World Agroforestry Centre

TRANSFORMING LIVES AND LANDSCAPES

REPORT 1

Baseline household survey in South Sulawesi

Noviana Khususiyah, Isnurdiansyah,

S. Suyanto, and James M. Roshetko

AgFor SULAWESI

Agroforestry and Forestry

Background

The Agroforestry and Forestry in Sulawesi: Linking Knowledge with Action project (the 'AgFor Sulawesi project') has been developed for implementation in three provinces of the island of Sulawesi, Indonesia (South Sulawesi, Southeast Sulawesi and Gorontalo) from 2011 until 2016. The ultimate outcome of the project is to enhance the agroforestry and forestry livelihood systems of rural communities in Sulawesi. In order to support the project, a baseline survey was conducted. One of the main objectives of the survey was to study the general characteristics of types of livelihoods in the community, local farming systems and the existing land use systems in the area based on community perspectives.

Two unit analyses were used in the livelihood baseline study: a) household level; and b) community level. This report provides the baseline data of household units in South Sulawesi.

Site characteristics and typologies

South Sulawesi, the province that lies in the southern part of Sulawesi Island consists of 20 districts and three municipalities with a total area of 45 764 km^2. The area consists of forest of more than 57%, wet paddy systems of 9%, wetland (swampy area) of more than 10%, and agriculture of nearly 10%. This province is famous for being the first producer of paddy and other food crops including maize, cassava, sweet potato and peanut in the eastern part of Indonesia. Plantation crops that are famous from South Sulawesi are cacao, coconut, coffee, and clove, crops that are mainly managed on smallholder rather than large scale. Bantaeng and Bulukumba were two districts selected as sites for the AgFor Sulawesi project (Figure 1).

In 2007 the Bantaeng and Bulukumba districts were respectively the second (15.8%) and fifth (10.1%) highest producers of maize as a food crop (with Gowa, Jeneponto and Bone districts).They were also strong producers of paddy. While Bantaeng was not the highest producer, their production was still above the average of South Sulawesi production (5.01 over 4.73), while Bulukumba was a slightly lower than the average (4.68)[1].

South Sulawesi, Bone, Luwu, Luwu Timur, Luwu Utara, and Pinrang districts, were the five districts with large areas of cacao production (more than 20 000 ha). As mentioned earlier, the large areas of cacao production were mainly operated on smallholder scale (265 985 ha) and

[1] Sulawesi Selatan Dalam Angka, 2008

private scale (4 075 ha), with productivity 172 083 ton and 1 472 ton respectively. Cocoa production in Bantaeng and Bulukumba districts covered 5 377 and 7 456 ha respectively, with productivity in Bantaeng, 2 157 ton (2.7%) and Bulukumba 4 628 t (1.2%) in 2010 (Statistik Perkebunan Tahun 2010).

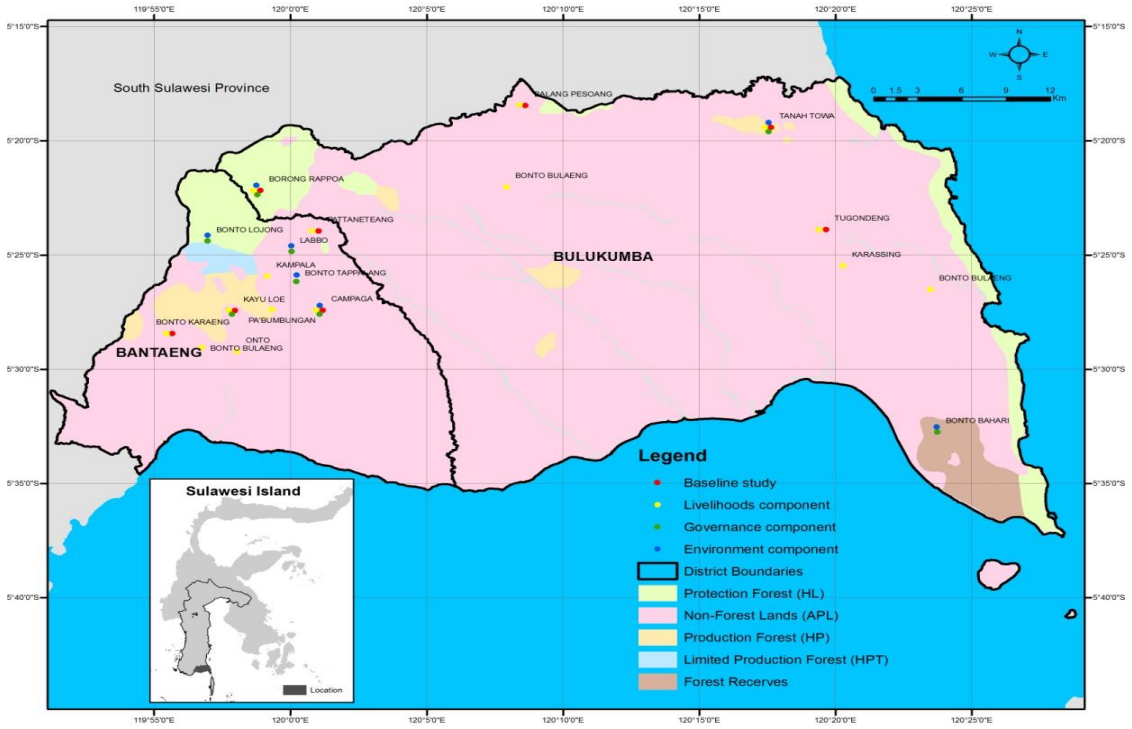

Figure 1. Study site in South Sulawesi

Coconut production of mixed-garden systems were mainly operated on small-holder scale (111 526) and private scale (1 431 ha). As much as 83 724 t of total coconut produced in 2010 in South Sulawesi, Bulukumba and Bantaeng produced 0.9% and 2.6% of this total, respectively.

Clove production in South Sulawesi was mainly from smallholder plantations of mixed-garden systems covering approximately 44 524 ha. Total clove produced in 2010 in South Sulawesi of 16,385 ha, Bulukumba and Bantaeng produced 5.2% and 1.9% of this total, respectively.

Total coffee production in 2010 in South Sulawesi of 36 554 t, Bulukumba produced 11.3% and Bantaeng, 4.4%. The total area of coffee production in South Sulawesi managed by smallholders was 70 412 ha, in Bantaeng, 3 800 ha, and in Bulukumba, 5 179 ha.

In order to capture general characteristics of each AgFor Sulawesi project site in South Sulawesi, group typologies were developed during a field trip, which took place after the inception

meeting held in Makassar on 25 January 2012. The typologies were based on physical conditions that lead to different main land use activities and farming practices in each area, while also considering administrative status. The list of typologies is presented in Table 1.

Table 1. Village typologies and detail of household survey held in South Sulawesi

Districts	Village typologies				Total respondents
	Degraded land (annual crops)	Agroforestry system (cocoa, coffee, cloves)	Agroforestry system (cocoa, coffee, cloves)	Timber-based system	
Bantaeng	Kayu Loe	Campaga	-	-	60
Bulukumba	-	-	Balangpesoang	Tugondeng	60
Number of sample	30	30	30	30	120

Method

Information was collected from 30 households of random stratification per village, from four sampled villages in Southeast Sulawesi (Table 1). As much as possible, both the husband and wife from each household were interviewed together. Data was sought on family characteristics including: household demography (house condition, schooling of the household head, wife and children, number of family members, age of household head, age of household members, number of males/females in household and ethnicity of household head); history of land use (slope of land, location of land, walking time from home to the field, years of land acquisition, status of land management, manner of land ownership, source of land, current land tenure status, current land use, land use before acquisition, land use one year after acquisition and previous land use); plot size for all crops; costs; hired labour use; and revenue of land use types (such as cacao agroforest, mixed-gardens, rice fields). Income data for each household was used to assess levels of poverty. Gender collective/group marketing, and agricultural technical assistance was also assessed.

Findings

1. Household demography in South Sulawesi

House condition

The condition of farmer's houses can be used as a proxy of their welfare. We assessed the condition of houses using four variables: type of house walls, roofs, floors and lighting, presented in Table 2–5 and Figure 2–5. The condition of houses for farmers of degraded land was poorer compared with other farmers, while the condition of houses was relatively similar for the agroforestry and timber-based farmers.

For the houses of degraded land farmers, the majority of the floors were made of wood (87%), and the walls also made of wood (67%). Roofs were made of iron sheeting (100%) and lighting consisted of kerosene lanterns (57%) and mini-hydro systems (27%).

For the houses of agroforestry farmers, the majority of the floors were made of wood (40–77%) and cement (23–43%), and the walls were made of wood (53–87%) and cement (13–47%). Roofs were made of iron sheeting (100%) and for lighting the public supply of electricity was used (93%). For the houses of timber-based farmers, the majority of the floors were made of wood (47%) and ceramics (33%). The walls were made of cement (53%) and wood (47%). Roofs were made of iron sheeting (93%) and for lighting the public supply of electricity was used (93%).

Education

The level of education of the degraded land farmers was very low, while it was relatively similar among the agroforestry and timber-based farmers. The level of education for females was slightly lower than for males. From statistical analysis there was no significant difference in education levels between males and females in all areas.

We found that most of the respondents in South Sulawesi, including both husbands and wives, possessed middle education levels (Table 6 and Figure 6). The average length of schooling for the degraded land farmers was very low at 1.29 years for males and 1.0 years for females. The highest illiteracy rates were also in this area, with 61% for males and 79% for females. The mean length of schooling for the agroforestry farmers was 5.2–5.7 years for males and 6.0–6.2 years

for females. The timber-based farmers were the highest compared with the other farmers, with the average length of schooling 9.0 years for males and 8.9 years for females. The results from data analysis using the 't test', demonstrated no significant difference in education levels between males and females in all areas.

We also calculated the distribution of the education of respondents' children in South Sulawesi (Table 7 and Figure 7). The mean length of schooling for children of the degraded land farmers was very low, with 3.3 years for males and 3.2 years for females. For agroforestry farmers it was 6.6– 8.2 years for males and 7.00–7.40 years for females. For the timber-based farmers it was 7.7 years for males and 7.1 years for females. The results from data analysis using the t test, demonstrated there were no significant differences in child education levels between males and females in all areas.

Household members

The average family size was similar for degraded land farmers, agroforestry farmers and timber-based farmers. The range of the average family size was 3.9–4.2 members, presented in Table 8 and Figure 8.

Age of household head

***The age of the household heads among degraded land farmers were the youngest compared with the other farmers. Among the agroforestry and timber-based farmers, the age of the household heads were relatively similar*.**

Table 9 and Figure 9 show that the age of household heads among degraded land farmers consisted of 60% aged below 40 years, with 40% over the age of 40 years. For the agroforestry farmers the average age was 40–60 years (50–70%). For the timber-based farmers, the age of the household heads were 40–60 years (47%), and below 40 years (30%).

Age of household members

The age of household members of degraded land, agroforestry and timber-based farmers was similar, with the majority aged 15–60 years (adults).

Table **10** and Figure 10 show the age of household members of degraded land farmers, with 61% aged between 15–60 years (adults). For agroforestry farmers, 64–76% were aged between 15–60 years (adults), and for timber-based farmers, 58% were 15–60 years (adults).

Number of males and females in household

The number of male and female household members in degraded land farmer was relatively similar to the agroforestry and timber-based farmers. Among degraded land and agroforestry farmers, males were slightly higher than females, however among timber-based farmers, males were slightly lower than females**.** Table **11** and Figure 11 show the number of male and female household members of the degraded land farmers, was 51% male, and 49% female. For agroforestry farmers it was 51–59% male and 41–49% female, and for timber-based farmers, 48% male and 52% female.

Ethnicity of household head

The ethnicity of the household head was relatively similar among the degraded land, agroforestry and timber-based farmers, with Makassar being the dominant ethnicity. It was only different in Balangpesoang, with Bugis the dominant ethnicity. This is presented in Table 12 and Figure 12.

Among the degraded land farmers, most of the heads of the household were Makassar (97%). However among the agroforestry farmers, the majority of household heads consisted of two different ethnicities, in Campaga, Makassar (90%), and in Balangpesoang, Bugis (97%). While among the timber-based farmers, most of the household heads were Makassar (83%).

2. History of land use in South Sulawesi

Slope of land

Most of the slope of the land in the degraded, agroforestry and timber-based areas was relatively similar (sideways).

Table 13 and Figure 13 show that most of the slope of the land in degraded areas was sideways (77%) and flat (23%). The slope of the land in agroforestry areas was sideways (51–73%) and flat (27–49%). In timber-based areas, most of the land slope was sideways (65%), while 35% was flat.

Location of land

The location of land use in all of the areas was mostly private land located within villages. Protected forest was only located in degraded land areas, and land outside of the village was located in agroforestry areas. This is presented in Table 14 and Figure 14.

In degraded land areas, the location of land was private land in the village (66%), and protected forest in the village (30%). In agroforestry areas the location of land was 76–94% private land in the village, and 6–24% private land outside of the village. In timber-based areas, most of the location of land was private land in the village (92%).

Walking time from home to the field

The average walking time from home to the field was relatively similar in the degraded land, agroforestry and timber-based areas. The average walking time from home to the field in all areas was ≤30 minutes.

Table 15 and Figure 15 show the average walking time from home to the field in degraded land areas was ≤30 minutes (89%). in the agroforestry areas, the average time was ≤30 minutes (78-88%), and in the timber-based areas it was also ≤30 minutes (83%).

Year of land acquisition

The distribution of plot holdings by year of land acquisition was different in the degraded land, agroforestry and timber-based areas. Most of the plot holdings by year of land acquisition in degraded land and timber-based areas were obtained after 2000, while in agroforestry areas they were obtained in the years 1980–1989 and 1990–1999.

Table 16 and Figure 16 show that in degraded land areas, most of the plot ownership was obtained in the years after 2000 (62%), and 23% in 1990–1999. Of the agroforestry areas, Campaga had 35% of plot holdings obtained in the years 1980–1989, and 24% in the years after 2005, whereas in Balangpesoang 34% were obtained in 1990–1999 and 33% after 2000. In comparison, most of the land in the timber-based areas was obtained in the years after 2000 (45%) and in 1990–1999 (35%).

Status of land management

The most recent status of land management was relatively similar in the degraded land, agroforestry and timber-based areas, with the majority of land in all areas owned and self-cultivated.

Table 17 and Figure 17 show the most recent status of land management in degraded land areas was owned and self-cultivated (94%). In agroforestry areas, 83–94% was owned and self-cultivated, and in timber-based areas, the majority was also owned and self-cultivated (88%).

Manner of land ownership

The majority of the manner of land ownership in degraded land, agroforestry and timber-based areas, was relatively similar. The majority of land ownership in all areas was land that had been inherited or purchased.

Table 18 and Figure 18 show that the majority of land ownership in degraded land- areas was inherited (63%) and purchased (30%). In agroforestry areas, 39–63% of the land was inherited and 23–46% was purchased. Land ownership in timber-based areas was purchased (51%) and inherited (41%). Other manners of land ownership in all areas were very low.

Source of land

The distribution of plot holdings by the source from which land was obtained was different in degraded, agroforestry and timber-based areas. The main source of land in degraded areas was the husband's parents, in agroforestry areas it was the husband's parents and other people, and in timber-based areas it was from other people.

Table 19 and Figure 19 show the distribution of plot holdings by source from which the land was obtained. In degraded areas, 41% of the plots were from the husband's parents, followed by other people (31%), and the wife's parents (20%). Relatives and secondary forest accounted for less than 8%. In agroforestry areas 24–38% of the plots were from the husband's parents, followed by the wife's parents (21–25%) other people (19–36%), and other source of land (18–19%). In comparison, most of the plot holdings in timber-based areas were from other people (38%), followed by the husband's parents (25%), the wife's parents (21%) and then relatives (16%).

