Working Paper

Agroforestry and Forestry in Sulawesi series:

Evaluation of the Agroforestry Farmer Field Schools on Agroforestry Management in South and Southeast Sulawesi, Indonesia

Endri Martini, Ummu Saad,Yeni Angreiny, James M. Roshetko,
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World Agroforestry Centre

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Working paper no. 220

Correct citation

Martini E, Saad U, Angreiny Y, Roshetko JM, Gunawan H, Maulana HT, Suganda G, Dwipayana G, Erwin LO, Hadedi A. 2016. *Agroforestry and Forestry in Sulawesi series: Evaluation of the Agroforestry Farmer Field Schools on agroforestry management in South and Southeast Sulawesi, Indonesia*. Working paper 220. Bogor, Indonesia: World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. 16p. DOI: 10.5716/WP16002.PDF.

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Published by the World Agroforestry Centre (ICRAF)
Southeast Asia Regional Program
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Indonesia

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Working Paper 220

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Abstract

The Agroforestry Farmer Field School (AFFS) is a program implemented through the Agroforestry and Forestry: Linking Knowledge to Action (AgFor) project that seeks to improve the agroforestry garden management capacity of smallholder farmers in several provinces of Sulawesi Island, Indonesia. In principle, the method implemented in AFFS follows the participatory concept of farmer field schools, with the AFFS design based on the local context of AgFor sites in South and Southeast Sulawesi provinces. The AFFS was implemented from April 2013 to March 2014, with a focus on five main commodities prioritized by farmer partners, that is, pepper, clove, coffee, cacao and durian. Experts and scientists from Indonesian national research institutes were engaged as resource persons in the AFFS. One year after the program initiation, an evaluation was conducted through interviews of randomly-selected AFFS participants from four districts in South and Southeast Sulawesi provinces. The evaluation was conducted from April to July 2014 with 263 respondents (12% of total AFFS participants). Results of the evaluation showed that 97% of the respondents gained benefit from attending AFFS. New and reliable knowledge or information was perceived as the most important aspect motivating farmers to attend AFFS. Results showed that one year after first implementation of AFFS, 14% of respondents had generated cash benefits from testing new knowledge learned during AFFS. The amount of money generated depended on the type of knowledge tested. Fertilizing and pruning were important techniques that yielded cash benefits for farmers in the short term (within one year). The evaluation concluded that after AFFS activities end, a minimum of one year of facilitation would be required to assist participants to effectively test and adapt the new knowledge learned.

Keywords

Agroforestry Farmer Field School, evaluation, coffee, durian, cacao, pepper, clove

Acknowledgements

This study was implemented through the Agroforestry and Forestry: Linking Knowledge to Action (AgFor) project funded by the Department of Foreign Affairs, Trade and Development (DFATD), Government of Canada (Contribution Arrangement No. 7056890) and the CGIAR Research Program on Forests, Trees and Agroforestry. Additional assistance and contribution was provided by the collaborating communities and local government offices in Bantaeng, Bulukumba, Konawe and East Kolaka. The authors greatly appreciate that support, assistance and contributions. The authors also greatly appreciate the English editing made by Robert F. Finlayson.

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1. Introduction

Farmers' management of their agroforestry gardens is very diverse. Owing to the nature of perennial crops, impact resulting from specific management may not be known for a year or more. Thus, any extension approach targeting garden management should focus on enhancing farmers' analytical skills and enriching their sources of information, which are essential for helping to decide the best-fit management options that will improve their gardens' productivity.

Farmer field schools can be an effective extension approach to enhance farmers' capacity in managing their gardens for higher and sustainable productivity. Hence, designing an Agroforestry Farmer Field School (AFFS) focused on tree-garden management would be expected to enhance agroforestry productivity, particularly, in areas where agroforestry systems have become the main source of livelihoods, as in Sulawesi, Indonesia.

In Sulawesi Island, Indonesia, a project focusing on agroforestry and forestry management for enhancing local livelihoods, called Agroforestry and Forestry: Linking Knowledge to Action (AgFor), which is funded by the Department of Foreign Affairs, Trade and Development (DFATD), Government of Canada and the CGIAR Research Program on Forest, Trees and Agroforestry, has been operating since 2012. One of the objectives of the AgFor project is to empower motivated farmers of either gender to enhance and diversify the productivity and profitability of their tree-based systems. Towards achieving that objective, an AFFS was implemented from April 2013 to March 2014.

The AFFS was supported by results of a project baseline survey conducted with farmers from October to November 2012. The survey showed that more than 60% of the respondents preferred extension methods that contained practical sessions and face-to-face discussions. The concept of farmer field schools, which uses participatory training techniques to achieve learning objectives, fits well with farmers' needs for innovative extension approaches at the AgFor sites. Thus, a farmer field school concept was applied to assist the 'linking knowledge to action' process, as stated in the AgFor title.

One year after the implementation of the AFFS, an evaluation was conducted with the objective of analysing the benefits and challenges of the school implementation, based on participants' perspectives. An analysis was also conducted to understand the possibility of implementing AFFS in a broader area.

2. Agroforestry farmer field school concepts and framework in the AgFor Project

Training and Visits[1] and Farmer Field Schools[2] are two extension approaches that have been implemented in the AgFor project. Nursery establishment and management require intensive work over one-to-two years, thus, biweekly training and visits over a minimum period of one year is an appropriate extension approach to improve quality seedling production (Roshetko et

