences in Ways Men and Women Access Agricultural Information and Inputs**

Although women are widely acknowledged to constitute a large share of the agricultural workforce in Africa, cultural norms mean they tend to have less access to both agricultural information and inputs, less control over land and less influence over decision making than their husbands and other male counterparts. One result of this gender gap is that female-managed plots consistently yield less per hectare than male-managed plots [27].

Among the factors impacting on this situation are: women are more tied to the home than men – due to the demands of child care and other domestic duties, as well as cultural limitations in some societies – and therefore are less able to travel to access training and sources of information and inputs. Also, in many societies, contact between men and women is severely limited: for example, male extension workers may not be allowed to address women farmers and extension workers are predominantly men [28].

Women are also usually less well educated than their male counterparts: of the 800 million or so illiterate people in the world in 2008, two-thirds were women ([http://www.unesco.org/education/ild2010/FactSheet2010\\_Lit\\_EN.pdf](http://www.unesco.org/education/ild2010/FactSheet2010_Lit_EN.pdf)).

Cultural norms tend to prevent women becoming extension workers in many countries: FAO estimate that 85% of extension workers worldwide are male; this is likely to be even higher in many African countries. An FAO study undertaken in 1988/89 covering 97 countries showed that only 5% of extension services were

directed at women; tellingly, more recent estimates are not available [29].

A recent study by International Food Policy Research Institute (IFPRI) in Ethiopia, where the public extension system works much better than in most other African countries, found that while 27% of men surveyed had been visited at home by extension agents, this was lower at 20% for women [30].

Men often control access and use of mobile phones and radios, while lower literacy rates among women mean they are less able to utilize text messaging and other written formats. Women are 23% less likely than men to own a mobile phone in Africa [31]. A study in Benin showed that among rice farmers, more men than women own radios and they also listen to more rural broadcasts [32].

In Kenya, 43% of calls to a farmers' helpline operated by a mobile phone company, which cost US\$0.25 per call, were women [31].

Farmer field schools (FFSs) are considered to be effective at reaching women. This is because facilitators and sponsors of FFSs often design and run them in a way that effectively engage with women including holding FFSs only for women and making an effort to invite women as trainers. Because FFS takes place in the community and are group activities they also tend to be more culturally acceptable [33].

FAO suggest that women are much less likely than men to use purchased inputs such as fertilizers and improved seeds or to make use of mechanical tools and equipment. In many countries women are only half as likely as men to use fertilizers [34].

However, at least 30% of the 10 000 agro-dealers in Kenya are women. A recent study conducted in Western Kenya provides some interesting insights into how men and women use the agro-dealers [35]. Among the findings were:

- women tend to purchase more affordable seed varieties;
- women farmers are more likely to take into account the taste/quality of the end product, especially for home consumption;
- women tend to prefer varieties of seed that they have seen doing well;
- women tend to understand their soil conditions, and will consequently invest in seeds specifically suited to their plot of land;
- women tend to buy smaller amounts of fertilizer than men at one time; in aggregate, however, they ultimately buy similar amounts;
- women more often attend training opportunities, such as field days, than men;
- women more often request credit and agro-dealers more willingly provide this to them – reasons given include women are less mobile than men and therefore easier to contact, women more often belong to groups

which can offer guarantees of repayment and women buy smaller quantities so the risk is lower.

A study of plant clinics in Kenya, established under the auspices of the CABI Plantwise project, revealed that 41% of the 'plant doctors' trained were women and 34% of farmers attending the clinics were women. It noted that collecting, monitoring and evaluation of data that was disaggregated by gender made it possible to improve planning for future clinics, for example by making sure they were in locations and at times which made them accessible to both women and men [36].

## Conclusion

There is clearly an unmet need for information by smallholder farmers in Africa. Furthermore, it is evident that men, women and youth have different information needs and differ in preferred sources of information that reflect their agricultural roles, capacities and culturally influenced behaviours.