Current land tenure status

Most of the current land tenure status was relatively similar in degraded land and agroforestry areas, however in timber-based areas the status was different. The majority of current land tenure status in degraded land areas was owned by the husband, in agroforestry areas it was also owned by the husband, and in timber-based areas it was owned by the wife and husband.

Table 20 and Figure 20 show current land tenure status in degraded land, agroforestry and timber-based areas. In degraded land area, most of the current land tenure status was owned by the husband (46%), followed by the wife and husband (30%), the wife (20%) and other people (4%). In agroforestry areas most of the current land tenure status was owned by the husband (37–39%), followed by the wife and husband (19–40%), the wife (16–27%), and other people (6–15%). In comparison, most of the current land tenure status in timber-based areas was owned by the wife and husband, as much as 51%. This was followed by the husband (24%), the wife (20%) and other people (6%).

Current land use

The current land use in degraded land areas was different compared with the other areas. The majority of the current land use in agroforestry areas was also different compared with the timber-based areas. The majority of the current land use in degraded areas was maize fields, in agroforestry areas it was agroforestry, and in timber-based areas it was coconut agroforest.

Most of the current land use in degraded land areas was maize fields (69%) and coffee agroforest (20%), (Table 21 and Figure 21). In agroforestry areas it was mixed-gardens/agroforestry (60–75%) and clove agroforest (14–19%). In comparison, current land use in timber-based areas was coconut agroforest (38%), mixed-gardens (24%), cacao agroforest (18%), trees (9%), rice fields (7%) and others (5%).

Land use before acquisition

The land use before acquisition was different in the degraded land, agroforestry and timber-based areas. The majority of land use before acquisition in degraded areas was maize fields, in agroforestry areas it was bush fallow and clove agroforest, and in timber-based areas it was bush fallow.

Most of the land use before acquisition in degraded land areas was maize fields (66%), bush fallow (14%), coffee agroforest (13%) and others (7%), (Table 22 and Figure 22). Land use before acquisition in agroforestry areas was bush fallow (21–32%), mixed-gardens (25–28%), rice fields (16%), clove agroforest in Balangpesoang (31%), and rice fields and maize fields in Campaga (31%). In timber-based areas it was bush fallow (39%), coconut agroforest (25%), maize fields (12%), cacao agroforest (9%), rice fields (8%) and others (7%).

Land use one year after acquisition

The land use one year after acquisition differed in the degraded land, agroforestry and timber-based areas. The major land use one year after acquisition in degraded land areas was maize fields, in agroforestry areas it was agroforestry and in timber-based areas it was maize fields and coconut agroforest.

Table 23 and Figure 23 show that the most land use one year after acquisition in degraded land was maize fields (80%), coffee agroforest (13%) and others (7%). Land use one year after acquisition in agroforestry areas was mixed-gardens (39–41%), maize fields (25–28%), clove agroforest in Balangpesoang (24%), rice fields in Campaga (17%) and others (10–17%). Land use one year after acquisition in timber-based areas was maize fields (32%), coconut agroforest (25%), cacao agroforest (15%), mixed-gardens (12%) and others (16%).

Previous land use

The previous land use in degraded land areas was different compared with other areas. The majority of previous land use in agroforestry areas was also different compared with timber-based areas. In degraded land areas the majority of previous land use was maize fields, in agroforestry areas it was agroforestry, and in timber-based areas it was maize fields and coconut agroforest.

Table 24 and Figure 24 show that most of the previous land use in degraded land areas was maize fields (77%), coffee agroforest (13%) and others (10%). Previous land use in agroforestry areas were mixed-gardens/agroforest (30–33%), maize fields (25–27%), clove agroforest (33%), rice fields in Balangpesoang (17%), bush fallow in Campaga (6–11%,) and others (6–14%). Previous land use in the timber-based areas was maize fields (34%), coconut agroforest (28%), cacao agroforest (11%), mixed-gardens (10%), rice fields (8%), bush fallow (7%) and trees (2%).

Five type proportions were planted by farmers with different conditions in each village. The average total of trees per hectare in South Sulawesi is summarized in Table 25 and Figure 25. In South Sulawesi all of the plot gardens were planted with perennial crops, multipurpose trees (MPTs) such as fruit, timber, banana and shading trees (other). More timber trees grew in timber-based areas rather than in other villages. However, the degraded land areas were dominated by perennial crops; cacao and coffee (71%). In agroforestry areas, perennial crops were relatively similar with the number of MPTs such as fruit and shading trees (other). The percentage of perennial crops was slightly higher than MPTs. In timber-based areas, 36% of trees were timber, 45% perennial crops and 15% MPTs.

3. Land holdings, income and income per capita

Land holdings

The average land holding per household for timber-based farmers (2.09 ha) was larger than for degraded land farmers (1.34 ha) and agroforestry farmers (1.06 ha), presented in Table 26 and Figure 26. The compositions of land holding by land use type were different across the sites (Table 27 and Figure 27).

For degraded land farmers, the major land use of land holding per household was maize fields (0.86 ha). Other land uses were coffee agroforest (0.29 ha) and others (0.19 ha). For agroforestry farmers, the major land use of land holding per household was mixed-gardens/agroforestry (0.65–0.80 ha), rice fields in Campaga (0.20ha), and clove agroforest in Balangpesoang (0.20 ha), and other land uses were very low. For timber-based farmers, the major land use of land holding per household was coconut agroforest (0.68 ha) and mixed-gardens/agroforest (0.65 ha), with other land uses cacao agroforest (0.32 ha), trees (0.22 ha), and others (0.22 ha).

Income

The average total income per year per household for degraded land farmers was lower than for agroforestry farmers and timber-based farmers. The average total income for farmers of degraded land was less compared with other farmers. The difference in income between degraded land, agroforestry and timber-based farmers was high. The major source of income was also different between the three groups of farmers.

The calculation of income included the value of consumed commodities, with 62% of income from rice fields for the agroforestry farmers being consumable income. However, most of the income came from cash crops.

For degraded farmers, the major sources of income were maize fields (28.3%), remittances (20.6%) and labour (12.2%), (Table 28 and Figure 28). For agroforestry farmers, the major sources of income were mixed-gardens/agroforest products (29.5–31.8%) and entrepreneurial work (13.4%–32.7%). Other sources of income were rice fields, clove agroforest and labour. For timber-based farmers, the average total of income per year per household was the highest. The

major source of income for timber-based farmers was coconut agroforest (23.2%). Other sources of income were entrepreneurial work (23.7%) and mixed-gardens/ agroforest products (18.3%).

Figure 29 show the share of income per household for degraded land farmers was similar for off-farm/non-agriculture (55%) and on-farm/agriculture (45%). While for agroforestry farmers the difference was only slight between off-farm/agriculture (52–61%) and off-farm/non-agriculture (39–48%). For timber-based farmers, the share of income from on-farm/agriculture (60%) was higher than from off-farm/non-agriculture (40%).

Income per capita

The daily income per capita of farmers in degraded land areas was lower than that of agroforestry farmers and timber-based famers. The daily income per capita of farmers in degraded land areas positioned them as living below the international poverty line. This indicated* that *farmers in degraded land areas were poorer compared with the others farmers.

Figure 30 shows that the daily income per capita of farmers in degraded land areas was IDR 8491 (USD 0.96), and for agroforestry farmers it was IDR 18,034 (USD 2.05)[2] and 15 963 (USD 1.81), while for timber-based farmers it was IDR 25 550 (USD 2.90). The average family size ranged from 3.90 to 4.23 members at both sites. Using the international poverty line standard of USD 1 a day, the percentage of farmers living below the international poverty line, in degraded land areas was the highest compared with agroforestry and timber-based areas. Thus we can conclude that farmers in degraded land areas were living below the international poverty line of USD 1 a day.

[2] Average exchange rate in 2010 was USD 1 = IDR 9,000.

4. Gender, agricultural technical assistance and collective/group marketing

Gender roles in farming management activities

Information on gender was collected from 30 households per village, from four sampled villages in South Sulawesi. Household survey results show that in degraded land farming areas, the role of women in land management consisted of as much as 97% of respondents. In the area of agroforestry farming, the role of women in land management consisted of more than 90% of respondents. Within timber-based farming, the role of women in land management was as much as 90% of respondents (Table 29 and Figure 31).

Table 30 and Figure 32 show the gender roles within farming system activities in South Sulawesi. The involvement of women in farming system activities was quite prominent, always at more than 60% in all surveyed villages. In all areas, the high proportion of women in farming system activities was mainly in post-harvesting and marketing. Women's roles were relatively similar to men's in harvesting activities. Other activities (land preparation, planting and crop care) were dominated by men, with the involvement of women lower than men.

Table 31 and Figure 33 show the role of women in decision making in South Sulawesi. The high proportion of women involved in making decisions about land activity was mainly regarding the marketing of crop products. Women were usually able to obtain higher prices than men in marketing crop products, due to women being considered to possess good bargaining skills. Decision making regarding other activities such as types of plant to be planted, time to start planting, planting other trees and applying fertilizer and medicine, were dominated by men, with women less involved than men. The three main farming systems were cacao agroforest, mixed-gardens (agroforest), maize fields, rice fields, coconut agroforest and other gardens. The various types of land use activities (cacao agroforest, mixed-gardens, maize fields, rice fields, coconut agroforest and other gardens) were dominated by men, with the involvement of women lower than men (Table 32 and Figure 34). Results from quantitative data analysis of labour use in farming system activities for various types of land use from four sampled villages in South Sulawesi can be seen in Table 33.

In rice field activities for agroforestry and timber-based farmers, the proportion of female involvement (53–56%) was higher than male, for all labour uses. However, labour use from the

family was seen as the male domain (53–58%).In maize field activities, the proportion of female involvement (30–37%) was lower than male for all labour uses; however in timber-based farming, female involvement (47 %) was lower than male. Labour use from the family was also dominated by men (60–73%).

In cacao agroforest activities, the proportion of female involvement (19–45%) was lower than male for all labour uses. Labour use from the family was also dominated by men with 59–79% in all areas.

In mixed-garden activities, the proportion of female involvement (15–31%) was lower than male for all labour uses. Only in timber-based farming was female involvement (53%) higher than male. Labour use from the family was also dominated by men, with 73–87% in degraded land farming and agroforestry farming. It was only in timber-based farming, where female involvement (56%) was higher than male.

Coconut agroforest activities were limited only to the timber-based farming areas. The proportion of female involvement (43%) was lower than male for all labour uses. Labour use from the family was also dominated by men (57%).

Clove agroforest activities, were limited only to the agroforestry farming areas. The proportion of female involvement (38–39%) was lower than male for all labour uses. Labour use from the family was also dominated by men (59–61%).

Tree farming activities were limited only to the timber-based farming areas. The proportion of female involvement (18%) was very low compared with male involvement, for all labour uses. Labour use from the family was also dominated by men (92%).

In coffee agroforest activities, it was only the areas of degraded land and agroforestry farming that coffee agroforest was farmed. The proportion of female involvement (4–20%) was lower than male for all labour uses. Labour use from the family was also dominated by men (81–97%).

Collective/group marketing in South Sulawesi

Information on collective/group marketing was collected from four sampled villages, from 30 households per village. The percentage of respondents who had heard of the term 'group marketing' was 13% in degraded land areas, 27% in agroforestry areas and 37% in timber-based areas (Table 34 and Figure 35). 63% of farmers in degraded land areas and agroforestry areas were interested in learning more about group marketing, with 83% in timber-based areas (Table 35 and Figure 36). 57% of farmers in the degraded land areas were interested to market together as a group, 47–53% in agroforestry areas and 70% in timber-based areas (Table 36 and Figure 37). 82% of respondents in degraded land areas were interested in forming small-scale enterprises, in agroforestry areas it was 93–94% and in timber-based areas it was 100% (Table 37 and Figure 38). Moreover, most of the respondents in degraded land, agroforestry and timber-based areas were interested to learn about how to form enterprises (86–100%), (Table 38 and Figure 39).

Technical assistance or extension services in South Sulawesi

Household access to agricultural technical assistance or extension services in South Sulawesi

Information on agricultural technical assistance was collected from 30 households per village. Discussion of the findings about household access to agricultural assistance or extension services was divided into two sections,: a) the existing agricultural extension services that have been received by villagers; and b) the expected agricultural extension services received through the AgFor Sulawesi project.

Existing agricultural extension services

From 30 respondents from four sampled villages, the percentage of respondents who had received agricultural extension services in South Sulawesi varied (Table 39 and Figure 40). Campaga, Kayu Loe and Tugondeng had relatively similar numbers of respondents who had received agricultural extension services (67%, 70%, and 80% respectively). It was only Balangpesoang which had the lowest number of respondents (33%) who had received agricultural extension services. Moreover, of the respondents who received agricultural extension services, more than 60% of them received physical agricultural aids such as planting

materials (seeds, seedlings), and fertilizer (Table 40 and Figure 41), except for Campaga. 55% of the respondents in Campaga received agricultural extension services to enhance their skills through in-class activities and training. The numbers of respondents were the lowest in the area of cross-visit activities. Only the respondents in Campaga and Kayu Loe had received support for cross-visit activities, and no respondents in Tugondeng and Balangpesoang received this support. Besides agricultural aids and cross-visits, farmers also received services such as training and in-class activities. The respondents in Kayu Loe received the lowest number of in-class activities compared with the other three villages. For training, Balangpesoang respondents received the lowest percentage.

Subjects covered in the agricultural extension services provided to farmers depended greatly on the sources of livelihood and the biophysical conditions of the area (Table 41 and Figure 42). Campaga, which depends on cacao agroforestry for livelihood, received extension services about cacao, vegetables and land management. Kayu Loe, which depends greatly on maize fields for livelihood and has large degraded land areas, received extension services on vegetables and timber trees. In Tugondeng, cacao and timber trees were the two most common subjects that were covered in the extension activities. Balangpesoang received more extension services on fruit species and timber trees.

Most agricultural extension services at village level were provided by government agencies. Of the respondents 90% named government agencies as the source of the agricultural extension services they received. Agricultural extension services on fruit species, vegetables, staple food species and estate crop species (cacao, rubber) were mostly provided by the government agricultural agencies, Dinas Pertanian (agriculture) and Dinas Perkebunan (plantations). The government forestry agency, Dinas Kehutanan, mainly provides extension services about subjects related to timber trees and forestry. Local non-government organizations (NGOs) provide extension services about subjects related to the projects they were working on. And the private sector provides extension services about subjects related to their business, for example Mars Company on cacao. In Campaga and Kayu Loe, Dinas Pertanian interacted more with farmers in providing agricultural extension services, while in Tugondeng and Balangpesoang, Dinas Pertanian interacted with farmers at relatively similar levels to Dinas Kehutanan (Table 42 and Figure 43).

Table 43 and Figure 44 clearly show the diverse proportion of agricultural extension services received from year to year per village. Respondents in Campaga received more extension services in 2011, and received the least in 2010. In Kayu Loe, respondents received an almost equal proportion per year from 2008 to 2010, and received the least in 2012. In Tugondeng, respondents received more extension services in 2010 and 2011, and fewer services in 2008, 2009 and 2012. For Balangpesoang respondents, agricultural extension services received decreased from year to year, and in fact in 2012, they received no agricultural extension services.

Respondents who were registered to receive agricultural extension services were male, due to the fact that the extension agencies recorded the head of the family to be the receivers. Females were registered as receivers if they were widows. Thus, it was sometimes difficult to separate the gender status of the agricultural extension receivers. However from the interviews conducted during the survey, the respondents grouped the agricultural recipients as male, female, and female and male (Table 44 and Figure 45). More than 65% of the respondents in all villages agreed that men received more extension services than women. Female extension recipients were the most in Kayu Loe and the least in Balangpesoang.

Levels of advantages received by respondents from agricultural extension services were diverse between villages (Table 45 and Figure 46). Campaga respondents felt that they received many advantages from the provided services. While in the other three villages, respondents only considered extension services provided a few advantages for them.

