PAPER PRESENTED AT THIRD WORLD CONGRESS ON AGROFORESTRY 2014

Session : Bridging science and development

Abstract code: WCA2014-1190

TITLE : Farmer to farmer interpersonal communication in agroforestry innovation dissemination in Sulawesi, Indonesia

Authors : Endri Martini, James M. Roshetko, Enggar Paramita

Affiliation : World Agroforestry Centre

Abstract :

During the past 35 years, research in agroforestry has evolved significantly. However in many countries the dissemination of agroforestry information and innovation is constrained due to a lack of extension agents knowledgeable of agroforestry issues. In countries like Indonesia, where smallholder livelihoods are dependent on agroforestry production systems, the dissemination of relevant agroforestry innovations is essential to reducing poverty and ensuring food security. Farmer-to-farmer communication is a possible alternative method of disseminating agroforestry innovations when there is a lack of extension agent in the agroforestry sector. To evaluate the potential of the farmer-to-farmer communication, a study was conducted in November 2012 and April 2013 to identify and understand village-level communication systems. Semi structured interviews of 146 farmers (40% female) in two districts in South Sulawesi province and two districts in Southeast Sulawesi province were combined with qualitative analysis of agroforestry farmer field school activities. Based on the study, farmer-to-farmer interpersonal communication is crucial to the dissemination of agroforestry innovation, particularly in places where: (a) extension agents' visit is limited; (b) language becomes a barrier for information dissemination; (c) the level of formal education is low; (d) under-developed infrastructure (road, electricity, phone signal, etc) limits the free flow of information. Results also specify that lead farmers are key actors in developing and supporting quality farmer-to-farmer interpersonal communication. The capacity of lead farmers should be enhanced by: (a) improving their information networking to ensure access to accurate information on agroforestry innovations, and (b) improving their linkage to the local government agencies. Supports from multistakeholders (government, research centres and NGOs) in establishing an information centre or forum where lead farmer can consult their problems and update new information will enhance farmer-to-farmer role in agroforestry innovation dissemination.

Keywords: agricultural extension, farmer field school, lead farmer, smallholder farmer

I. INTRODUCTION

Worldwide, since 1978, research in agroforestry has evolved significantly, starting from plot level issues up to landscape level issues and beyond. Innovations in agroforestry have been produced mainly in how to enhance plot level production through improved germplasm and garden management, how to improve farmers market access, how to diversify income from agroforestry and how to enhance agroforestry contribution to better ecosystem services (Beer *et al.*, 2005). Those innovations are positive in improving livelihood in rural areas and better environment. However in many countries, mainly in developing countries, the dissemination of agriculture and agroforestry information and innovation is constrained by number of challenges with one of them being the weak linkages between research agencies with farmers and extension agents (Okia, 2006; Feder *et al.*, 2010), which leads to extension agents lacking knowledge on agroforestry issues.

In Indonesia, based on statistic data in year 2013 there were 31.7 million farmers whose livelihoods depend on agricultural sector. At least 17 million of them were smallholder farmers located in rural areas with agroforestry gardens as main source of their livelihood. Improvement in agroforestry innovation dissemination in Indonesia will help farmers in enhancing their garden productivity and improving their access to market, which are important for reducing poverty and ensuring food security. However, most of the times, lack of coordination between agroforestry research agencies with extension agents, and lack of number of agroforestry extension agents who interacted with farmers have constrained the dissemination of agroforestry innovations in Indonesia particularly in area that located further away from central government as in Sulawesi, Indonesia (Martini *et al.*, 2012).

At farmer level, although farmers have limited access to agroforestry innovations produced by research agencies, they have developed their own system which depending on the successful experience of knowledgeable farmers in the village. Limited information and extension services lead farmers to copy adoption decisions of other farmers particularly farmers from the same village (Pomp and Burger, 1995). Thus, farmer-to-farmer communication is a possible alternative method of disseminating agroforestry innovations when there is a lack of extension agent in the agroforestry sector. Isaac *et al.* (2007) in Ghana showed that 84% of farmers interviewed depend on external source of information for improving their agroforestry practices. Both external and farmer-derived sources of knowledge of agroforestry practices are essential for the maintenance of productive agroforestry systems. Hence, this study is focused to evaluate the potential of farmer-to-farmer communication to complement the public extension services to enhance the adoption rate of agroforestry innovation by improving its information dissemination, particularly in Sulawesi, Indonesia.