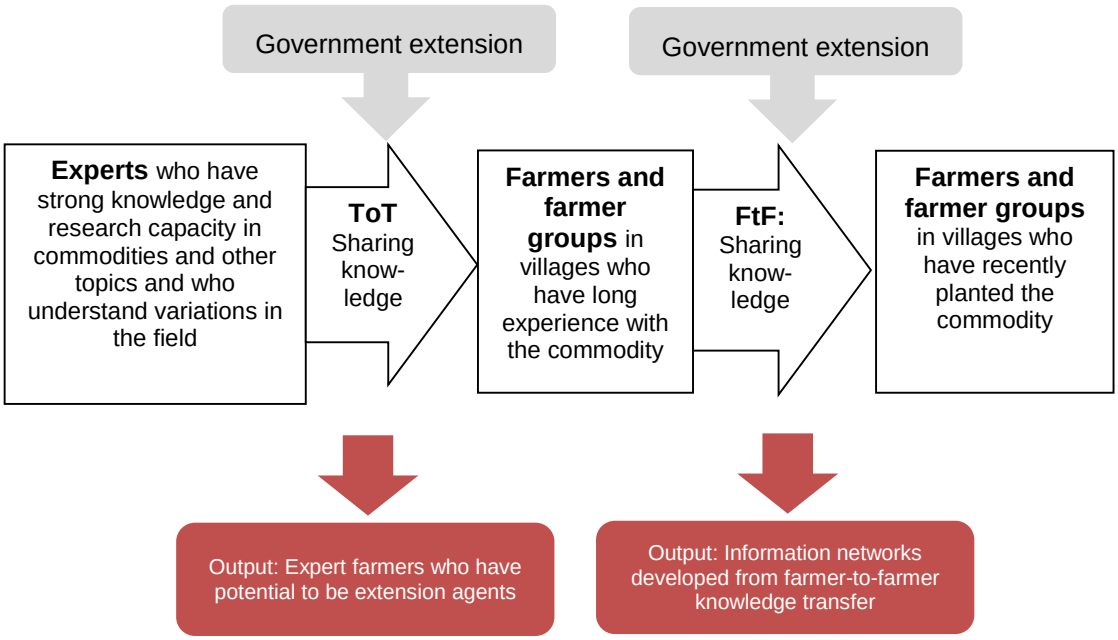
[1] Training and Visits is one extension approach identified by the Food and Agriculture Organization of the United Nations (FAO).

[2] A farmer field school is a group learning process where farmers enhance their knowledge and analytical skills through observation and experimental learning conducted over the full cycle of crop production. The concept was originally developed and tested by the FAO for controlling the use of pesticides in annual crops, particularly, rice.

al 2013). However, for topics such as garden management, where the nature of perennial tree crops requires a minimum of one year post-intervention to evaluate the impact of the different management options, another extension approach is necessary that enhances farmers' analytical skills and enriches their sources of information. A modified farmer field school extension approach was expected to enhance farmers' knowledge and skills leading to increases in agroforest garden productivity, thus, an AFFS was developed through AgFor (Martini 2013).

The objectives of the AFFS were to 1) stimulate an extension approach that uses demonstration plots as places to learn new knowledge and technology; 2) provide an innovative extension approach that can enhance farmers' analytical skills and information networking and which can be continued by government extension agents; and 3) prepare expert farmers who can play a role as extension agents in the future. Besides enhancing the knowledge of farmers in managing agroforestry gardens, another expected outcome of the AFFS was positive links between farmers, government extension agents and scientists from research institutes.

A main concept of AFFS is to link knowledge produced by research institutes to farmers (Figure 1.) through participation, a key principle of AFFS, by involving research institutes, government extensionists and farmers in the entire process. Government extension agents are expected to: 1) facilitate the learning process in the field; 2) maintain facilitation of positive extension systems; and 3) keep connections with research institutes as sources of information. Training of Trainers (ToT) and Farmer to Farmer (FtF) extension are two essential processes included in the AFFS. Besides strengthening knowledge and experience, the ToT process is expected to form expert farmers who have potency as extension agents while the FtF process is expected to facilitate the formation of informal farmer information networks.



Source: Primary concept

Figure 1. Concept of AgFor's Agroforestry Farmer Field Schools for Garden Management

A technical committee was formed before implementing the AFFS. The committee consisted of a) an agroforestry extension specialist; b) AFFS field team; c) government extension agents; and d) AFFS communication team. Detailed roles of each member of the technical committee are listed in Table 1.

Table 1. Technical committee for implementing AFFS

Technical committee member	Role
Agroforestry extension specialist	• Establish connections with research institutes • Design agenda and topics for the school • Coordinate all activities related to the school
Field team	• Prepare schedule, venue, logistics (equipment, catering) • Invite all stakeholders in the village to attend the school • Select venues for the farmer field day • Prepare and select farmer demonstration trials ('demoplots') to be used as learning venues in the school • Facilitate the school process • Monitor follow-up needs post-AFFS
Government extension agents	• Together with the field team, facilitate the learning process of the school • Transfer results from the school to government programs
Communication team	• Together with the agroforestry extension specialist, develop extension materials • Disseminate the results and lessons learned of the school to broader audiences through mass media or other communication channels

In AFFS, at least five different commodities became the focus over a period of one year. Every three months, the AFFS held sessions that provided new information and perspectives related to one-to-two commodities prioritized by farmers. In each third-month session, three steps were commenced to enhance farmers' analytical skills (Table 2): 1) Strengthening the concept and knowledge through scientist-to-farmer and farmer-to-farmer extension approaches; 2) farmer field days; and 3) evaluation.

Table 2. Steps in each of AFFS 3 monthly-session

Steps	Time	Objectives	Activities
Step 1: **Strengthening the concept and knowledge**	First month	To strengthen farmers' knowledge and update external sources of information on topics of agroforestry management	A one-day school in at least two farmer demonstration plots. Discussion, analysis and practice conducted through scientist-to-farmer and farmer-to-farmer extension approaches
Step 2: **Farmer field day**	Second month	To enhance farmers' analytical skills and to expand farmers' sources of information and networks that can assist farmers to solve problems they encounter in their gardens	A one-day school through field visits to demonstration plots in other villages or research stations
Step 3: **Evaluation**	Third month	To reflect on how the new knowledge learned from the school could be applied in their gardens	A half-day school in class. Discussion about new knowledge and how it can be applied in gardens

The AFFS process was completed after one year and participants were given certificates. The AFFS follow-up continued through monitoring conducted at selected agroforestry gardens and demonstration plots established on the land of AFFS participants with the objective of learning about the adoption process and impact of the new technologies introduced through the AFFS. The selection of demonstration plots was based on farmers' willingness to test the technology in their gardens and allow the plots be used for learning during a subsequent two years.