Expected agricultural extension services

Respondents who received or did not receive agricultural extension services were asked whether they wanted to receive them in the coming years, and more than 65% of the respondents did wish to (Table 46 and Figure 47). However, 33% of the respondents in Kayu Loe, 20% in Balangpesoang, and 7% in Campaga didn't wish to receive the services. Unfortunately, the particular reasons for the respondents to refuse the agricultural extension services could not be identified during this baseline survey.

The respondents, who were expecting to receive agricultural extension services in the coming years, were then asked about the subjects they wanted to learn about, and the priority species

they wanted to focus on. The agricultural extension services that were most requested by respondents were classified into three activities, a) in-class activities; b) training activities; and c) the distribution of superior planting materials from priority species.

The respondents who wished to receive agricultural extension services in the future, listed their requested topics for in-class extension services, presented in Table 47. Garden management, cultivation, pest and disease handling, and tree maintenance were the four most popular topics requested. Respondents also requested that these four popular topics be included in training activities (Table 48). However, the topics for in-class activities and training may be implemented differently per village, depending on the priority species in each village. For example, Campaga is focused on cacao and clove, Kayu Loe on maize, cacao and clove, Tugondeng on cacao, coconut, maize, timber trees and rubber, and Balangpesoang on clove, cacao, durian, mangosteen and rubber.

Superior planting materials are an important investment for farmers, as good planting materials will produce optimum production, which will enhance their livelihoods. However, in the four villages the access of farmers to good planting materials remains limited. Thus, respondents were also expecting to receive superior planting materials for the species that they prioritized as important for their livelihood.

Each village had a diverse proportion of priority species that they requested for planting materials (Table 49). In Balangpesoang, durian was the most requested species, followed by clove, nutmeg, mangosteen, rubber, cacao, rambutan, teak, lansium, mahagony and pepper. In Campaga, clove, maize and cacao were the top three priority species, followed by paddy, durian, nutmeg, mangosteen, rambutan, longan, teak, mango, peanut and vegetables. In Kayu Loe, clove was the most requested species, with the second most requested being cacao, maize and coffee, followed by rambutan, potato, onion, longan, gmelina, and vegetables. Finally, in Tugondeng, rubber and cacao were the most requested species, followed by coconut, maize, paddy, clove, rambutan, gaharu and oil palm. Reflecting on the situation regarding the former agricultural extension services, most of the respondents expected the AgFor Sulawesi project can facilitate the improvement of the services, either from in-class activity, training, or through the distribution of good/superior planting materials.

Appendix

1. Household demography in South Sulawesi

Table 2. House condition by house floor in South Sulawesi

Village typologies	Villages	n	House floor					
			Wood		Cement		Ceramics	
			n	%	n	%	n	%
Degraded land	Kayu Loe	30	26	87	3	10	1	3
Agroforestry system	Campaga	30	23	77	7	23	0	0
	Balangpesoang	30	12	40	13	43	5	17
Timber-based system	Tugondeng	30	14	47	6	20	10	33

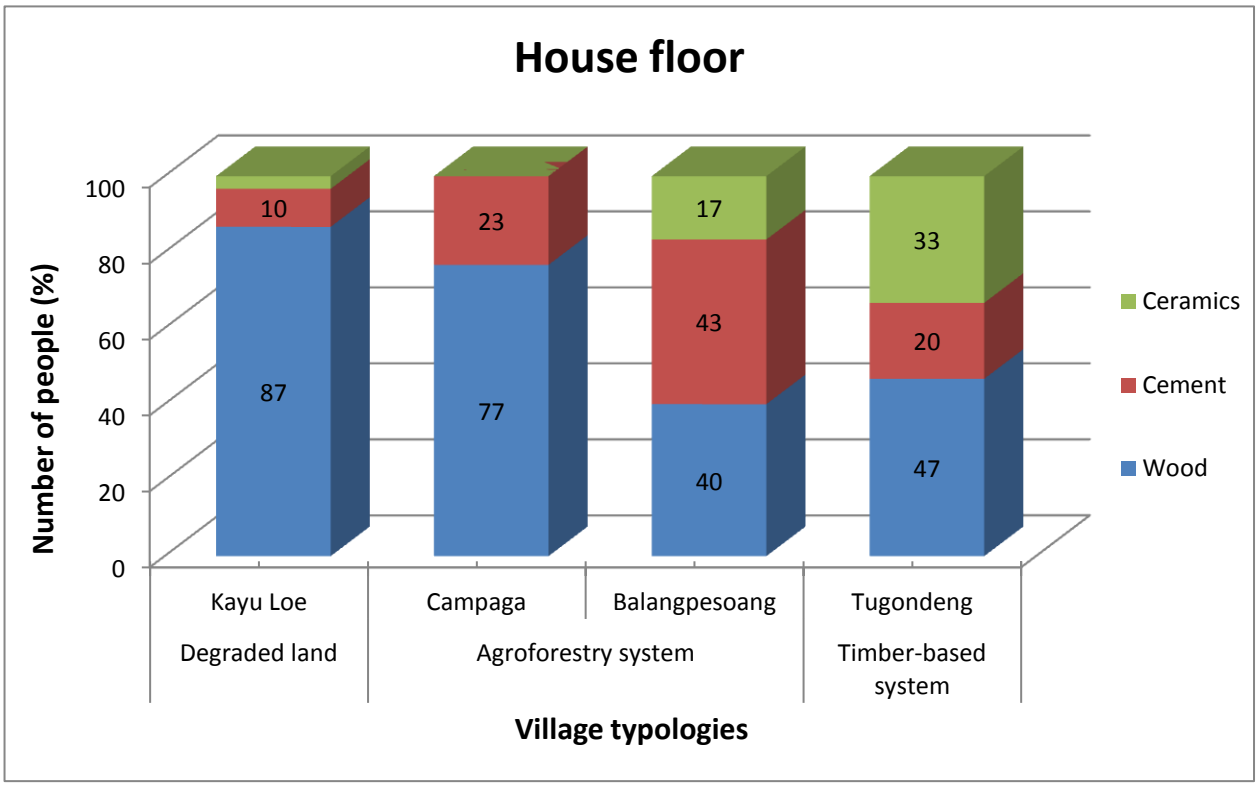

Figure 2. House condition by house floor in South Sulawesi

Table 3. House condition by house wall in South Sulawesi

Village typologies	Villages	n	House wall					
			Bamboo		Wood		Cement	
			n	%	n	%	n	%
Degraded land	Kayu Loe	30	6	20	20	67	4	13
Agroforestry system	Campaga	30	0	0	26	87	4	13
	Balangpesoang	30	0	0	16	53	14	47
Timber-based system	Tugondeng	30	0	0	14	47	16	53

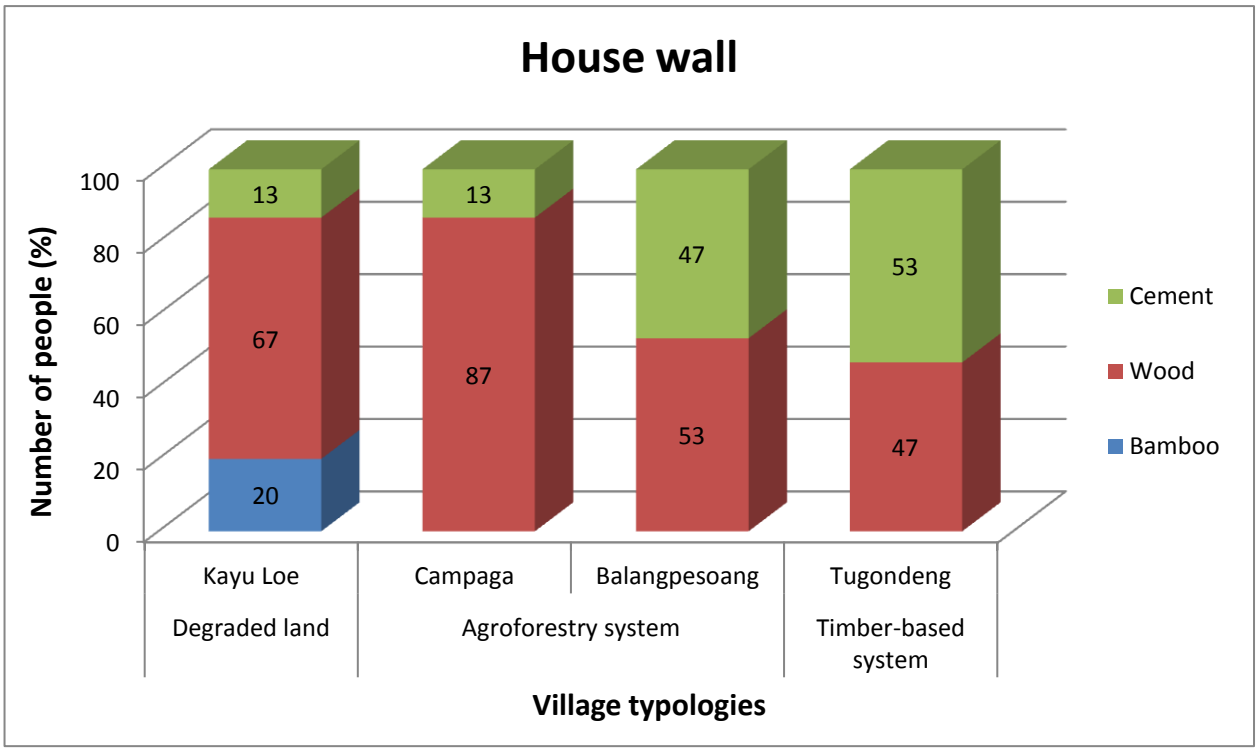

Figure 3. House condition by house wall in South Sulawesi

Table 4. House condition by house roofs in South Sulawesi

Village typologies	Villages	n	House roofs			
			Iron sheeting		Tiles	
			n	%	n	%
Degraded land	Kayu Loe	30	30	100	0	0
Agroforestry system	Campaga	30	30	100	0	0
	Balangpesoang	30	30	100	0	0
Timber-based system	Tugondeng	30	28	93	2	7

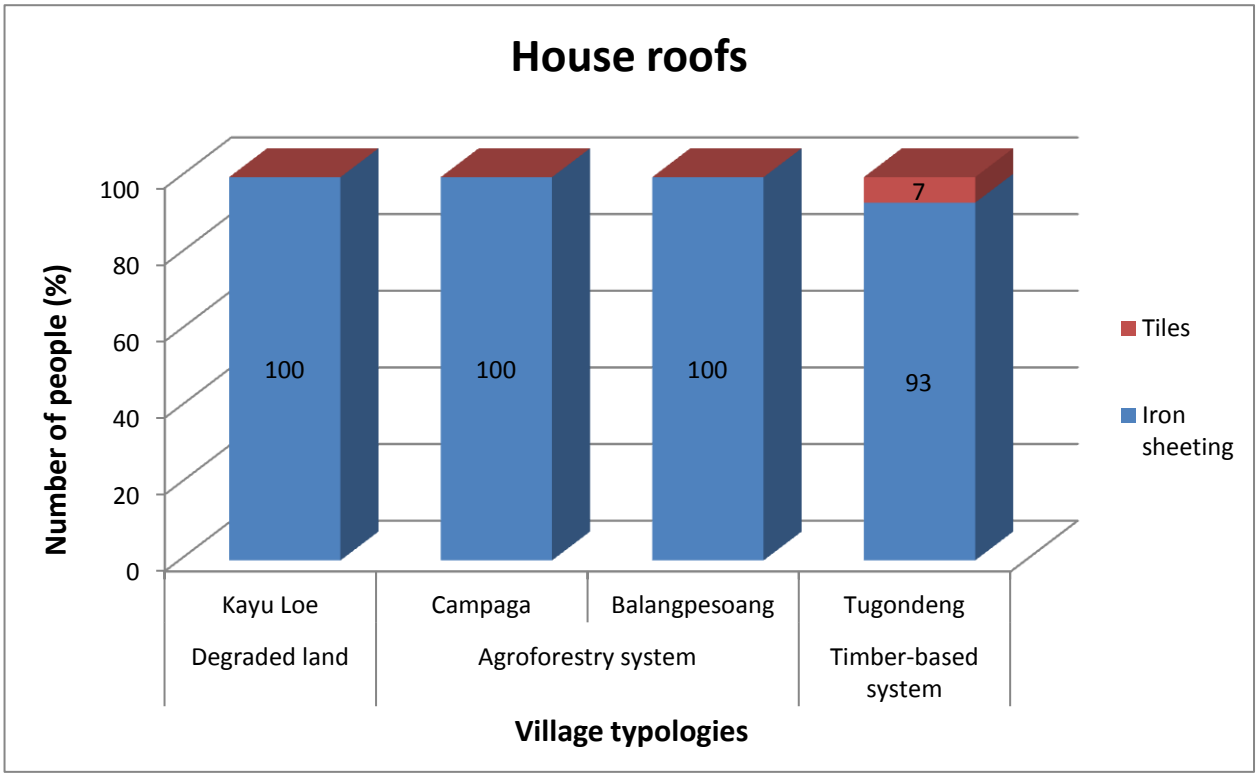

Figure 4. House condition by house roofs in South Sulawesi

Table 5. House condition by house lighting in South Sulawesi

Village typologies	Villages	n	House lighting							
			No supply		Generator		Public supply		Mini-hydro	
			n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	30	17	57	4	13	1	3	8	27
Agroforestry system	Campaga	30	2	7	0	0	28	93	0	0
	Balangpesoang	30	2	7	0	0	28	93	0	0
Timber-based system	Tugondeng	30	2	7	0	0	28	93	0	0

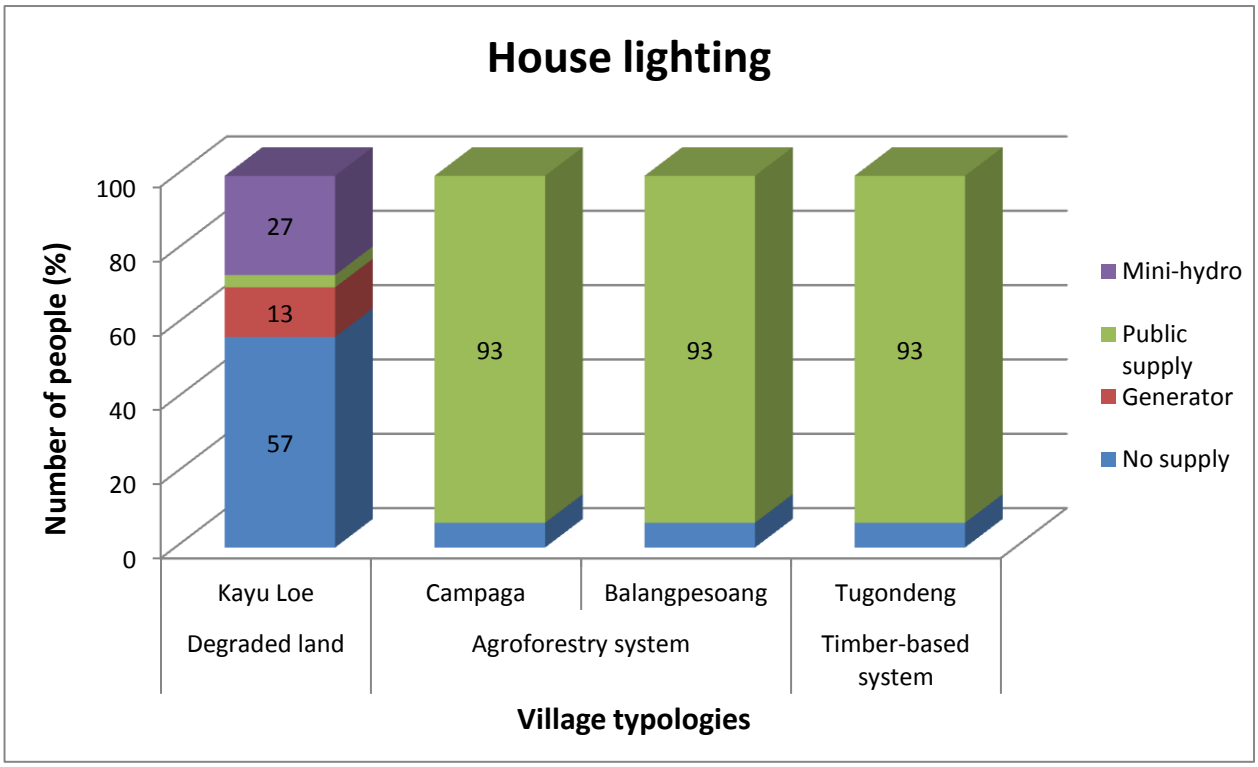

Figure 5. House condition by house lighting in South Sulawesi

Table 6. Distribution of household head and wife by years of schooling in South Sulawesi