II. DATA COLLECTION

Data was collected by combining semi-structured interview of 146 farmers (40% female) that was conducted in October to November 2012, with qualitative analysis of the agroforestry farmer field school implementation in April 2013 to February 2014. The study was conducted in two districts of South Sulawesi province (Bantaeng district and Bulukumba district) and two districts of Southeast Sulawesi province (Konawe district and Kolaka district). Sources of farmers' livelihood in those districts are dominated from agroforestry systems with cacao, coffee, clove, durian and pepper as main commodities in the systems (Janudianto *et al.*, 2012; Khususiyah *et al.*, 2012). In each district, 3 villages were selected randomly by considering its distance to capital of the district that is acknowledged as source of information on agroforestry innovation. Data was analyzed quantitatively by descriptive statistics and qualitatively.

III. FARMER TO FARMER INTERPERSONAL COMMUNICATION IN SULAWESI, INDONESIA

Result show that for obtaining general information (on agriculture, health and education), on average from 146 respondents, 48% of information obtained per respondent come from inside village (village leaders, farmer groups, friends, family) and 52% come from outside village (from radio, television, government agents, projects, newspaper, friends/farmers in other village). Men tend to have a higher percentage (63%) to obtain information from outside village than women (51%), this may because men have more chances to visit other areas. In Southeast Sulawesi, farmers access to external information (58%) is slightly higher than in South Sulawesi (50%), this may because farmers in Southeast Sulawesi are transmigrants (mostly from South Sulawesi, Bali, Java, Lombok) who used to depend reliable information from outside village, while in South Sulawesi, the communities are local ethnicity, i.e. Makassar, Konjo, Bugis.

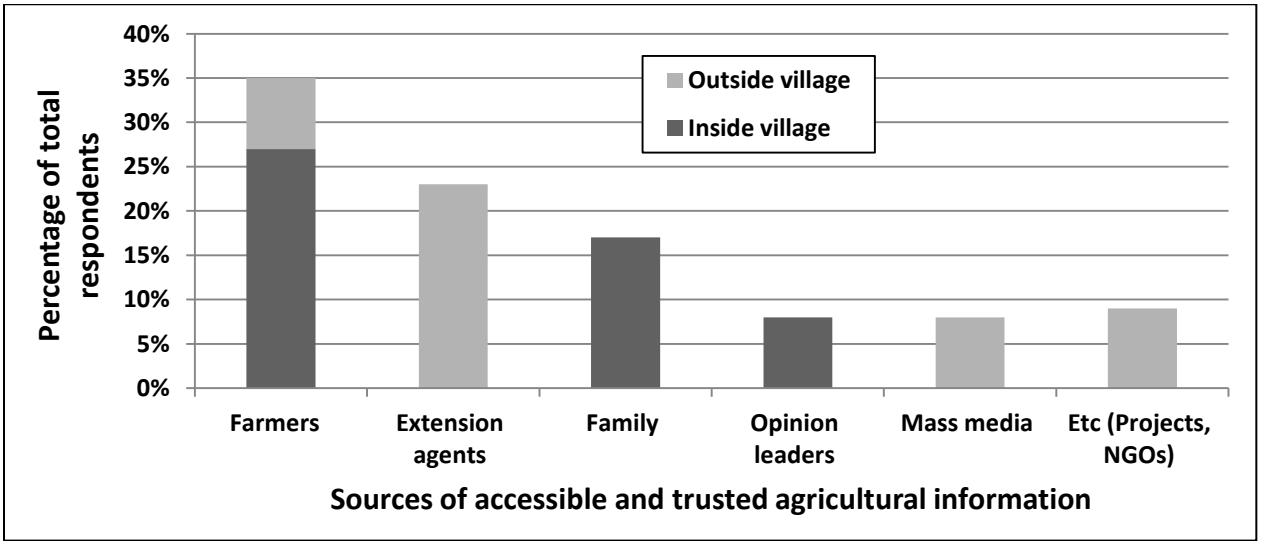

Figure 1. Source of accessible and trusted agricultural and agroforestry information based on farmers perception in South and Southeast Sulawesi

On the other hand, for agricultural and agroforestry information (Figure 1.), in general, 35% of the respondent choose farmers (27% farmers of the same village and 8% farmers from other village) as the most accessible and effective source of information, 23% of the respondent choose extension agents, 17% choose family, 8% choose opinion leaders, 8% choose mass media, the rest choose project, NGOs, and from their own experience.