In order to effectively reach all members of smallholder farming families it can therefore be argued that using a range of approaches and working through multiple intermediaries is more likely to reach all members of farming families and strengthen messages delivered. Often organizations focus on specific methodologies, while few seek to integrate or bring together different complementary approaches. Evidence points to the potential to make more and better use of both local agro-dealers as intermediaries and youth as conduits in delivering information to farming families.

As ASHC moves into phase 2, ASHC and its partners will aim to test the hypothesis that there is added value to integrated approaches that target different entry points to reach farming families with information they can use to experiment with and adopt new practices. Also, to assess further how agro-dealers can be effective intermediaries and whether approaches specifically targeting youth results in information being introduced and shared within farming families. As ASHC starts to implement scale-up campaigns that aim to deliver ISFM information to smallholder farming families, the project will share its experiences, successes and failures, and lessons learned from working with these important intermediaries.

## References

- Ozowa VN. Information Needs of Small Scale Farmers in Africa: The Nigerian Example. 1995. Available from: URL: <http://www.worldbank.org/html/cgiar/newsletter/june97/9nigeria.html>
- Ferris S, Robbins P. Developing Market Information Services in Eastern Africa: the Food Net Experience, Local, National and Regional Market Information Services. International Institute of Tropical (IITA), Ibadan Nigeria; 2004.
- Benard R, Dulle F, Ngalapa H. Assessment of information needs of rice farmers in Tanzania; A case study of Kilombero District, Morogoro. Library Philosophy and Practice (e-journal) 2014; Paper 1071. Available from: URL: <http://digitalcommons.unl.edu/libphilprac/1071>
- Yusuf SFG, Masika P, Ighodaro DI. Agricultural Information Needs of Rural Women Farmers in Nkonkobe Municipality: The Extension Challenge. 2013. Available from: URL: <http://www.ccsenet.org/journal/index.php/jas/article/view/23216>
- Masuki FG, Mowo JG, Sheila R, Kamugisha R, Opondo C, Tanui J. Improving smallholder farmers' access to information for enhanced decision making in natural resource management: experiences from Southwestern Uganda. In: Andre Bationo, *et al.*, editors. Innovations as Key to the Green Revolution in Africa. Exploring the Scientific Facts. Springer, Netherlands; 2011. Available from: URL: <https://books.google.co.uk/books?id=LxOW9b1Lc8C&pg=PA1145&lpg=PA1145&dq=information+needs+africa+farmers&source=bl&ots=9QS20-FlaV&sig=HTo9U5i7pMpmAvhtu9EI3d3BVhM&hl=en&sa=X&ei=-JyuVKKcMMbR7Qack4HIAw&ved=0CCAQ6AEwADgU#v=onepage&q=information%20needs%20africa%20farmers&f=false>
- Spurk C, Schanne M, Mak'Ochieng M, Ugungu W. Good Information is in Short Supply: Kenyan Farmers and their Assessment of Information on Agricultural Innovation. Multi Media University College of Kenya and Institute of Applied Media Studies Zurich, Zurich; 2013. Available from: URL: [http://www.zhaw.ch/fileadmin/user\\_upload/linguistik/\\_Institute\\_und\\_Zentren/IAM/PDFS/News/final\\_report\\_Kenya\\_agri\\_communication\\_IAM\\_MMU\\_01.pdf](http://www.zhaw.ch/fileadmin/user_upload/linguistik/_Institute_und_Zentren/IAM/PDFS/News/final_report_Kenya_agri_communication_IAM_MMU_01.pdf)
- Jidenma N. How Africa's mobile revolution is disrupting the continent. 2014. Available from: URL: <http://edition.cnn.com/2014/01/24/business/davos-africa-mobile-explosion/>
- Butt B. Herding by mobile phone: technology, social networks and the transformation of pastoral herding in East Africa. *Human Ecology* 2015;43:1-14. Available from: URL: <http://link.springer.com/article/10.1007%2Fs10745-014-9710-4>
- Anon. Public and private agricultural stakeholders join to boost extension capacities. *New Agriculturist*; 2012. Available from: URL: <http://www.new-ag.info/en/focus/focusItem.php?a=2476>
- Rwakakamba M. (2012) What Aileth Uganda's Agriculture Sector? *The African Executive*. Available from: URL: <http://www.africanexecutive.com/modules/magazine/articles.php?article=6659>
- Samuel K. Nigeria-extension-workers-farmers-ratio-worries-KADP director. Kalusam's blog 10 September 2013, 2013. Available from: URL: <https://kalusam.wordpress.com/2013/09/10/-director/>
- Rockefeller Foundation. Fertilizer Toolkit: Promoting Efficient and Sustainable Fertilizer Use in Africa; 2009. Available from: URL: <http://www.worldbank.org/html/extdr/fertilizeruse/documentspdf/RockefellerAgroDealerSupport.pdf>
- Mulupi D. How Farm Shop is Modernising the Agro Dealership Experience. *How We Made it in Africa*. Maritz Africa, Cape Town; 2013. Available from: URL: <http://www.howwemadeitinafrica.com/how-farm-shop-is-modernising-the-agro-dealership-experience/26942/>
- CABI. mFarmer: Providing Kenya's farmers with agricultural information via mobile. 2013. Available from: URL: <http://www.cabi.org/projects/project/33024>