Village typologies	Village	n	Years of schooling										Mean years of schooling	t test
			Illiteracy		Primary school		Junior high school		Senior high school		Pass senior high school			
			n	%	n	%	n	%	n	%	n	%		
Degraded land	**Kayu Loe**													
	Male	28	17	61	10	36	1	4	0	0	0	0	1.29	t stat= 0.448 (P>|t|= 0.965)
	Female	28	22	79	4	14	2	7	0	0	0	0	1	
Agroforestry system	**Campaga**													
	Male	26	5	19	15	58	3	12	3	12	0	0	5.15	t stat= -1.103 (P>|t|= 0.460)
	Female	29	2	7	20	69	3	10	3	10	1	3	6.24	
	Balangpesoang													
	Male	30	5	17	14	47	7	23	4	13	0	0	5.73	t stat= -0.304 (P>|t|= 0.495)
	Female	30	4	13	16	53	6	20	4	13	0	0	6.03	
Timber-based system	**Tugondeng**													
	Male	30	0	0	10	33	8	27	11	37	1	3	8.97	t stat= 0.46 (P>|t|= 0.637)
	Female	27	0	0	9	33	7	26	11	41	0	0	8.93	

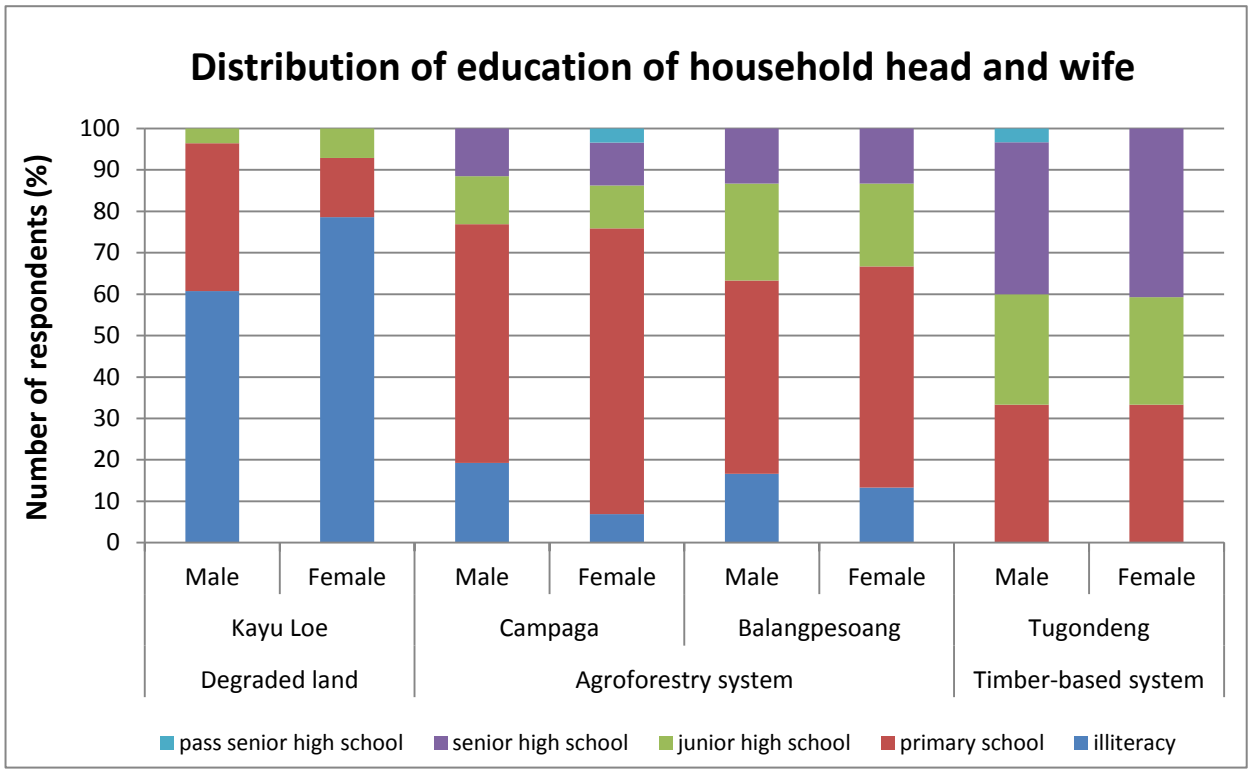

Figure 6. Distribution of household head and wife by years of schooling in South Sulawesi

Table 7. Distribution of child population by years of schooling in South Sulawesi

Village typologies	Village	n	Years of schooling (children)										Mean years of schooling	t test
			Illiteracy		Primary school		Junior high school		Senior high school		Pass senior high school			
			n	%	n	%	n	%	n	%	n	%		
Degraded land	**Kayu Loe**													
	Male	23	4	17	17	74	0	0	2	9	0	0	3.3	t stat= 0.102 (P>ltl= 0.954)
	Female	19	1	5	15	79	3	16	0	0	0	0	3.21	
Agroforestry system	**Campaga**													
	Male	28	0	0	10	36	8	29	9	32	1	4	8.21	t stat= 0.818 (P>ltl= 0.143)
	Female	20	0	0	8	40	8	40	3	15	1	5	7.4	
	Balangpesoang													
	Male	30	0	0	16	53	7	23	6	20	1	3	6.57	t stat= -0.317 (P>ltl= 0.178)
	Female	14	1	7	7	50	2	14	1	7	3	21	7	
Timber-based system	**Tugondeng**													
	Male	16	0	0	6	38	3	19	6	38	1	6	7.69	t stat= 0.391 (P>ltl= 0.164)
	Female	21	1	5	8	38	6	29	2	10	4	19	7.14	

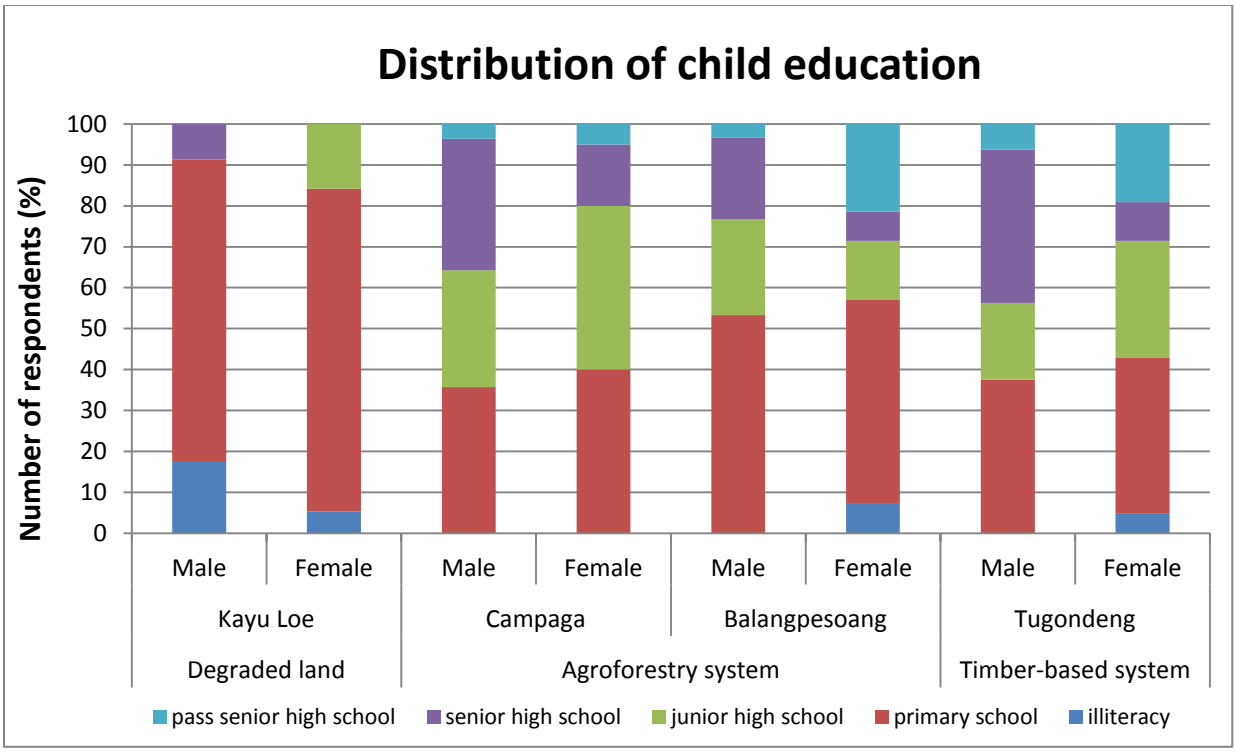

Figure 7. Distribution of child population by years of schooling in South Sulawesi

Table 8. Average number of household members in South Sulawesi

Village typologies	Villages	Average number of household members
Degraded land	Kayu Loe	4.23
Agroforestry system	Campaga	3.93
	Balangpesoang	3.90
Timber-based system	Tugondeng	4.07
Total average		4.03

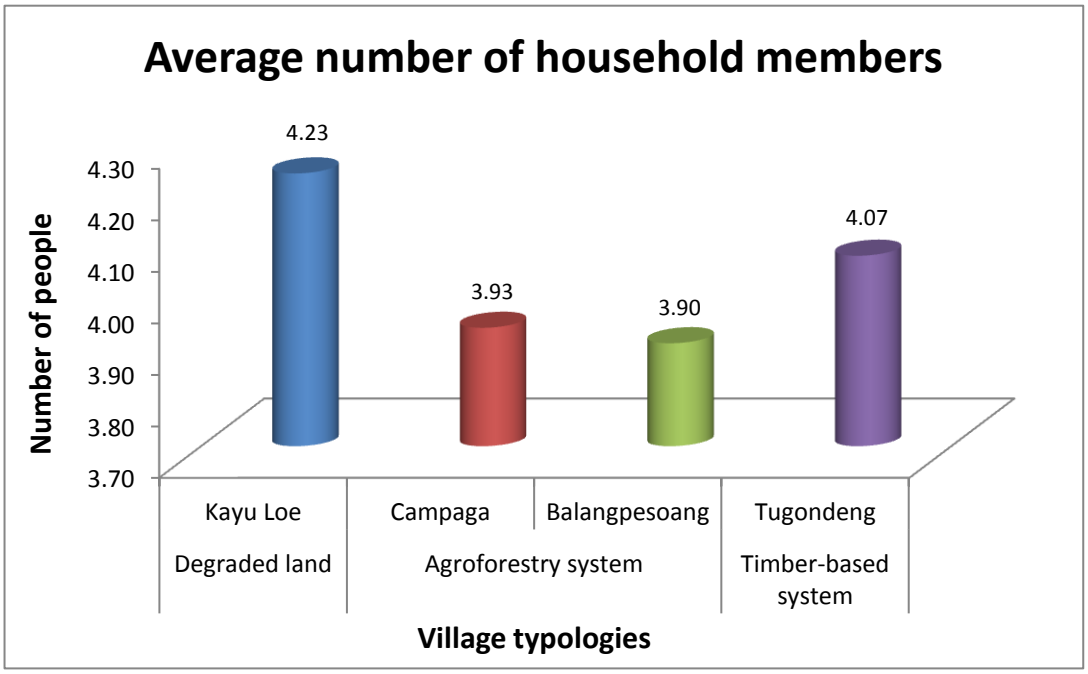

Figure 8. Average number of household members in South Sulawesi

Table 9. Number of household head age in South Sulawesi

Village typologies	Villages	n	Number of household head age					
			< 40		40-60		> 60	
			n	%	n	%	n	%
Degraded land	Kayu Loe	30	18	60	12	40	0	0
Agroforestry system	Campaga	30	8	27	21	70	1	3
	Balangpesoang	30	7	23	15	50	8	27
Timber-based system	Tugondeng	30	9	30	14	47	7	23

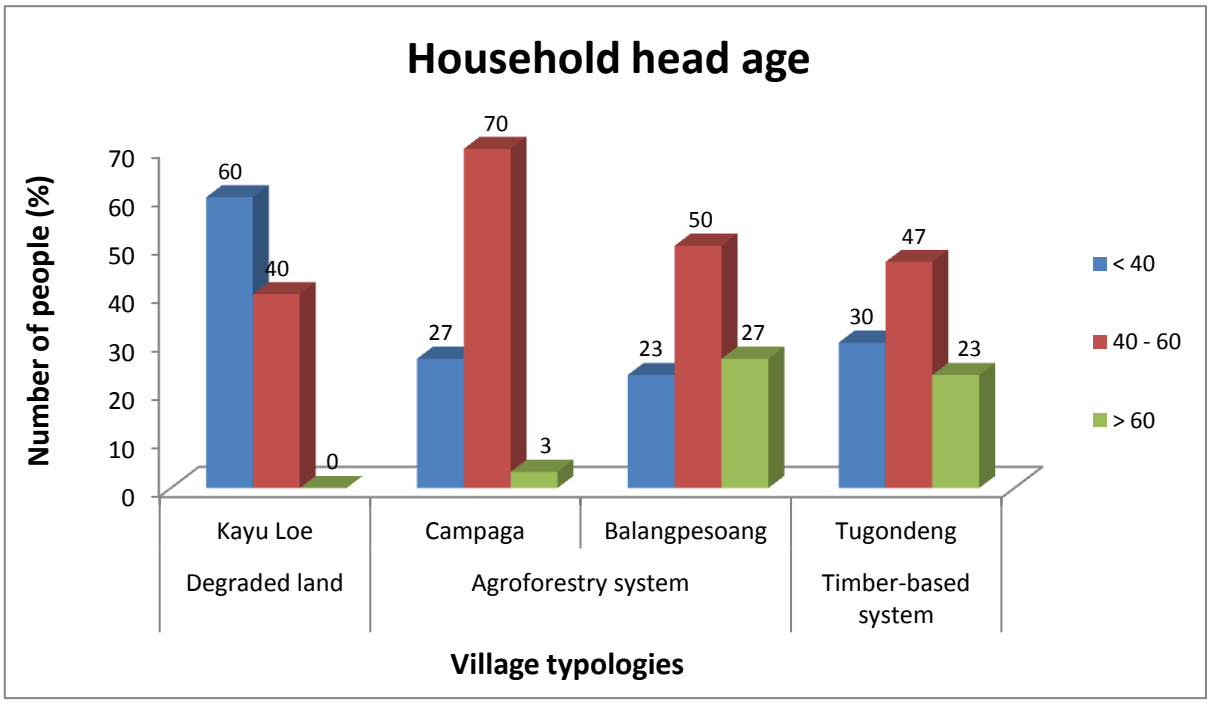

Figure 9. Number of household head age in South Sulawesi

Table 10. Number of household members' age in South Sulawesi

Village typologies	Villages	n	Number of household members' age					
			Children (<15)		Adults (15–60)		Elders (>60)	
			n	%	n	%	n	%
Degraded land	Kayu Loe	127	45	35	78	61	4	3
Agroforestry system	Campaga	118	27	23	90	76	1	1
	Balangpesoang	117	30	26	75	64	12	10
Timber-based system	Tugondeng	122	36	30	71	58	15	12