3. Data collection

The AFFS was implemented at AgFor project sites in South and Southeast Sulawesi provinces. In South Sulawesi, the AFFS was implemented in seven villages located in Bantaeng District and five villages in Bulukumba District. The two districts are adjacent, with clove, coffee, cacao, durian and other tropical fruit as dominant commodities produced in agroforestry gardens being farmers' main sources of livelihoods (Khususyiah et al., 2012). In Southeast Sulawesi, the AFFS was implemented in seven villages located in Konawe and seven villages in East Kolaka districts. Konawe and East Kolaka are also adjacent to each other, with cacao, pepper, durian and teak as main commodities (Janudianto et al., 2012). Differences in number of villages per district related to the number of AgFor pilot villages located in each district.

A survey was conducted from April to July 2014 through structured interviews with 263 respondents, equalling 12% of the total participants in the AFFS (total of 1733 attendees). Respondents were randomly selected from seven villages in Bantaeng, three in Bulukumba, seven in Konawe and seven in East Kolaka. Of the total, 25% of respondents were women, equalling the percentage of women who attended the AFFS activities. The number of respondents in South Sulawesi (150: 112 men; 38 women) was higher than the number of respondents in Southeast Sulawesi (113: 85 men; 28 women) because the number of AFFS sessions and participants was greater in South Sulawesi.

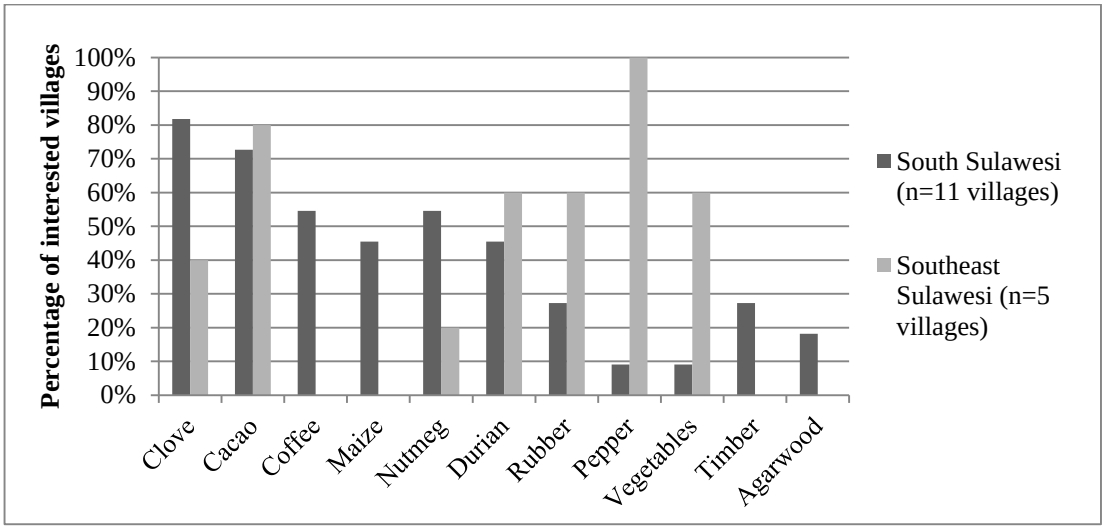
Respondents were between 17 and 70 years-old, with average age of 39 years in South Sulawesi and 42 years in Southeast Sulawesi. Most of the respondents (91%) were farmers, with the other 9% being government extension agents, housewives, labourers (non-agricultural), school teachers and traders. Almost all the respondents (98%) were members of AgFor farmer groups; four respondents were government extension agents and a housewife. In general, the respondents were active participants in the AgFor project.

Information collected in the study was on the type of AFFS process that was attended by respondents, the favourite AFFS activity of the respondents, the motivation of respondents to attend AFFS activities, and the type of changes in respondents' gardens resulting from participation in AFFS activities. A qualitative analysis was also conducted to identify and understand the challenges of the AFFS approach.

4. Results and discussion

4.1. AFFS implementation

AFFS activities were held at AgFor project sites in South and Southeast Sulawesi from April 2013 to March 2014. Clove, pepper, cacao, coffee and durian were selected as the focus commodities based on farmers' prioritization (Figure 2). While nutmeg was also prioritized, particularly by farmers in South Sulawesi, there was not much new knowledge generated for nutmeg garden management. Nutmeg-related activities in AgFor focused on producing quality seedlings.



Source: Primary data from focus-group discussions in January 2013 (South Sulawesi) and February 2013 (Southeast Sulawesi)

Figure 2. Commodities proposed by farmers for inclusion in the AFFS in South Sulawesi and Southeast Sulawesi.

Based on focus-group discussions with farmers, the main topics for AFFS were set as integrated pest and disease management and garden rehabilitation. In addition, based on recommendations from experts in the prioritized commodities, information on planting, fertilizing, pruning and producing superior seedlings were also included in the AFFS.

Scientists from Indonesian national research institutes (Table 3) were engaged to share new knowledge in AFFS sessions with farmers from selected villages who had long experience with the commodity. These selected farmers were called 'village trainers' and most spoke Indonesian, the national language, fluently. Language capacity was important because not all farmers spoke Indonesian fluently but rather their own local language. One-to-two weeks after the training, the 'village trainers' would share their new knowledge with other farmers in villages that had not received visits from the scientists because the farmers were new to the commodities discussed in the training. Some of the follow-up training sessions were conducted in local languages to maximize clear communication; this was particularly necessary in Bantaeng and Bulukumba districts.