Table 1. Most accessible and effective source of agricultural and agroforestry information in South Sulawesi and Southeast Sulawesi based on farmer perception

Most accessible and effective source of information	South Sulawesi	SE Sulawesi	NOTE
Farmers	31%	37%	Due to limited extension agents' visit, lack access to mass media
Extension agents	29%	18%	Due to the poor road condition in Southeast Sulawesi, which limit extension agent's visit.
Family	10%	24%	Due to closer bond between family in more plural ethnicity in SE Sulawesi
Opinion leaders (head of village, influential persons, successful farmers)	16%	1%	Due to more plural ethnicity in SE Sulawesi villages
Mass media	6%	9%	Due to the under-developed infrastructure (no electricity and weak phone signal) in some villages.

Note: percentage is from total respondents per province

Comparing between provinces (Table 1.), 31% respondent in South Sulawesi chose farmers as the most accessible and effective source of information on agriculture and agroforestry, while in Southeast Sulawesi 37% of the respondent. Poor road condition in Southeast Sulawesi has limited the extension agents visit in the villages, thus farmers were depending their sources of information to the farmers. Interestingly, distinct result from South Sulawesi and Southeast Sulawesi was on the role of opinion leaders, only 1% of the respondent in Southeast Sulawesi considered opinion leader as trusted disseminator agents of agriculture and agroforestry information, while in South Sulawesi is 16%. This due to the more plural ethnicity in Southeast Sulawesi if compare to South Sulawesi. Family also play an important role as source of information, particularly for transmigrants as in Southeast Sulawesi.

Besides of the availability of sources of information, sometimes, language also become barrier in disseminating agroforestry innovations. In general, language barriers when conducting extension services was encountered in South Sulawesi, where 61% of the farmer respondents have only an elementary school or below level of formal education. Those individuals prefer to use the local language and some are illiterate. In Southeast Sulawesi, most of the farmers use Indonesian, the national language, daily and are able to write and read. Thus, in South Sulawesi, farmers or

extension agents that can speak the local language are considered as the most accessible source of information.

Mass media as source of information in both provinces is also limited due to the under-developed infrastructure in many villages, no electricity and weak phone signal in their region. In these villages, discussions with other farmers are considered as the most effective source of information for improving the production of their agroforestry systems.

Hence, in particular places where sources of external information is limited due to lack of visit from extension agents, language barriers and under-developed infrastructure, farmer-to-farmer interpersonal communication is considered as the most accessible and effective communication method to obtain information on agricultural and agroforestry.

IV. AGENTS IN AGROFORESTRY INNOVATION DISSEMINATION

Based on the interview with respondents, top three type of agroforestry innovations that are favorite for the farmers are grouped as technologies to improve germplasm on 1) planting new species in AF system (30% of the respondents), 2) vegetative propagation (25% of the respondents) and 3) access to new species or superior varieties (19% of the respondents). Those agroforestry innovations were sourced from agroforestry projects (24%), farmers (22%), government aids (16%), opinion leaders (14%), family (8%), private sectors (7%), extension agents (4%), traders (3%) and farmer groups (2%).