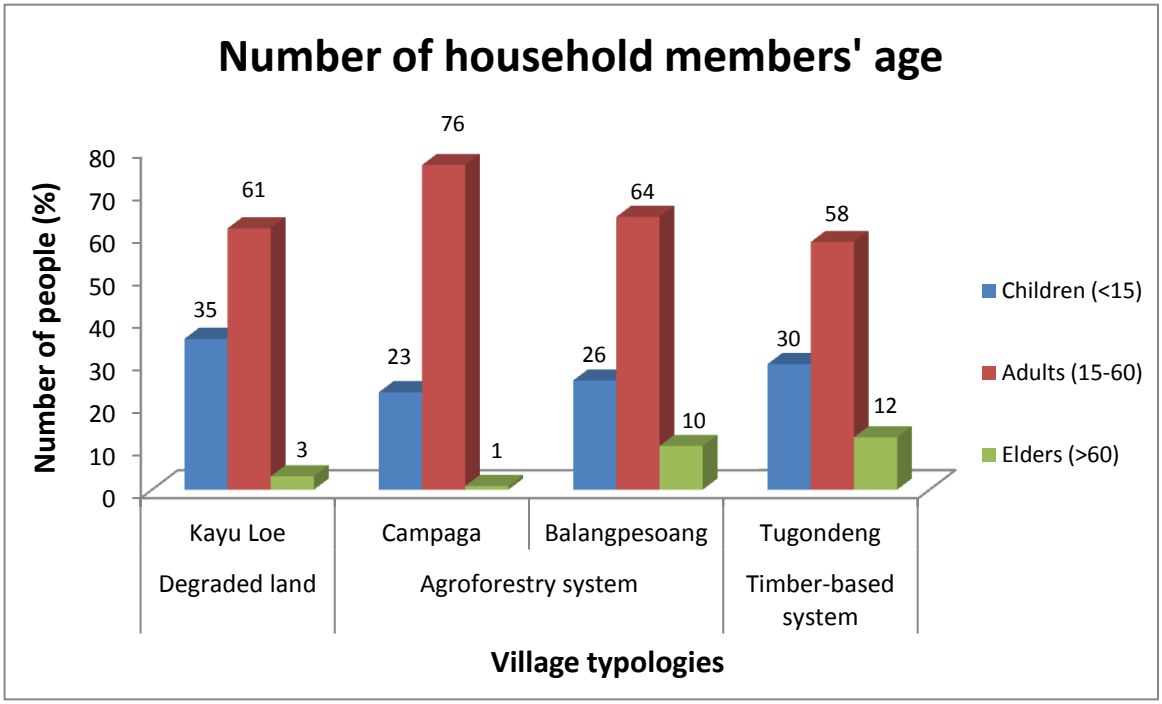

Figure 10. Number of household members' age in South Sulawesi

Table 11. Number of males and females in households in South Sulawesi

Village typologies	Villages	n	Number of males and females in household			
			Male		Female	
			n	%	n	%
Degraded land	Kayu Loe	127	65	51	62	49
Agroforestry system	Campaga	118	60	51	58	49
	Balangpesoang	117	69	59	48	41
Timber-based system	Tugondeng	122	59	48	63	52

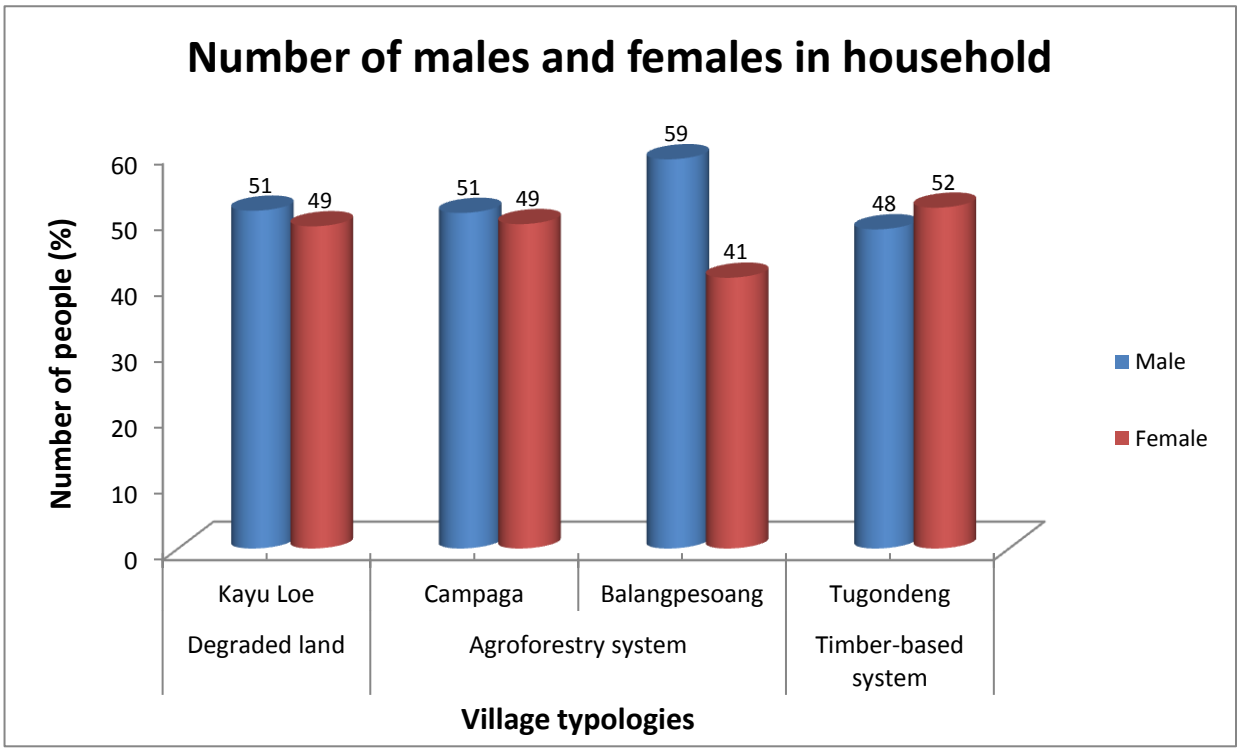

Figure 11. Number of males and females in households in South Sulawesi

Table 12. Ethnicity of household head in South Sulawesi

Village typologies	Villages	n	Ethnicity of household head							
			Bugis		Makassar		Javanese		Flores	
			n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	30	0	0	29	97	1	3	0	0
Agroforestry system	Campaga	30	1	3	27	90	2	7	0	0
	Balangpesoang	30	29	97	0	0	0	0	1	3
Timber-based system	Tugondeng	30	4	13	25	83	1	3	0	0

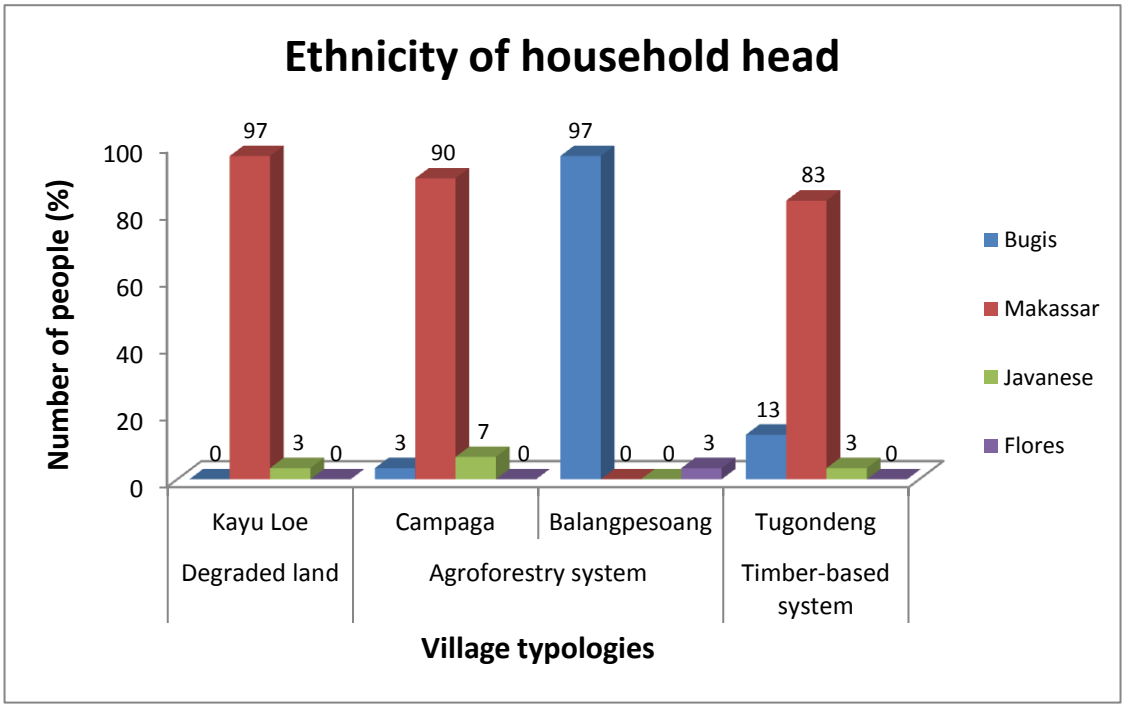

Figure 12. Ethnicity of household head in South Sulawesi

2. History of land use in South Sulawesi

Table 13. Slope of land in South Sulawesi

Village typologies	Villages	n	Slope of land			
			Flat		Sideways	
			n	%	n	%
Degraded land	Kayu Loe	70	16	23	54	77
Agroforestry system	Campaga	88	43	49	45	51
	Balangpesoang	67	18	27	49	73
Timber-based system	Tugondeng	85	30	35	55	65

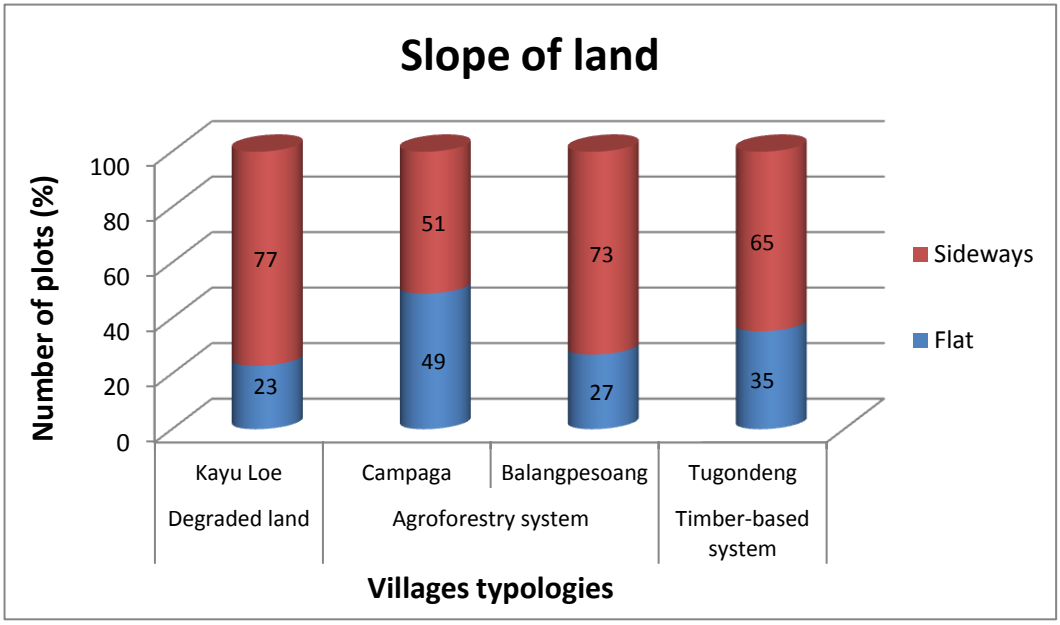

Figure 13. Slope of land in South Sulawesi

Table 14. Location of land in South Sulawesi

Village typologies	Villages	n	Location of land					
			Private land in the village		Private land outside the village		Protected forest	
			n	%	n	%	n	%
Degraded land	Kayu Loe	70	46	66	3	4	21	30
Agroforestry system	Campaga	88	67	76	21	24	0	0
	Balangpesoang	67	63	94	4	6	0	0
Timber-based system	Tugondeng	85	78	92	7	8	0	0

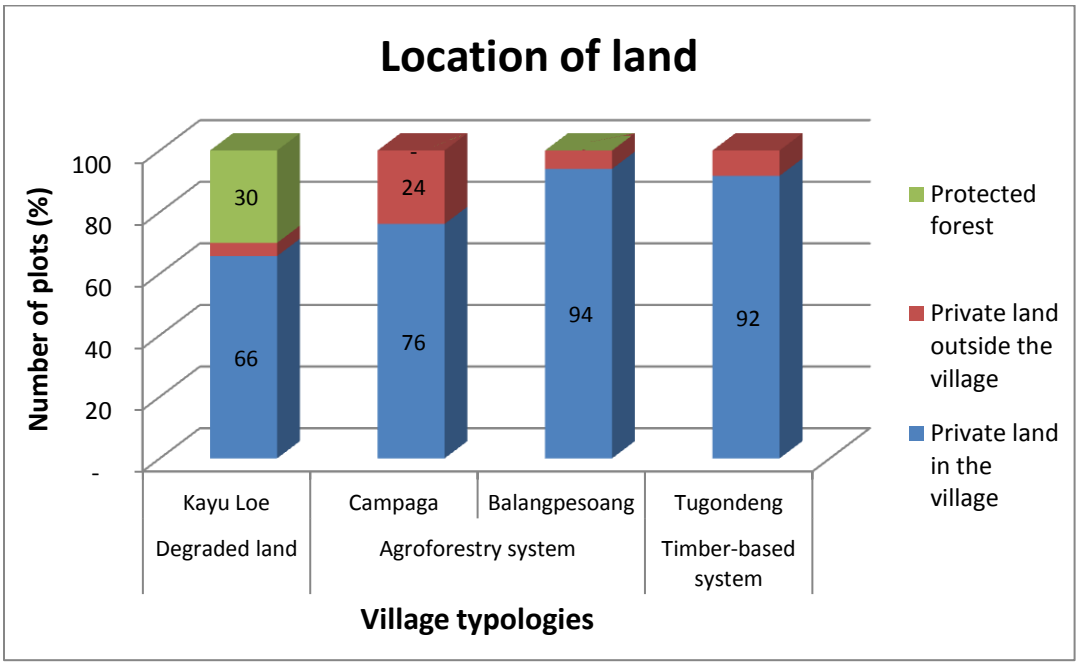

Figure 14. Location of land in South Sulawesi

Table 15. Walking time from home to the field in South Sulawesi

Village typologies	Villages	n	Walking time from home to the field							
			≤15 minutes		16-30 minutes		31-60 minutes		>60 minutes	
			n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	30	43	32	46	8	11	0	0
Agroforestry system	Campaga	88	38	43	31	35	13	15	6	7
	Balangpesoang	67	47	70	12	18	7	10	1	1
Timber-based system	Tugondeng	85	54	64	16	19	9	11	6	7