Table 3. Resource persons for each commodity in the AFFS

Commodity	Institution	Resource person
Clove and pepper	National Research Institute for Spices and Medicinal plants (Balai Penelitian Tanaman Rempah dan Obat/Balittro), based in Bogor, West Java Province	Dr Dyah Manohara (pepper expert) Dr Dono Wahyuno (clove expert)
Cacao and coffee	Indonesia Coffee and Cacao Research Institute (ICCRI), based in Jember, East Java Province	Dr Retno Hulupi (coffee expert) Dr Adi A. Prawoto (cacao expert)
Durian and fruit trees	National Research Institute for Tropical Fruit (Pusat Kajian Buah Tropika, Institut Pertanian Bogor), based in Bogor, West Java Province	Dr Sobir (tropical fruit expert)

After one year, the total number of AFFS participants in the two provinces was 1733 with an average budget expenditure of USD 17 per participant. The number of extension agents involved in the AFFS was 40 in Southeast Sulawesi and eight in South Sulawesi. The lower level of involvement in South Sulawesi was because most extension agents were focused on rice and vegetable production. The percentage of women participants varied based on the commodity (Table 4). In both provinces, the number of participants was highest for clove and pepper because those two crops had the highest economic values (compared to coffee, cacao, and durian).

Table 4. AFFS events conducted from April 2013 to March 2014

Schedule	Topics	South Sulawesi			Southeast Sulawesi		
		Men	Women	Total	Men	Women	Total
April–September 2013	Pest and disease management of clove and pepper in agroforests; garden rejuvenation strategies	79.9%	20.1%	637	70.4%	29.6%	265
October–December 2013	Coffee agroforestry garden management (including pests and diseases and garden rejuvenation strategies)	67.2%	32.8%	174	78.8%	21.2%	117
October–December 2013	Cacao agroforestry garden management (including pests and diseases and garden rejuvenation strategies)	65.8%	34.2%	213	N/A	N/A	N/A
February–March 2014	Durian and other tropical fruits agroforestry garden management (including pests and diseases and garden rejuvenation strategies)	72.5%	27.5%	174	74.8%	25.2%	153

An AFFS on cacao was not implemented in Southeast Sulawesi because intense cacao extension activities had been provided by government extension agents through various cacao garden management programs, such as the national cacao improvement program (*Gernas*

Kakao) and the Sulawesi Rainfed Agriculture Development Project of the Asian Development Bank. Instead, the AFFS was focused on how Southeast Sulawesi farmers could best use their knowledge of other priority species to enrich their cacao agroforestry garden.

4.2. AFFS outputs and outcomes

AFFS activities in South and Southeast Sulawesi provinces has resulted 3 main outputs:

1) Thirty-five (35) expert farmers from four districts—17 farmers in South Sulawesi (10 men and four women in Bantaeng and three men in Bulukumba) and 18 farmers in Southeast Sulawesi (seven men in Konawe and six men and three women in East Kolaka)—were formed. Additionally, two government extension agents in Southeast Sulawesi (one each from Konawe and East Kolaka), who followed all five AFFS activities, became key partners in improving agroforestry systems in the area.
2) Farmer demonstration trials were established. Based on a participatory process, 109 farmer demonstration trials (FDTs) or demoplots were proposed as part of follow-up from the AFFS. Subsequently, 99 of the FDTs were established: 71 in South Sulawesi and 28 in Southeast Sulawesi. Monitoring of these plots has been conducted every three months since November 2013.
3) Extension materials (booklets) were produced through collaboration with resource persons in the AFFS. The communication team assisted with editing and printing the booklets. The five booklets covered pepper (Manohara and Wahyuno 2013), clove (Wahyuno and Martini 2015), durian (Sobir and Martini 2014), coffee (Hulupi and Martini 2013) and cacao (Prawoto and Martini 2014). The booklets were distributed to farmers and extension agents and are available through the project to all interested parties.

Outcomes of AFFS implementation in South and Southeast Sulawesi were mainly grouped into 3 main topics:

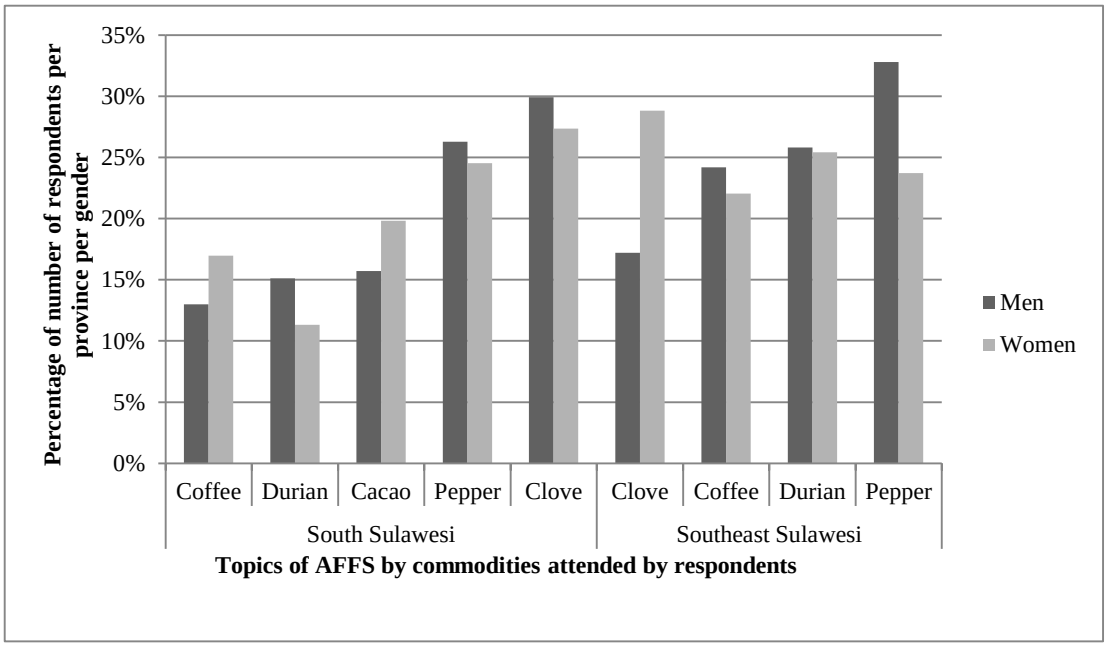
1) Farmers and extension agents had enhanced knowledge of agroforestry management of the five priority commodities: coffee, cacao, clove, pepper and durian. All participants received certificates acknowledging their completion of the AFFS.
2) Enhanced links between farmers, extension agents and researchers were created. Communication between researchers and farmers via SMS and phone had become common and was expanding. At the end of each AFFS session, the researchers enthusiastically gave their phone numbers to the participants to encourage more information exchange.