## 6 CAB REVIEWS

15. Makinde K. Agro-dealers use cell phones to keep farmers up to date. 2011. Available from: URL: <http://ictupdate.cta.int/Feature-Articles/Input-from-experts>
16. Agmark. SAGCOT agrodealer development program. 2013. Available from: URL: <http://agmark.org/agrodealers/>
17. Precise Consult International. Enhancing Farmer-info-services in Ethiopia: A Critical Review of Sources, Channels and Formats. Ethiopian Agricultural Transformation Agency, Addis Ababa; 2013. Available from: URL: [https://docs.google.com/file/d/0B2tkc\\_Z6zMbVNUNWbUVSSkRQZFE/edit?pli=1](https://docs.google.com/file/d/0B2tkc_Z6zMbVNUNWbUVSSkRQZFE/edit?pli=1)
18. Nierenberg D. The year of family farming. Ensia; 2014. Available from: URL: <http://ensia.com/voices/2014-the-year-of-family-farming/>
19. Bain RK, Tanner JC, Campbell D, Lloyd-morgan K, Mburu F, *et al.* The Wambui project. Final Technical Report. 2002. Available from: URL: <http://www.fao.org/docs/eims/upload/agrotech/1939/R7425-FTR.pdf>
20. DFID Animal Health Programme. Annual Report 2003–2004, Centre for Tropical Veterinary Medicine (CTVM), University of Edinburgh, UK; 2004, p. 10. Available from: URL: [http://r4d.dfid.gov.uk/PDF/Outputs/AnimalHealth/AHP\\_Annual\\_Report\\_2003-04.pdf](http://r4d.dfid.gov.uk/PDF/Outputs/AnimalHealth/AHP_Annual_Report_2003-04.pdf)
21. Proctor FJ, Lucchesi V. Small-scale farming and youth in an era of rapid rural change, IIED/HIVOS, London/The Hague; 2012. <http://pubs.iied.org/pdfs/14617IIED.pdf>
22. Ochillo W. Youth changing the face of agriculture in Kenya Plantwise. 2014. Available from: URL: [bloghttp://blog.plantwise.org/2014/05/19/youth-changing-the-face-of-agriculture-in-kenya/](http://blog.plantwise.org/2014/05/19/youth-changing-the-face-of-agriculture-in-kenya/)
23. Davis B, Winters P, Carletto G, Covarrubias K, Quinones E, Zezza A, *et al.* *Rural Income Generating Activities: A Cross Country Comparison*. ESA Working Paper No. 07-16. Rome: FAO Electronic Journal of Agricultural and Development Economics, Agricultural Development Economics Division (ESA) FAO. 2007. Available from: URL: [www.fao.org/es/esa/eJADE](http://www.fao.org/es/esa/eJADE)
24. Adeogun SO, Olawoye JE, Akinbile LA. Information sources to cocoa farmers on cocoa rehabilitation techniques (CRTs) in selected states of Nigeria. *Journal of Media and Communication Studies* 2010;2(1):009–015. January, 2010. Available from: URL: [http://www.academicjournals.org/jmcshttp://academicjournals.org/article/article1380093281\\_Adeogun%20et%20al.pdf](http://www.academicjournals.org/jmcshttp://academicjournals.org/article/article1380093281_Adeogun%20et%20al.pdf)
25. CTA. How is Information and communication technology transforming family farmers lives? 2014. Available from: URL: <http://www.cta.int/en/article/2014-06-26/family-farming-and-the-transforming-power-of-icts.html>
26. Alao OT, Torimiro DO, Ayinde JO. Perception of youth roles in agricultural innovation management system among arable crop farmers in farming communities of Osun State, Nigeria. *American Journal of Experimental Agriculture* 2015;5(2):124–133. Article no.AJEA.2015.014. Available from: URL: <http://sciencedomain.org/issue/665>