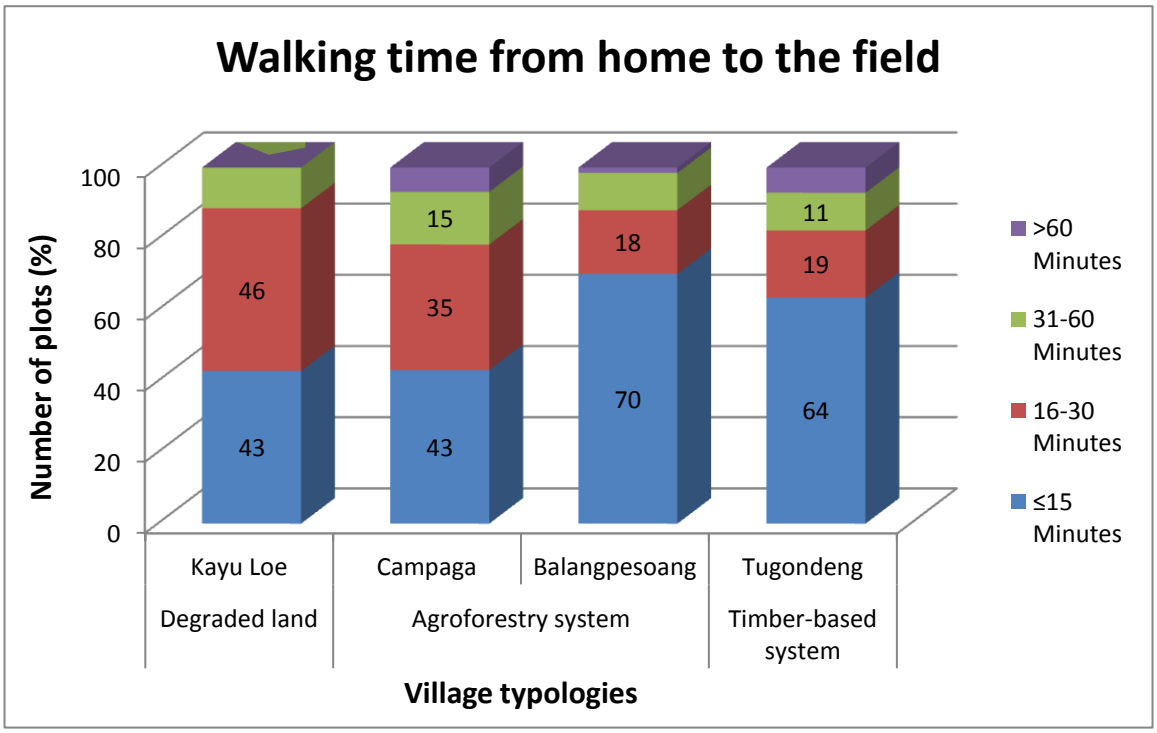

Figure 15. Walking time from home to the field in South Sulawesi

Table 16. Year of land acquisition in South Sulawesi

Village typologies	Villages	n	Year of land acquisition									
			<1980		1980-1989		1990-1999		2000-2005		>2005	
			n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	5	7	6	9	16	23	20	29	23	33
Agroforestry system	Campaga	88	8	9	31	35	12	14	16	18	21	24
	Balangpesoang	67	9	13	13	19	23	34	14	21	8	12
Timber-based system	Tugondeng	85	9	11	8	9	30	35	18	21	20	24

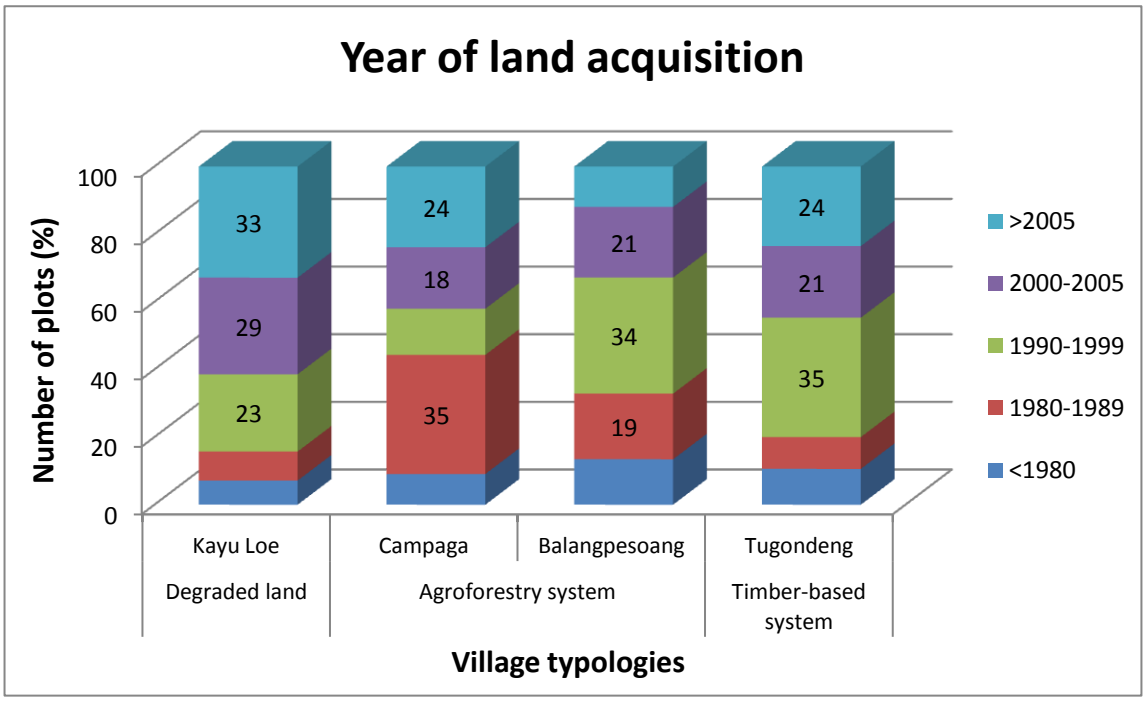

Figure 16. Year of land acquisition in South Sulawesi

Table 17. Status of land management in South Sulawesi

Village typologies	Villages	n	Status of land management													
			Owned and self-cultivated		Operating other's		Rented from others		Pawned from others		Borrowed from others		Owned and sharecropping		Owned but not operated	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	66	94	2	3	0	0	0	0	1	1	1	2	0	0
Agroforestry system	Campaga	88	73	83	6	7	1	1	4	5	2	2	2	2	0	0
	Balangpesoang	67	63	94	4	6	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	85	75	88	2	2	2	2	1	1	1	1	3	4	1	1

Table 18. Manner of land ownership in South Sulawesi

Village typologies	Villages	n	Manner of land ownership													
			Inherited		Purchased		Open forest		Share-cropping		Rented in		Pawned		Borrowed	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	44	63	21	30	2	3	2	3	0	0	0	0	1	1
Agroforestry system	Campaga	88	55	63	20	23	0	0	6	7	1	1	4	5	2	2
	Balangpesoang	67	26	39	31	46	5	7	5	7	0	0	0	0	0	0
Timber-based system	Tugondeng	85	35	41	43	51	0	0	3	4	2	2	1	1	1	1

Table 19. Source of land in South Sulawesi

Village typologies	Villages	n	Source of land											
			Husband's parents		Wife's parents		Relative		Other people		Primary forest		Secondary forest	
			n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	29	41	14	20	3	4	22	31	0	0	2	3
Agroforestry system	Campaga	88	33	38	22	25	16	18	17	19	0	0	0	0
	Balangpesoang	67	16	24	14	21	8	12	24	36	2	3	3	4
Timber-based system	Tugondeng	85	21	25	18	21	14	16	32	38	0	0	0	0

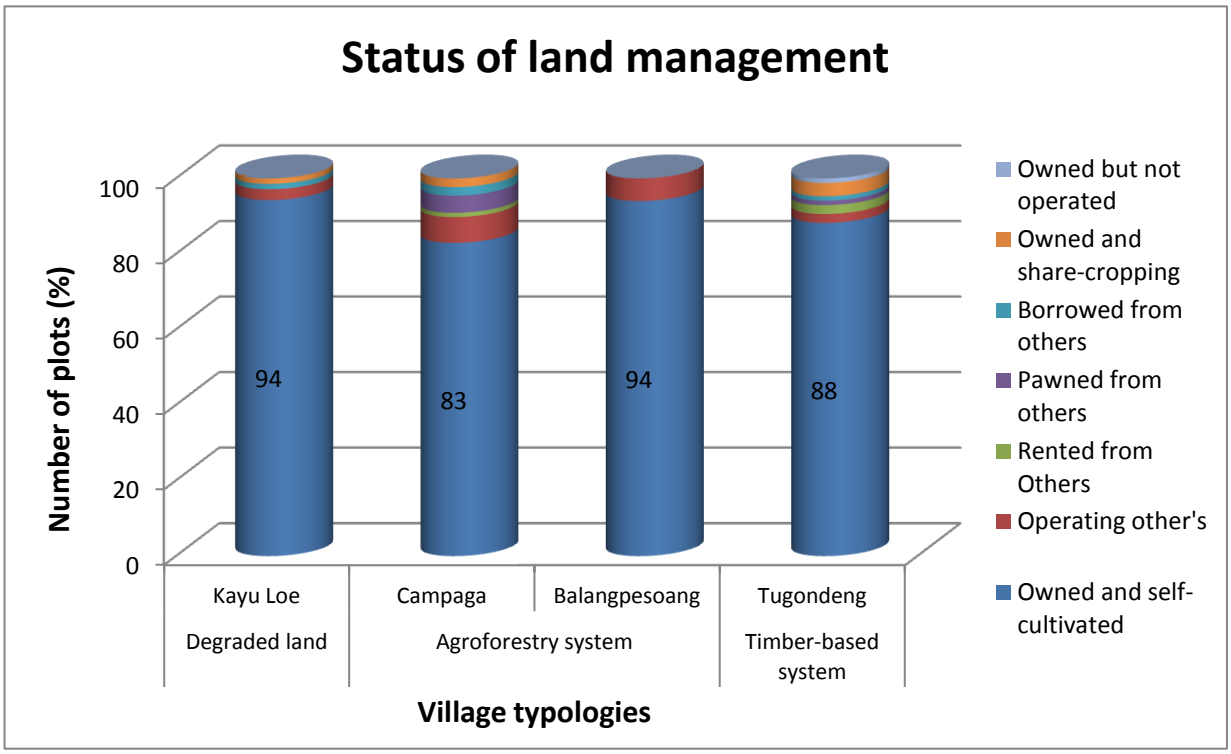

Figure 17. Status of land management in South Sulawesi

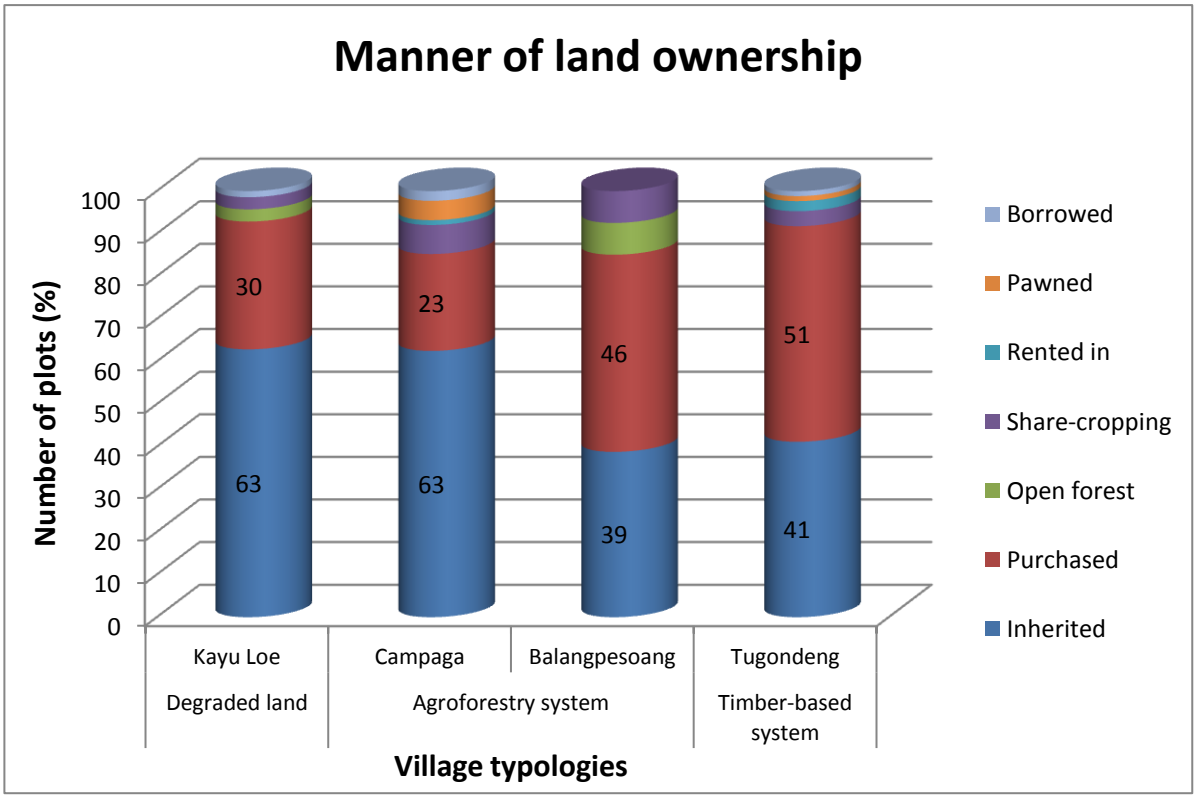

Figure 18. Manner of land ownership in South Sulawesi

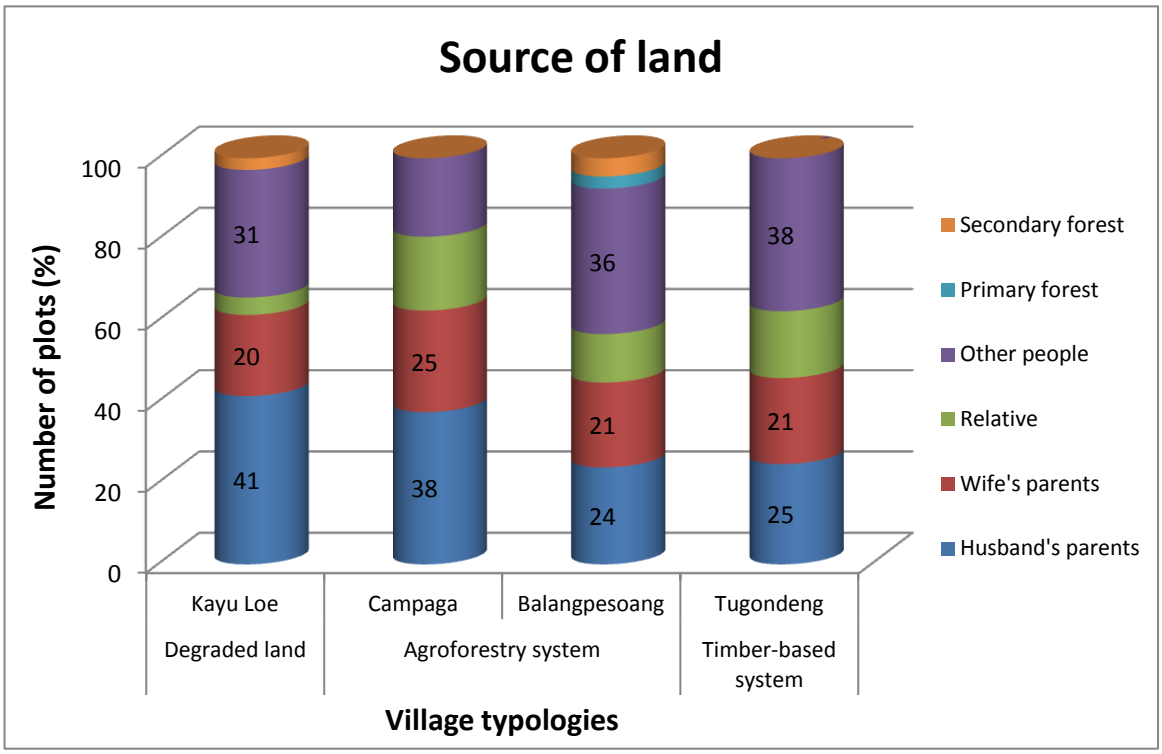

Figure 19. Source of land in South Sulawesi

Table 20. Current land tenure status in South Sulawesi

Village typologies	Villages	n	Current land tenure status							
			Owned by wife and husband		Owned by husband		Owned by wife		Owned by other people	
			n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	21	30	32	46	14	20	3	4
Agroforestry system	Campaga	88	17	19	34	39	24	27	13	15
	Balangpesoang	67	27	40	25	37	11	16	4	6
Timber-based system	Tugondeng	85	43	51	20	24	17	20	5	6