3) Farmers' information networks on agroforestry technologies were expanded. Visits to successful agroforestry farmers provided good opportunities for farmers to expand their information networks about agroforestry technologies implemented in places other than their village. Farmers exchanged phone number during the visits to maintain communication with successful farmers outside their village.

4.3. AFFS evaluation

4.3.1. Topics and extension methods attended and preferred by respondents

Of the total number of survey respondents, 52% attended scientist-to-farmer sessions of the AFFS, 36% farmer-to-farmer sessions and 12% visit sessions. Of the total respondents (263 persons), 27% attended the pepper AFFS, 25% clove, 18% durian, 17% coffee and 13% cacao. The higher attendance at pepper and clove AFFS was because very few extension services in either province focused on these commodities.



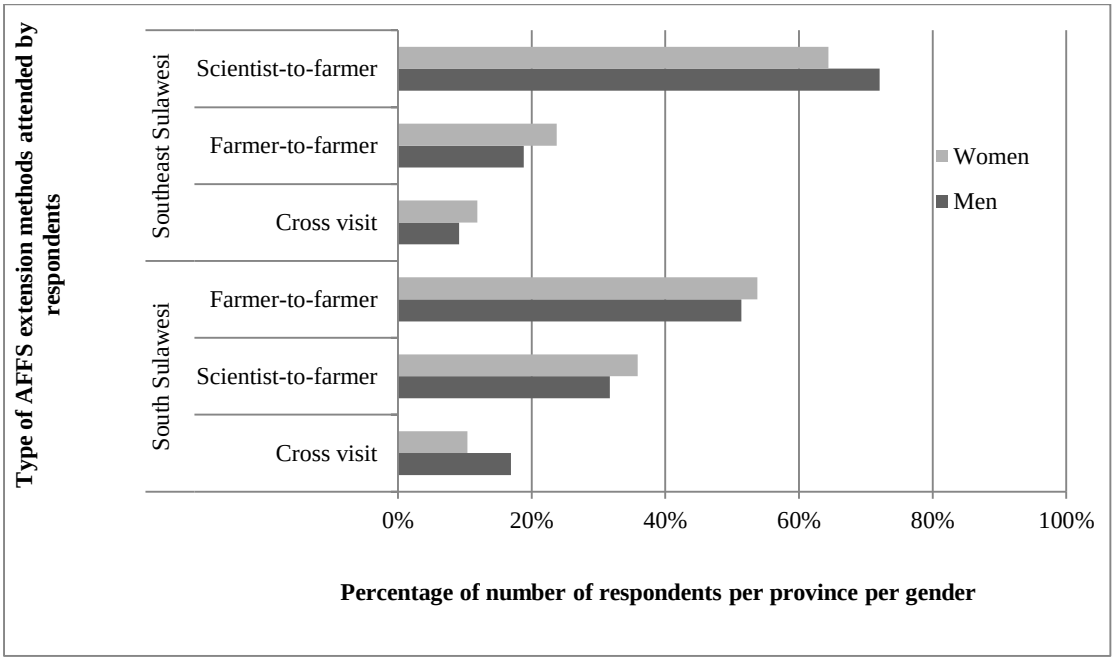
Note: number of respondents in South Sulawesi (n men = 112, n women=38), in Southeast Sulawesi (n men= 85, n women 28).

Figure 3. Topic of AFFS by commodities attended by respondents per province per gender

In South Sulawesi, both genders had high attendance at the clove AFFS because of the high price of clove motivating farmers to obtain greater knowledge of how to enhance yields (Figure 3). For the same reason, both genders in Southeast Sulawesi had high attendance at the pepper AFFS pepper. In Southeast Sulawesi, there was a clear gender difference in attendance at the clove AFFS, with nearly two-thirds of the participants being women. The lower male attendance was because clove was a new commodity there and some of the male

farmers were not sure if local climatic and soil conditions were suitable for clove while female farmers were interested in clove owing to its high economic value. For durian, in Southeast Sulawesi market price and demand was growing, thus, farmers were willing to invest in durian, including attending the AFFS. The prices of clove and pepper were the highest of all commodities that were the focus of the AFFS: for clove reaching USD 12 per kg of dried flowers; USD 9 per kg of dried fruit for pepper; USD 2–8 USD per fruit for durian; USD 2.5 USD per kg dried beans for cacao; and USD 0.3 USD per kg dried beans for coffee. In conclusion, for AFFS topics in South and Southeast Sulawesi, farmers' attendance was highest if the focal species had high prices or strong market demand.

Besides commodity topics, we also analyzed the various extension methods used in AFFS (Figure 4). In South Sulawesi, attendance level by gender was similar for both farmer-to-farmer and scientist-to-farmer sessions. However, women's attendance on cross visits was lower because women were less willing to travel far from their home owing to their domestic responsibilities of children and household care. Although in Southeast Sulawesi women had slightly higher attendance on cross visits mostly because they were migrants who were familiar with travel from place to place. Comparison at the provincial level showed higher attendance at scientist-to-farmers sessions in Southeast Sulawesi because participants preferred to receive new information from scientists who were perceived as more reliable and having up-to-date knowledge. In South Sulawesi, the farmer-to-farmer method had the highest attendance owing to the language barrier; many farmers were not fluent in, or confident in using, Indonesian, thus, it was difficult for them to understand explanations given by the scientists.