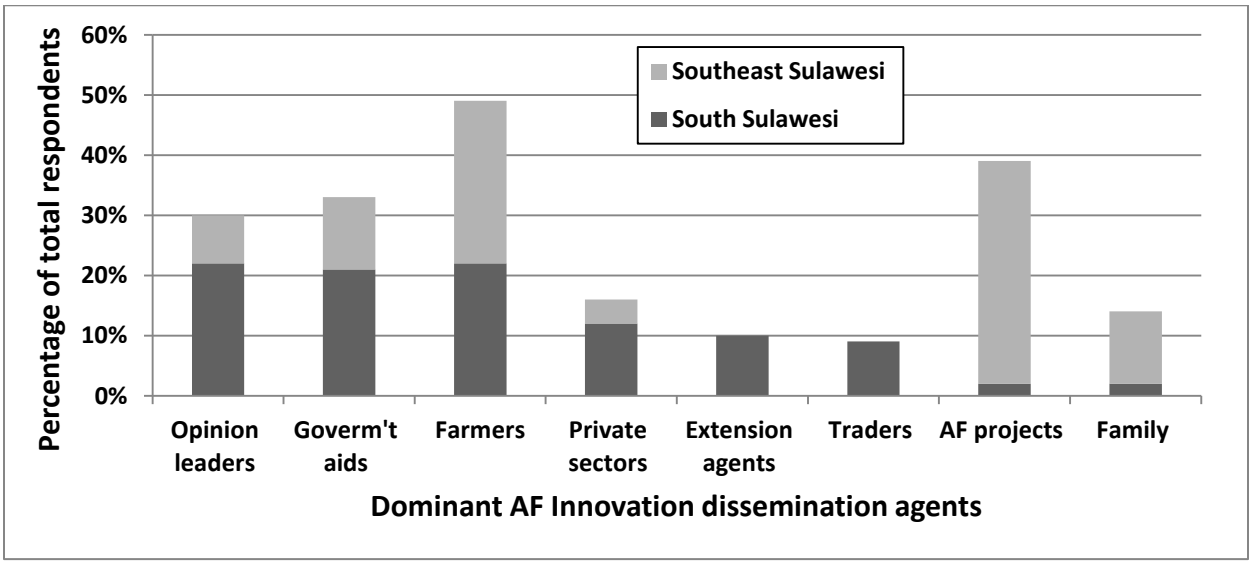

Figure 2. Dominant AF-innovation dissemination agents between South Sulawesi with Southeast Sulawesi province.

However, between provinces, the sources of agroforestry innovations were different (Figure 2.). Dissemination in South Sulawesi was dominated by opinion leaders (22%) followed by government aids (21%), farmers (18%), private sectors (12%), extension agents (10%), traders

(9%), farmer groups (4%), agroforestry projects (2%) and family (2%). While in Southeast Sulawesi, agroforestry projects (37%) played major role in dissemination of agroforestry innovation, followed by farmers (27%), family (12%), government aids (12%), opinion leaders (8%), and private sectors (4%). Thus, lead farmers role in disseminating agroforestry innovations are more important in South Sulawesi than in Southeast Sulawesi.

The important role of lead farmers in agroforestry innovations dissemination in South Sulawesi was confirmed during the implementation of agroforestry farmer field school (AFFS) that was run under AgFor Sulawesi project funded by CIDA and implemented by ICRAF and partners in April 2013-February 2014 in the study sites. Main focus of the agroforestry farmer field school is on garden management, by focusing on 5 main commodities, i.e. durian, cocoa, coffee, clove and pepper. Aside from a researcher-to-farmer extension approach, a farmer-to-farmer extension approach was also implemented as part of AFFS where lead farmers were selected to play role as resource persons in the AFFS. Participants of the AFFS event with lead farmers (who were also participants of Researcher-to-Farmer AFFS event) as resource persons were as enthusiast as participants of the AFFS event with researcher as resource persons.

Farmer-to-farmer interpersonal communication in exchanging experience for maintaining agroforestry appeared more when we conduct cross-visit between AgFor farmers as part of the AFFS. We brought farmers that having problems with their AF garden to farmers who have successfully maintaining their AF garden. Thus, cross-visit farmer-to-farmer extension activities tend to have stronger impact on enhancing farmers motivation for improving their AF gardens.