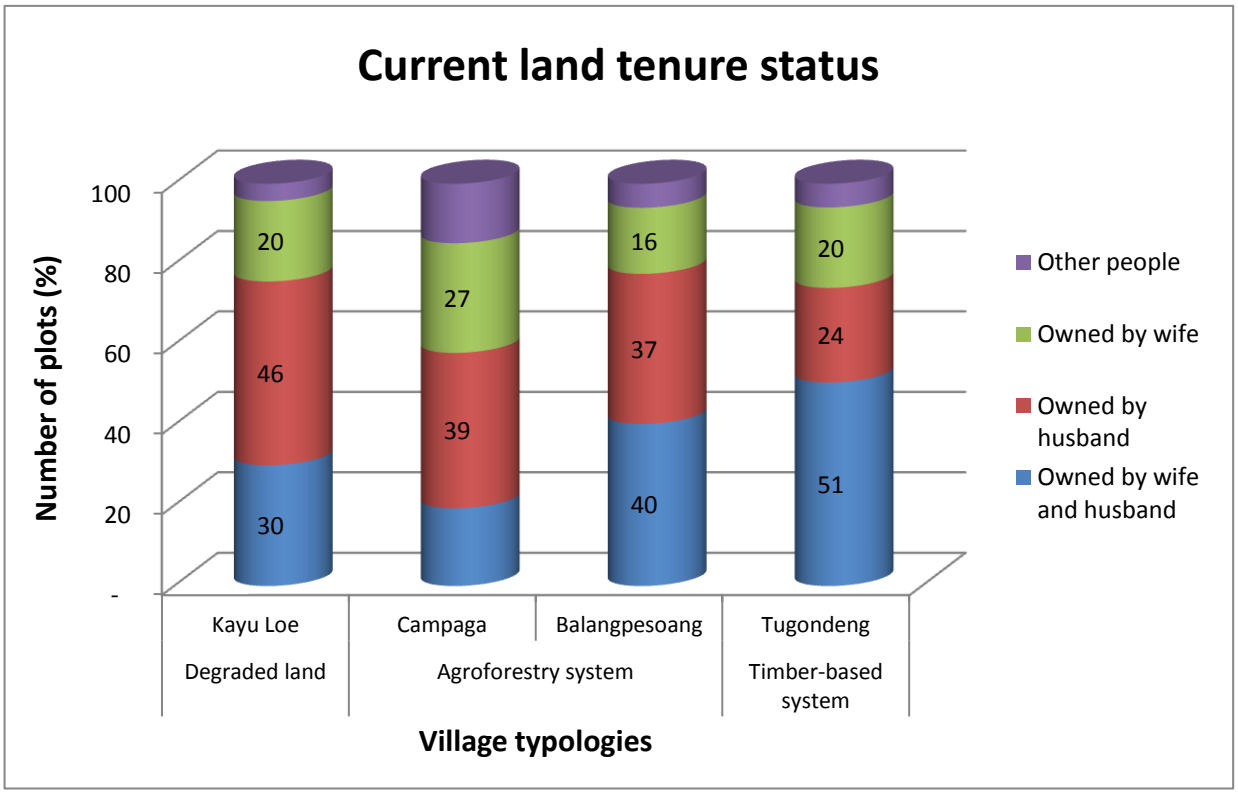

Figure 20. Current land tenure status in South Sulawesi

Table 21. Current land use in South Sulawesi

Village typologies	Villages	n	Current land use																	
			Rice fields		Maize fields		Cacao agroforest		Trees		Mixed-gardens		Bush fallow		Clove agroforest		Coconut agroforest		Coffee agroforest	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	0	0	48	69	4	6	0	0	4	6	0	0	0	0	0	0	14	20
Agroforestry system	Campaga	88	15	17	2	2	4	5	0	0	53	60	0	0	12	14	0	0	2	2
	Balangpesoang	67	0	0	0	0	4	6	0	0	50	75	0	0	13	19	0	0	0	0
Timber-based system	Tugondeng	85	6	7	3	4	15	18	8	9	20	24	1	1	0	0	32	38	0	0

Table 22. Land use before acquisition in South Sulawesi

Village typologies	Villages	n	Land use before acquisition																			
			Rice fields		Maize fields		Cacao agroforest		Trees		Mixed-gardens		Bush fallow		Primary forest		Secondary forest		Clove agroforest		Coconut agroforest		Coffee agroforest	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	0	0	46	66	1	1	0	0	2	3	10	14	0	0	2	3	0	0	0	0	9	13
Agroforestry system	Campaga	88	14	16	13	15	1	1	0	0	25	28	28	32	0	0	0	0	6	7	0	0	1	1
	Balangpesoang	67	0	0	6	9	3	4	0	0	17	25	14	21	2	3	4	6	21	31	0	0	0	0
Timber-based system	Tugondeng	85	7	8	10	12	8	9	2	2	4	5	33	39	0	0	0	0	0	0	21	25	0	0

Table 23. Land use one year after acquisition in South Sulawesi

Village typologies	Villages	n	Land use one year after acquisition																	
			Rice fields		Maize fields		Cacao agroforest		Trees		Mixed-gardens		Bush fallow		Clove agroforest		Coconut agroforest		Coffee agroforest	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	0	0	56	80	2	3	0	0	3	4	0	0	0	0	0	0	9	13
Agroforestry system	Campaga	88	15	17	22	25	6	7	0	0	36	41	2	2	5	6	0	0	2	2
	Balangpesoang	67	0	0	19	28	3	4	0	0	26	39	3	4	16	24	0	0	0	0
Timber-based system	Tugondeng	85	7	8	27	32	13	15	5	6	10	12	2	2	0	0	21	25	0	0

Table 24. Previous land use in South Sulawesi

Village typologies	Villages	n	Previous land use																	
			Rice fields		Maize fields		Cacao agroforest		Trees		Mixed-gardens		Bush fallow		Clove agroforest		Coconut agroforest		Coffee agroforest	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	70	0	0	54	77	1	1	0	0	3	4	3	4	0	0	0	0	9	13
Agroforestry system	Campaga	88	15	17	24	27	3	3	0	0	27	31	10	11	7	8	0	0	2	2
	Balangpesoang	67	0	0	17	25	3	4	0	0	20	30	4	6	22	33	0	0	1	1
Timber-based system	Tugondeng	85	7	8	28	33	9	11	4	5	8	9	6	7	0	0	23	27	0	0