Note: number of respondents in South Sulawesi (n men = 112; n women=38); in Southeast Sulawesi (n men= 85; n women 28)

Figure 4. Extension method of AFFS attended by respondents per province per gender

Respondents were asked to identify their favourite topics and extension methods. The results in South Sulawesi showed, clove, cacao and coffee, respectively, were the three most favourite topics. Clove was favoured because of the high and stable price while cacao and coffee were favoured because they had been grown in the area for a long time and made a substantial contribution to local livelihoods. While in Southeast Sulawesi, pepper, durian and coffee were the most favourite topics. Pepper and coffee were favoured because there was a lack of good quality seedlings for these species and farmers wanted to explore techniques for providing seedlings. Durian was favoured because it had good market potential, particularly, in Southeast Sulawesi.

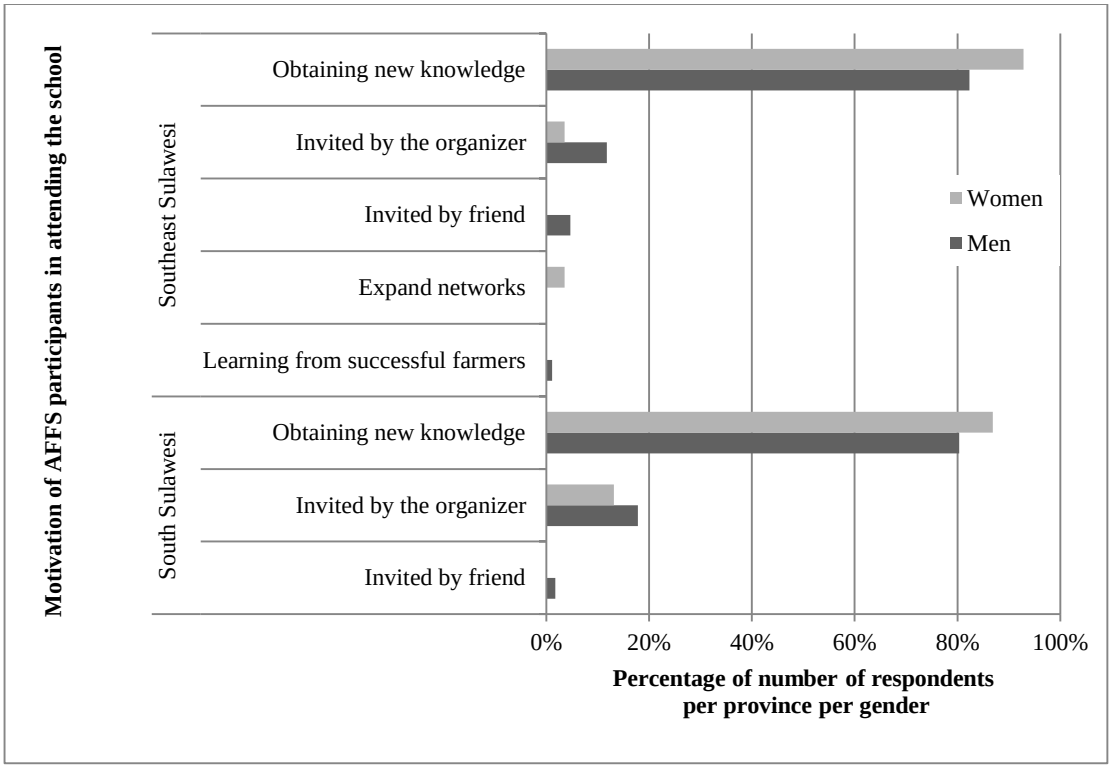
Farmer-to-farmer was the favourite method followed by scientist-to-farmer and visits, respectively. Farmer-to-farmer was preferred because it provided practical demonstrations, easy-to-understand technical information and the language (speaking style) was easily comprehensible. Scientist-to-farmer was liked because it provided new and reliable information from scientists, provided practical demonstrations and the scientists explained in language and approach that was easy to be understood by farmers. Cross-visits had the advantage that the people visited spoke the local language, which was easily understood; also, farmers could have direct observation and discussion in the field.

4.3.2. Motivation of respondents in attending AFFS

Most respondents (86%) were motivated to attend AFFS to obtain new knowledge; 12% because they were invited by the organizer; and 2% because invited by a friend and wanted to expand their networks by learning from successful farmers who attended the AFFS.

When comparing provinces, Southeast Sulawesi respondents' motivation for attending AFFS sessions was slightly more diverse than in South Sulawesi (Figure 5). In South Sulawesi, the percentage of respondents who attended because they were invited by the organizer was higher than in Southeast Sulawesi, thus, we could conclude that providing formal invitations to farmers can enhance attendance. Women seem to have had higher internal motivation to attend the AFFS (that is, obtaining new knowledge). While for men, besides internal motivation, external motivation such as an invitation from the organizer or a friend was also important.

There was no significant difference in the motivation of farmers and extension agents in attending the AFFS; all were primarily attracted to obtain new knowledge. However, with government extension agents, their main motivation was being invited by the organizer. Thus, clearly stating that new knowledge will be provided is very important for attracting farmers to an AFFS.



Note: number of respondents in South Sulawesi (n men = 112; n women = 38); in Southeast Sulawesi (n men = 85; n women = 28)

Figure 5. Motivation of AFFS participants in attending per province per gender

4.3.3. Benefits of AFFS based on respondents' perspectives

Benefits gained by respondents from the AFFS were new knowledge (70%), improved yields (17%), increased income (8%) and improved motivation (2%). A small number of respondents (3%) felt they did not get any benefit from attending. There was no difference between farmers and extension agents regarding benefits gained.

Respondents who felt they did not benefit from AFFS were higher in women (4%) than men (1%). This may because in some areas women are not the main actors in garden management and, thus, the knowledge gained is less applicable. Only men reported improved motivation to manage their gardens as a benefit from AFFS; this likely relates to men being the main decision-makers regarding garden management in both provinces.

New knowledge was perceived as the greatest benefit received from attending AFFS. Some respondents also cited some improvements in their income and yields, which, however, were not large because the AFFS had been completed only one year to a couple of months before the evaluation, which was not long enough to see major changes in tree yields or farmers' incomes.