27. The World Bank. *Levelling the Field: Improving Opportunities for Women Farmers in Africa*. The World Bank, Washington; 2014. Available from: URL: [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/03/14/000333037\\_20140314131214/Rendered/PDF/860390WPOWB00N0osure0date0March0180.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/03/14/000333037_20140314131214/Rendered/PDF/860390WPOWB00N0osure0date0March0180.pdf)
28. Peterman A, Behrman J, Quisumbing A. A review of empirical evidence on gender differences in non-land agricultural inputs, technology, and services in developing countries ESA Working Paper No. 11-11 March 2011 Agricultural Development Economics Division Food and Agriculture Organization of the United Nations; 2011. Available from: URL: [www.fao.org/economic/esa](http://www.fao.org/economic/esa) <http://www.fao.org/3/a-am316e.pdf>
29. GIZ. *Gender and Agricultural Extension*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; 2013. Available from: URL: <http://www.giz.de/expertise/downloads/giz2012-en-gender-and-agricultural-extension.pdf>
30. Moguees T, Cohen MC, Birner L, Lemma M, Randriamamonjy J, Tadesse F, *et al.* *Agricultural Extension in Ethiopia through a Gender and Governance Lens*. ESSP2 Discussion Paper 007. Ethiopia Strategy Support Program 2 (ESSP2) IFPRI, Washington; 2009.
31. GSMA. *Women & Mobile: A Global Opportunity A study on the mobile phone gender gap in low and middle-income countries*. 2013. Available from: URL: [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/GSMA\\_Women\\_and\\_Mobile-A\\_Global\\_Opportunity.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/01/GSMA_Women_and_Mobile-A_Global_Opportunity.pdf)
32. Zossou E, Vodouhe DS, Van Mele P, Lebailly Ph. *Linking farmers' access to rural radio, gender and livelihoods: case study of rice processors in Benin*. 2012. Available from: URL: [http://www.agroinsight.com/downloads/Articles-Agricultural-Extension/2012\\_AE2\\_Linking-farmers-access-to-rural-radio-gender-and-livelihood-Zossou-et-al-2012.pdf](http://www.agroinsight.com/downloads/Articles-Agricultural-Extension/2012_AE2_Linking-farmers-access-to-rural-radio-gender-and-livelihood-Zossou-et-al-2012.pdf)
33. van Vark C. *Improving access to services for women in agriculture*. 2013. Available from: URL: <http://www.theguardian.com/global-development-professionals-network/2013/sep/25/women-agriculture-access-india>
34. FAO (undated). *Men and women in agriculture: closing the gap*. 2011. Available from: URL: <http://www.fao.org/sofa/gender/key-facts/en/>
35. Okello B, Paruzzolo S, Mehra R, Shetty A, Weis E. *Agrodealerships in Western Kenya: How Promising for Agricultural Development and Women Farmers?* International Center for Research on Women ICRW. 2012. Available from: URL: <http://www.icrw.org/files/publications/Kenya%20Agrodealers%20FINAL.pdf>
36. Plantwise. *Who benefits from Plantwise?* Plantwise blog. 2014. Available from: URL: <http://blog.plantwise.org/2014/03/31/who-benefits-from-plantwise/#more-6643>