In conclusion, farmer-to-farmer interpersonal communication is crucial as source of agricultural/agroforestry information, particularly in places where: (a) extension agents' visit is limited; (b) language becomes a barrier for information dissemination; (c) the level of formal education is low; (d) under-developed infrastructure (road, electricity, phone signal, etc) limits the free flow of information. Results were also specified that lead farmers are one of the key actors in developing and supporting quality farmer-to-farmer interpersonal communication. However, the capacity of lead farmers should be enhanced by: (a) improving their information networking to ensure access to accurate information on agroforestry innovations, and (b) improving their linkage to the local government agencies. Sustainability of farmer-to-farmer extension approach, will require investments in human, social, and financial capital that can motivate lead farmer in working effectively (Kiptot and Franzel, 2013).

Although farmer-to-farmer communication has played a major role in the agroforestry innovation dissemination in Sulawesi, external sources of information that generated by research agencies are still key for farmers in generating innovation that can improve their agroforestry productivity in sustainable manner. Thus, farmer access to agroforestry innovations needs to be enhanced by improving: farmer's information networking with research agencies, local governments and with farmers from other areas. Agroforestry research agencies as agroforestry innovation generators, need to improve their strategies in disseminating the research result to farmers. Initiatives from local government is necessary particularly in establishing and maintaining an information centre or forum where farmers can consult their problems and update new information. Conditions in South and Southeast Sulawesi as reported in this study are represent of agroforestry conditions in rural Indonesia. We feel the study results are directly applicable across Indonesia and other countries in Southeast Asia.

ACKNOWLEDGMENTS

This study was funded through the Agroforestry and Forestry: Linking Knowledge to Action (AgFor) project funded by Canadian International Development Agency (CIDA) in year 2011 to 2016. We appreciate the assistance and contribution of the collaborating communities and local government offices in Bantaeng, Bulukumba, Konawe and Kolaka.

REFERENCES

Beer J, Ibrahim M, Sinclair F. 2005. The History and Future of Agroforestry Research and Development: Policy Impacts and Needs. In Forests in the Global Balance – Changing Paradigms. G. Mery, R. Alfaro, M. Kanninen, M. Lobovikov. (eds.). IUFRO World Series Volume 17. Helsinki. 318 p.

Feder G, Anderson JR, Birner R, Deininger K. 2010. Promises and Realities of Community-Based Agricultural Extension. The International Food Policy Research Institute (IFPRI) Discussion Paper 00959.

Isaac, M. E., B. H. Erickson, S. Quashie-Sam, and V. R. Timmer. 2007. Transfer of knowledge on agroforestry management practices: the structure of farmer advice networks. Ecology and Society 12(2): 32.

Janudianto, Khususiyah N, Isnurdiansyah, Suyanto, Roshetko JM. 2012. Agroforestry and Forestry in Sulawesi series: livelihood strategies and land use system dynamics in Southeast Sulawesi *ICRAF Working paper no. 156* Bogor, Indonesia World Agroforestry Centre (ICRAF) 53p 2012055 http://www.worldagroforestry.org/downloads/publications/PDFs/WP12055.PDF

Khususiyah N, Janudianto, Isnurdiansyah, Suyanto, Roshetko JM. 2012. Agroforestry and Forestry in Sulawesi series: livelihood strategies and land use system dynamics in South Sulawesi *ICRAF Working paper no. 155* Bogor, Indonesia World Agroforestry Centre (ICRAF) 47p 2012054 http://www.worldagroforestry.org/WP12054.PDF

Kiptot E, Franzel S. 2013. Voluntarism as an investment in human, social and financial capital: evidence from a farmer-to-farmer extension program in Kenya. Agricultural Human Values.

Martini E, Tarigan J, Purnomosidhi P, Prahmono A, Surgana M, Setiawan E, Megawati, Mulyoutami E, Meldy BW, Syamsidar, Talui R, Janudianto, Suyanto and Roshetko JM. 2012. Agroforestry and Forestry in Sulawesi series: Agroforestry extension needs at the community level in AgFor project sites in South and Southeast Sulawesi, Indonesia. Working paper 159. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. 43p.

Okia, CA. 2006. Dissemination and Scaling up of demand driven agroforestry technologies and innovations in Uganda. Uganda Stakeholders' Workshop Report on TOFNET Project 3, Mukono ARDC, 10-11 August 2006.

Pomp M, Burger K. 1995. Innovation and Imitation: Adoption of Cocoa by Indonesian Smallholders. World Development 23(3): 423-431.