In Southeast Sulawesi, respondents identified nursery management and vegetative propagation as important new knowledge received from attending the AFFS (Figure 6). Interestingly, women and men held different perceptions regarding vegetative propagation and nursery management. Women were more interested in vegetative propagation than men whereas men were more interested in nursery establishment and management than women.

Farmers in Southeast Sulawesi still depended on seedling sources that were outside the province, that is, from Bali, South Sulawesi and Java (Angreiny et al., 2014).

In South Sulawesi, pruning and fertilizing were the most important new knowledge topics reported by respondents (Figure 6). Interestingly, women saw spacing as important knowledge while it was not so important for men. These priorities were complementary and logical; both genders reported that women reminded men to use the recommended spacing, otherwise the men would not prioritize it.

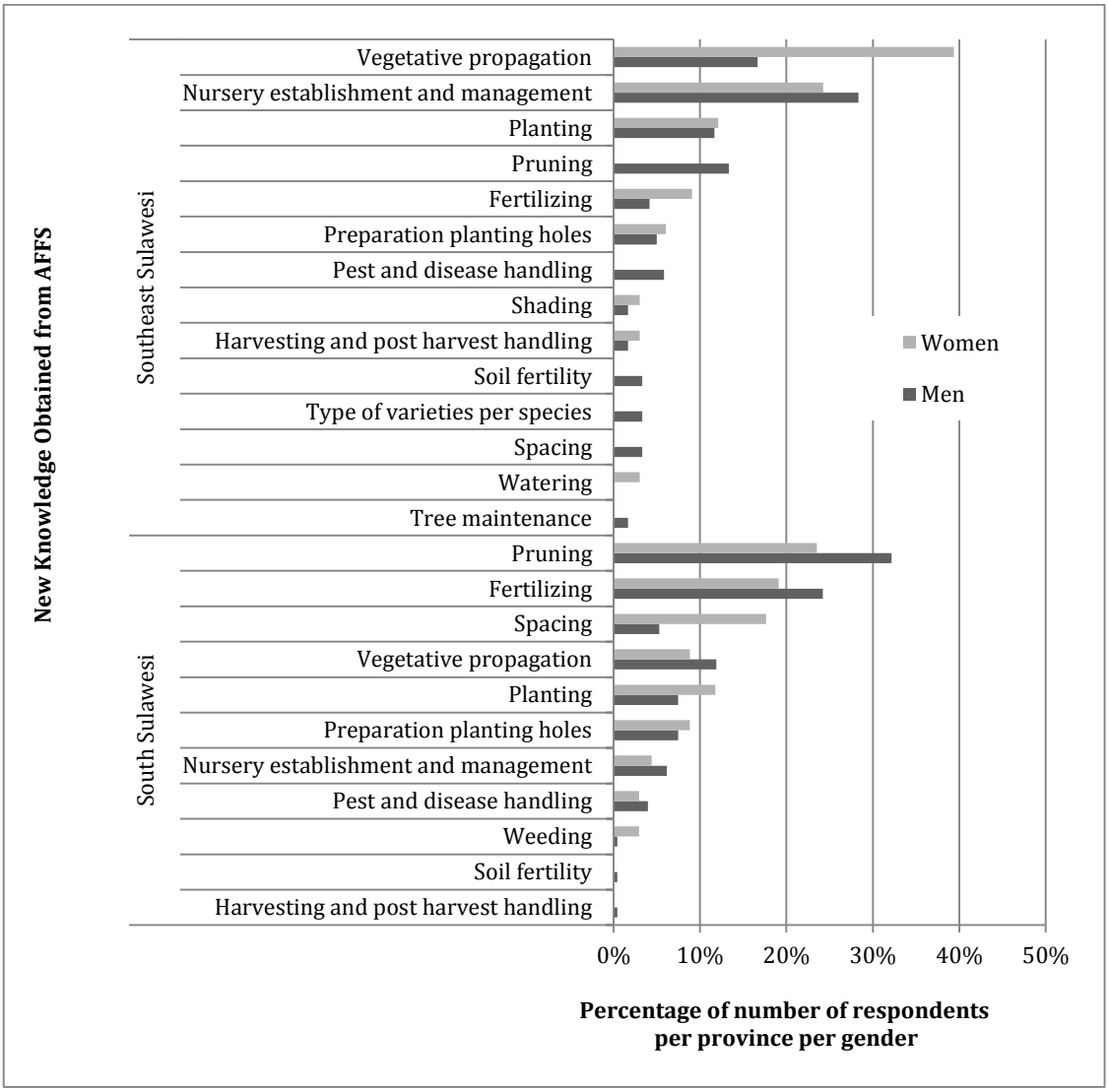


Figure 6. Type of new knowledge obtained by AFFS participants per province per gender

Even though the AFFS was completed only a year or less before the evaluation, some farmers attributed increased yields and incomes to adopting knowledge gained at the AFFS, that is, 33 respondents in South Sulawesi and five in Southeast Sulawesi (Table 5). Improvement in yields depends on the technology tested and level of adoption because not all respondents adopt 100% of the introduced technologies. In both provinces, yield improvement resulted from testing pruning and fertilizing techniques. Respondents in both provinces also succeeded in producing superior quality seedlings—particularly, for durian and pepper—with 90% of the seedlings produced for their own use, with the balance sold locally.

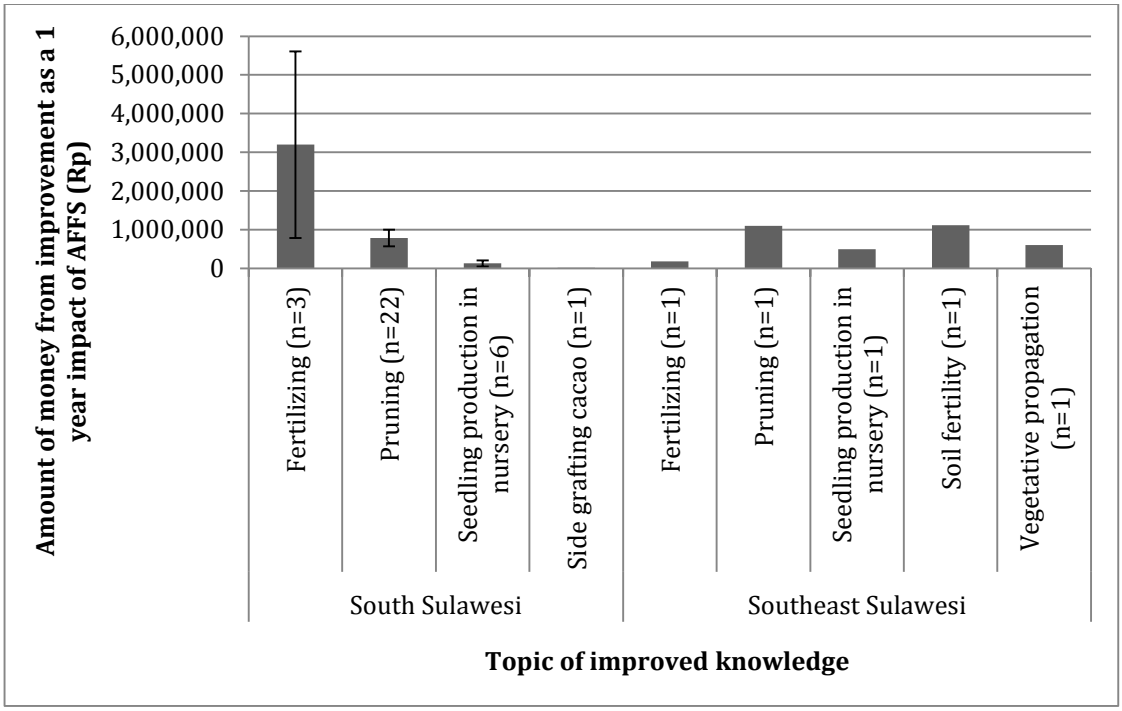
Table 5. Improvement in yields from introduced new technology in AFFS based on farmers perspectives

Provinces	Technology introduced	Increased yields
South Sulawesi	Pruning cacao (n=18: 14 men, 4 women)	1–100 kg dried cacao beans/ha
	Pruning coffee (n=5: 4 men, 1 woman)	300–600 L dried coffee beans/ha (5 L dried coffee beans/tree)
	Fertilizing coffee (n=1 woman)	200 L dried coffee beans/ha
	Fertilizing clove (n=2 men)	100 kg dried clove flowers/ha (4 L/tree)
	Side-grafting cacao (n=1 man)	0.5 kg dried cacao beans/tree
	Vegetative propagation durian (n=1 man)	10 durian superior seedlings
	Pepper nursery (n=5 men)	30–300 pepper superior seedlings
Southeast Sulawesi	Pepper pruning (n=1 man)	10 dried kg/ha
	Fertilizing (n=1 man)	3 dried kg/ha
	Soil fertility (‘rorak’) (n=1 man)	60 dried kg/ha
	Vegetative propagation durian (n=1 man)	100 durian superior seedlings
	Pepper nursery (n=1 man)	300 pepper superior seedlings

In South Sulawesi, most monetary benefit (average IDR 3,000,000 (±USD 280)) was received from improvement in fertilizing techniques applied to clove systems; the second highest (average IDR 800,000 (±USD 72)) was from improvement of pruning techniques applied in coffee and cacao systems (Figure 7). Respondents also received minimal monetary benefit from seedling production and side-grafting cacao. Most of the seedlings produced were used to enrich farmers’ gardens. Side-grafting of mature trees had not yet yielded significant increases in production.

In Southeast Sulawesi, the greatest monetary benefit was from improvement of pruning in pepper systems (IDR 1,100,000 (±USD 100)) and improvement of soil fertility (‘rorak’ technique[3]) applied to cacao systems (IDR 1,120,000 (±USD 101)). Some monetary benefit was also received from vegetative propagation of durian seedlings (IDR 600,000 (±USD 55)) and selection of superior pepper germplasm (IDR 500,000 (±USD 45)).

[3] The ‘rorak’ technique, which is a technique used to improve soil aeration and rejuvenate roots by digging a hole with distance 50 cm from the tree trunk. The hole size is 60 cm depth, 80 cm length, 30 cm width. This technique was recommended for coffee but some farmers also applied it to cacao.



Note: USD 1 = IDR 11,000

Figure 7. Amount of money received from improvements made by respondents in their gardens with the information and knowledge they received from the AFFS

From the results above, it is clear that the AFFS provided short-term benefit in the form of new knowledge and greater motivation and long-term benefit through improved yields and income. While these initial short-term benefits were impressive and participants were pleased with the AFFS, they acknowledged that sustained long-term benefits were necessary for the new knowledge provided through the AFFS to be fully integrated into farmers' standard management practices. Otherwise, the new knowledge might be forgotten. Further facilitation was necessary to consolidate benefits. Thus, AgFor continues to strengthen the learning process via regular visits by the AgFor team, who monitor the demoplots and provide personal consultations with the owners of the plots every three months for two years. There are 71 farmer demoplots in South Sulawesi and 28 in Southeast Sulawesi. In the second year, those plots will be evaluated in order to identify and share the impact of adopting new knowledge on improved yields and income.

Conclusion

The evaluation of the AFFS one year after implementation showed that most of the respondents felt they gained knowledge and other benefits from AFFS. Farmers' attendance and interest in AFFS was highest when the focal species had a high price or good market potential. New and reliable information was the most important aspect of AFFS that attracted farmers to attend and then test the new knowledge they received. Benefits received by respondents after one year can be divided into short term—obtaining new knowledge—and long term: improved yields and income. Fourteen percent (14%) of the respondents gained monetary benefit from applying the new knowledge. In the following one or two years, there might be more or less respondents applying the knowledge they gained from AFFS. Thus, it is important that after AFFS ends to implement a facilitation strategy by the AgFor project in collaboration with government extension agents to promote continued testing by farmers of the new knowledge they received from the AFFS.

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