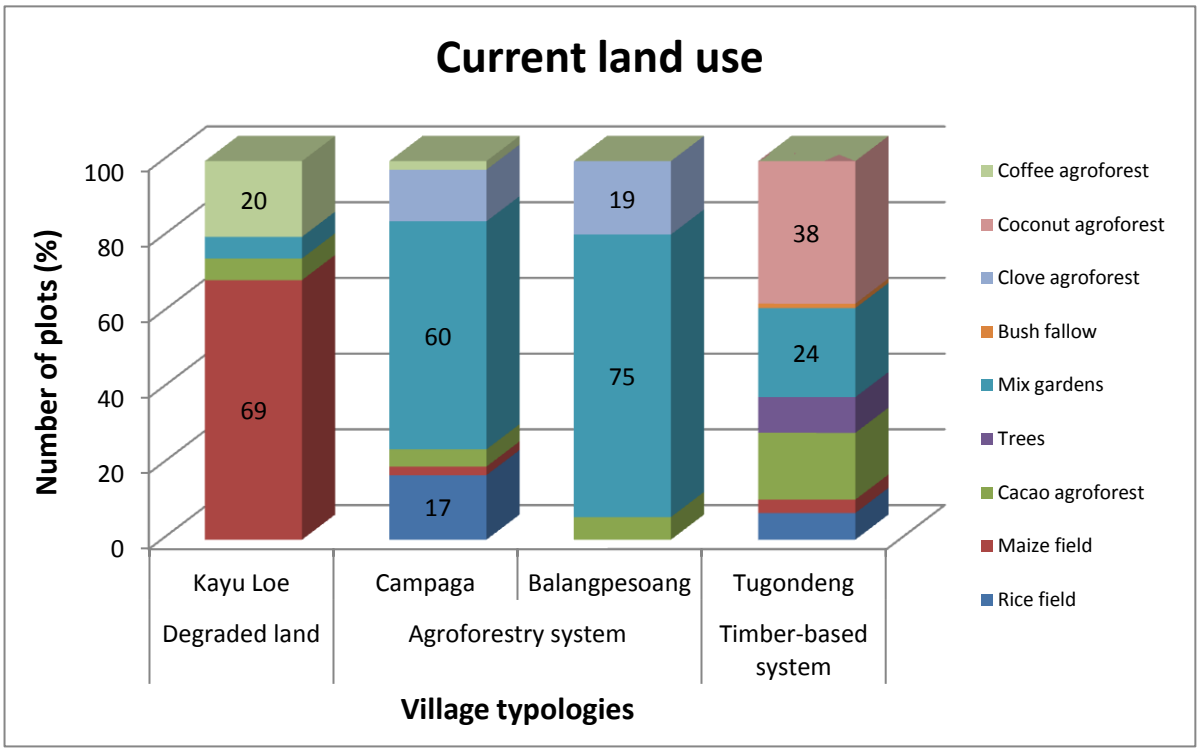

Figure 21. Current land use in South Sulawesi

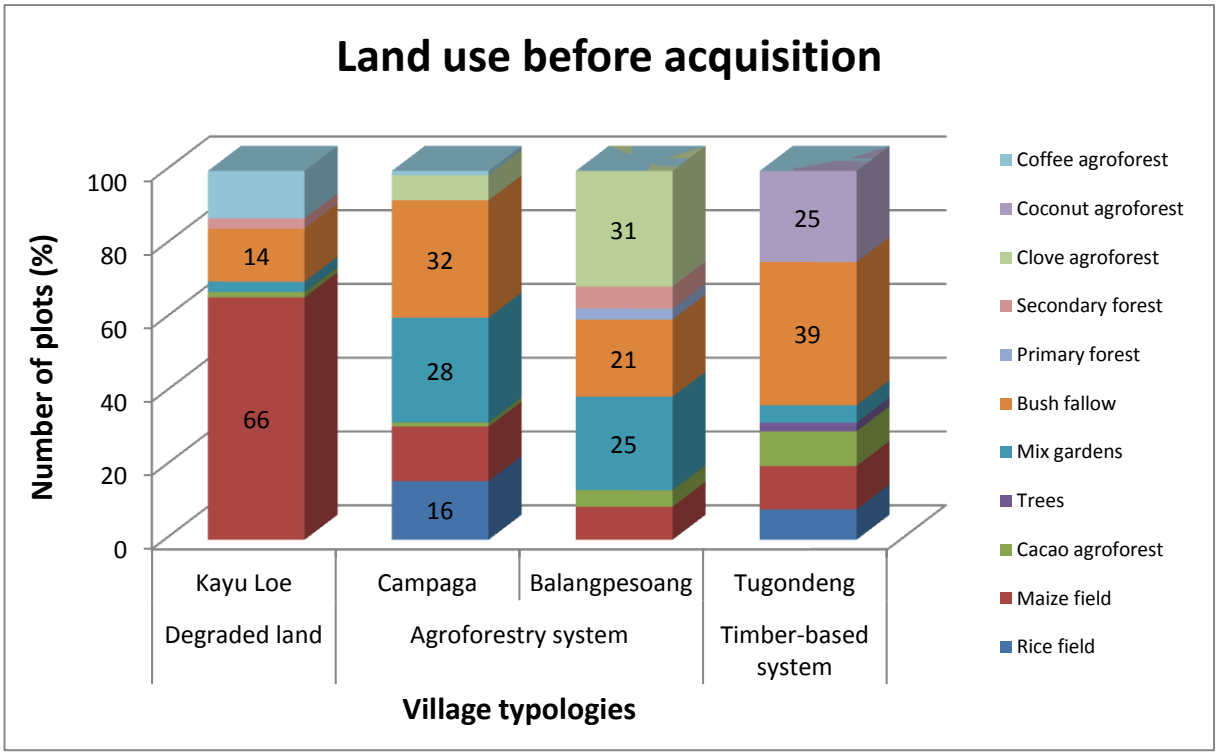

Figure 22. Land use before acquisition in South Sulawesi

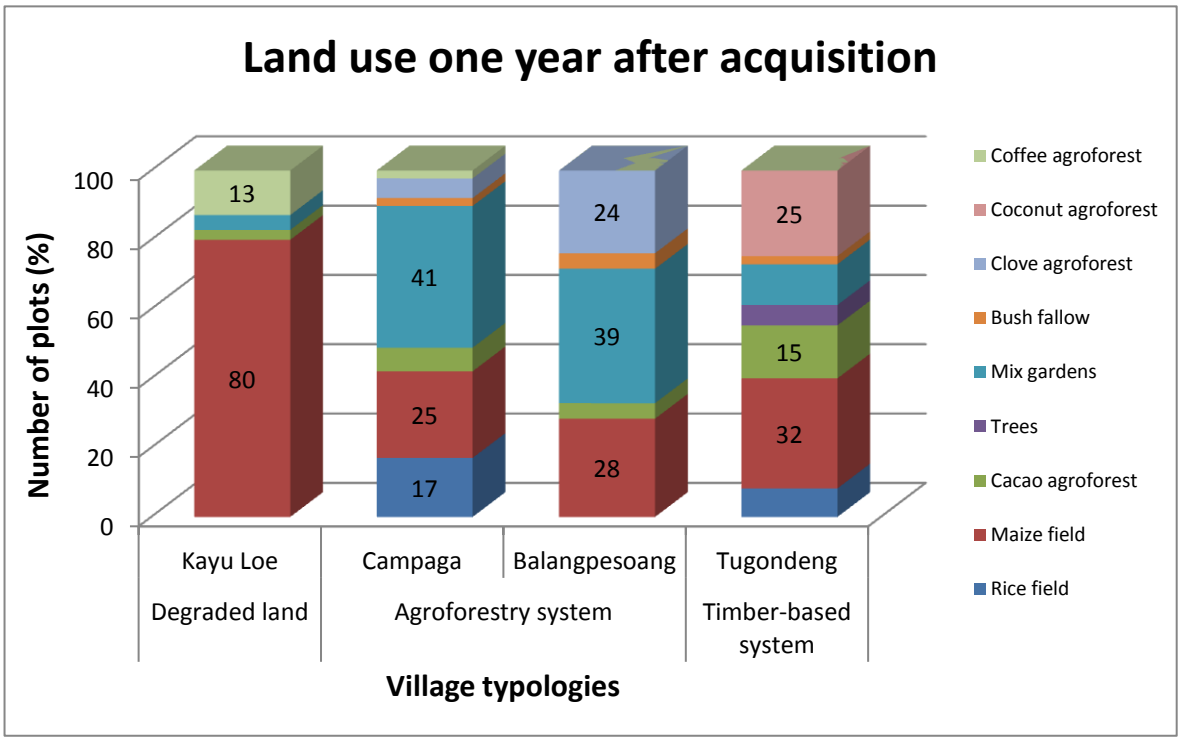

Figure 23. Land use one year after acquisition in South Sulawesi

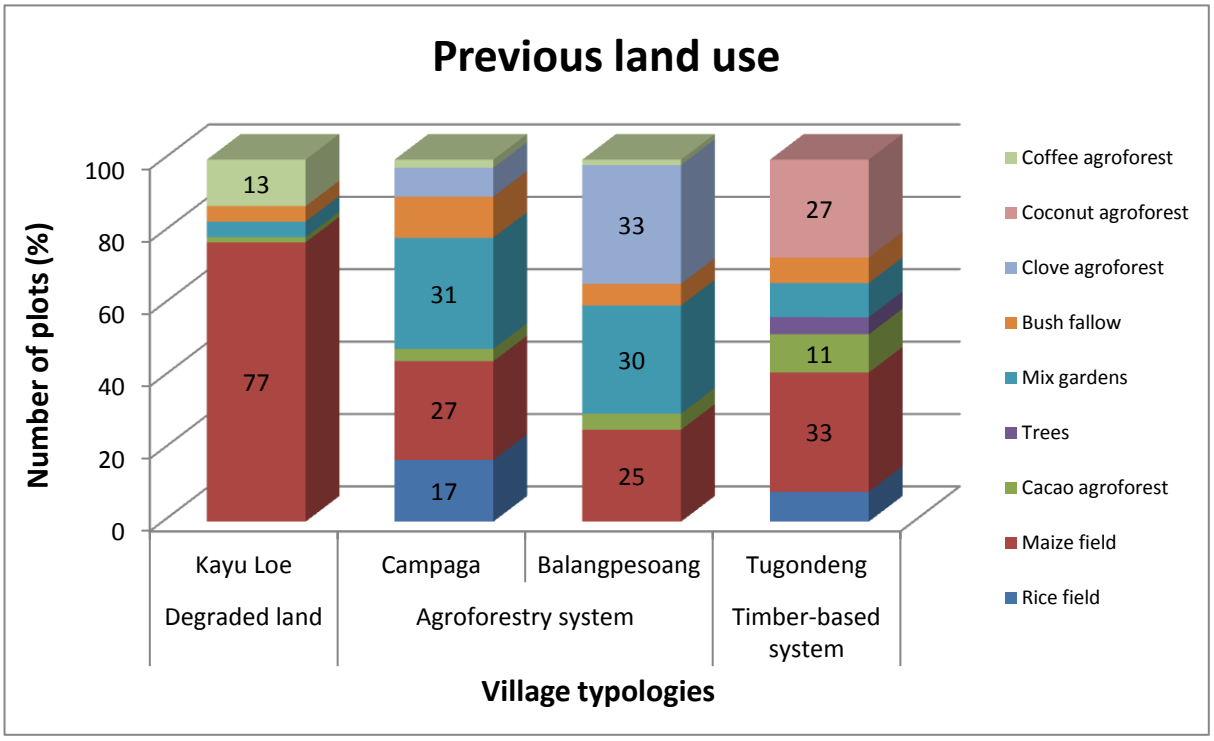

Figure 24. Previous land use in South Sulawesi

Table 25. Average total of trees per hectare in South Sulawesi

Village typologies	Villages	n	Average total of trees per hectare									
			Perennial crop		MPTS		Timber		Banana		Others	
			n	%	n	%	n	%	n	%	n	%
Degraded land	Kayu Loe	557	397	71	62	11	56	10	12	2	30	5
Agroforestry system	Campaga	781	475	61	237	30	40	5	24	3	5	1
	Balangpesoang	534	236	44	236	44	46	9	7	1	9	2
Timber-based system	Tugondeng	742	336	45	112	15	264	36	30	4	0	0

Others: Gamal, Bamboo

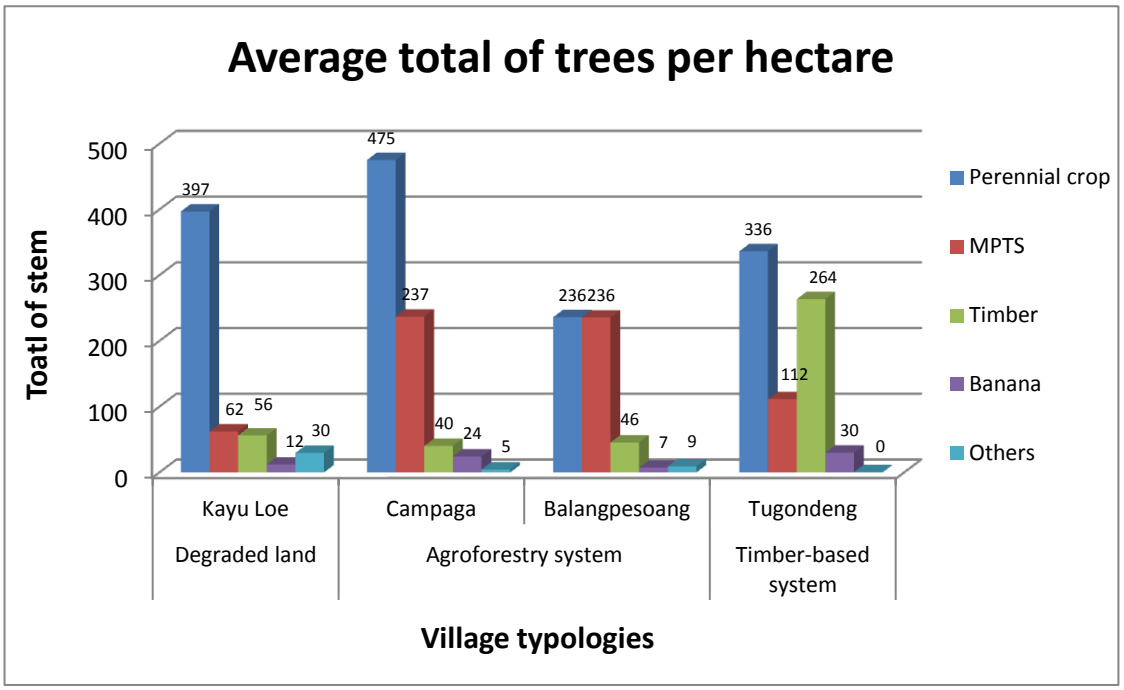

Figure 25. Average total of trees per hectare in South Sulawesi

3. Land holdings, income, income per capita

Table 26. Land holding per household in South Sulawesi

Village Typologies	Villages	Land holding per household (ha)
Degraded land	Kayu Loe	1.34
Agroforestry system	Campaga	1.02
	Balangpesoang	1.11
Timber-based system	Tugondeng	2.09

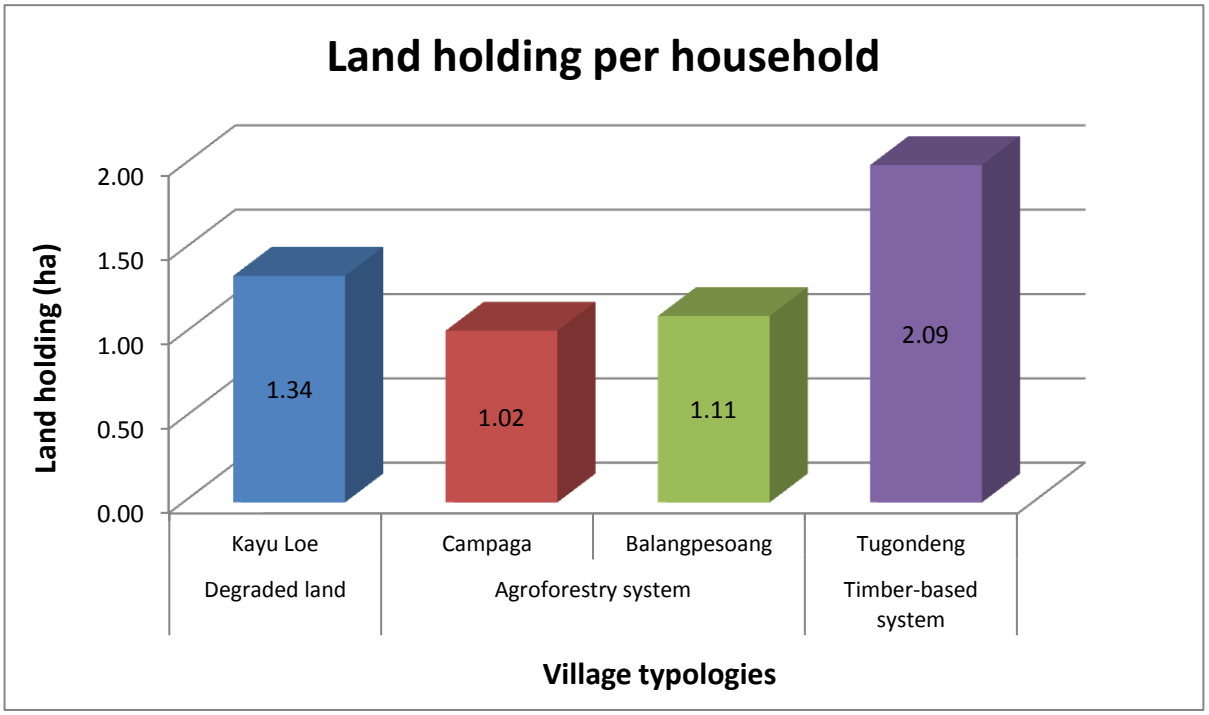

Figure 26. Land holding per household in South Sulawesi

Table 27. Average land holding by land use in South Sulawesi

Village typologies	Villages	Average land holding by land use (ha)								
		Rice fields	Corn fields	Cacao agroforest	Mixed-gardens	Trees	Clove agroforest	Coconut agroforest	Coffee garden	Bush fallow
Degraded land	Kayu Loe	0.00	0.86	0.05	0.14	0.00	0.00	0.00	0.29	0
Agroforestry system	Campaga	0.20	0.01	0.03	0.65	0.00	0.08	0.00	0.04	0
	Balangpesoang	0.00	0.00	0.07	0.83	0.00	0.20	0.00	0.00	0
Timber-based system	Tugondeng	0.18	0.04	0.32	0.65	0.22	0.00	0.68	0.00	0.01

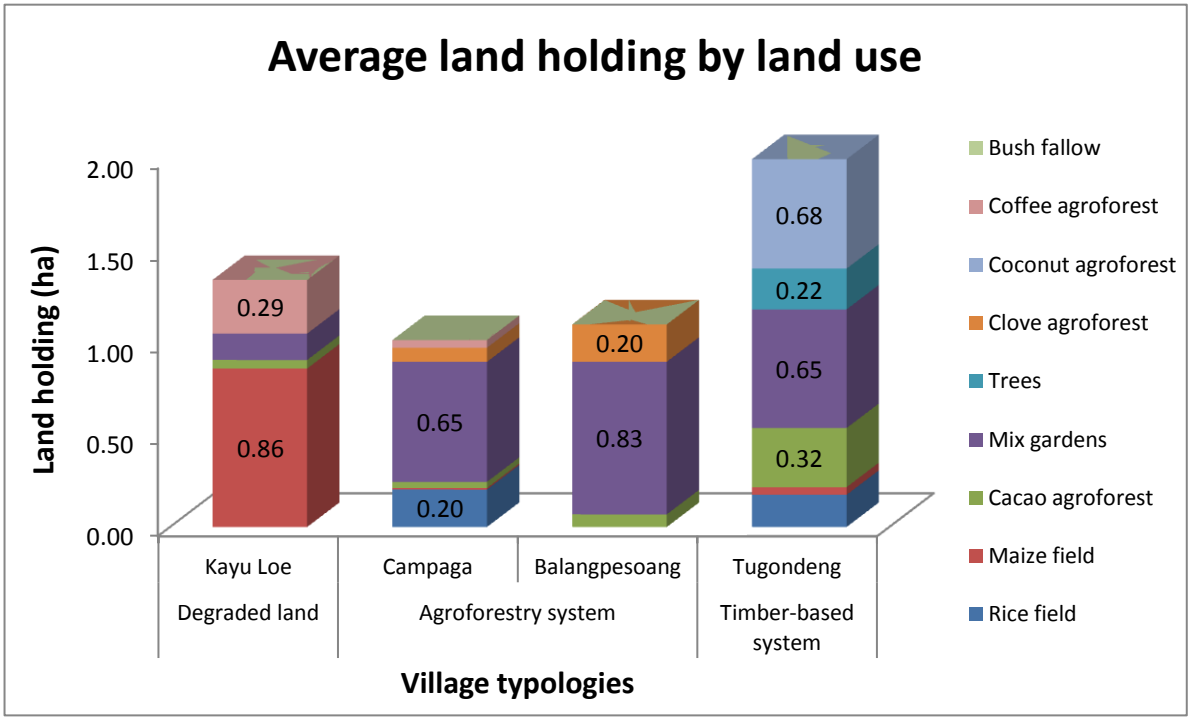

Figure 27. Land holding by Land Use in South Sulawesi

Table 28. Sources of income in South Sulawesi in 2012

Source of income	Average income per household								Income per capita			
	Degraded land		Agroforestry system				Timber-based system		Degraded land	Agroforestry system		Timber-based system
	Kayu Loe village		Campaga village		Balangpesoang village		Tugondeng village		Kayu Loe village	Campaga village	Balangpesoang village	Tugondeng village
	IDR	%	IDR	%	IDR	%	IDR	%	IDR	IDR	IDR	IDR
1. On-farm/ agriculture	5,877,350	45.2	12,470,985	52.3	8,377,393	39.4	21,764,539	60.3	1,388,350	3,170,589	2,148,049.60	5,351,935.90
Rice fields	-	-	2,519,550	10.6	0	-	823,217	2.3	-	640,564	0	202,430
Maize fields	3,688,182	28.3	59,383	0.2	0	-	448,167	1.2	871,224	15,097	0	110,205
Cacao agroforest	284,208	2.2	153,817	0.6	394,233	1.9	4,995,860	13.8	67,136	39,106	101,085	1,228,490
Mixed-gardens (agroforest)	334,467	2.6	7,045,085	29.5	7,064,477	33.2	6,604,790	18.3	79,008	1,791,123	1,811,404	1,624,129
Coconut agroforest	-	-	-	-	0	-	8,373,406	23.2	-	0	0	2,059,034
Clove agroforest	-	-	2,179,617	9.1	526,683	2.5	-	-	-	554,140	135,047	-
Trees	-	-	-	-	0	-	84,783	0.2	-	0	0	20,848
Coffee agroforest	1,059,110	8.1	5,550	0	0	-	-	-	250,183	1,411	0	-
Other agriculture	511,383	3.9	507,983	2.1	392,000	1.8	434,317	1.2	120,799	129,148	100,513	106,799
2. Off-farm/ non-agriculture	7,134,400	54.8	11,378,300	47.7	12,869,500	60.6	14,314,167	39.7	1,685,291	2,892,788	3,299,872	3,519,877
Firewood	669,933	5.1	884,000	3.7	918,900	4.3	607,000	1.7	158,252	224,746	235,615	149,262
Labourer (worker)	1,582,133	12.2	2,292,667	9.6	2,032,667	9.6	1,038,500	2.9	373,732	582,881	521,197	255,369
Entrepreneurial	636,667	4.9	3,186,000	13.4	6,942,933	32.7	8,560,667	23.7	150,394	810,000	1,780,239	2,105,082
Professional	454,000	3.5	1,390,667	5.8	360,000	1.7	828,000	2.3	107,244	353,559	92,308	203,607
Other	1,111,667	8.5	3,131,633	13.1	2,141,667	10.1	3,140,000	8.7	262,598	796,178	549,145	772,131
Remittances	2,680,000	20.6	493,333	2.1	473,333	2.2	140,000	0.4	633,071	125,424	121,368	34,426
3. Total income per year	13,011,750	100	23,849,285	100	21,246,893	100	36,078,706	100	3,073,642	6,063,378	5,447,921	8,871,813
Income per capita per year	3,099,336		6,582,491		5,826,343		9,325,579		732,127	1,673,515	1,493,934	2,293,175
Income per capita per day (IDR)									8,491	18,034	15,963	25,550
Income per capita per day (USD)									0.96	2.05	1.81	2.9

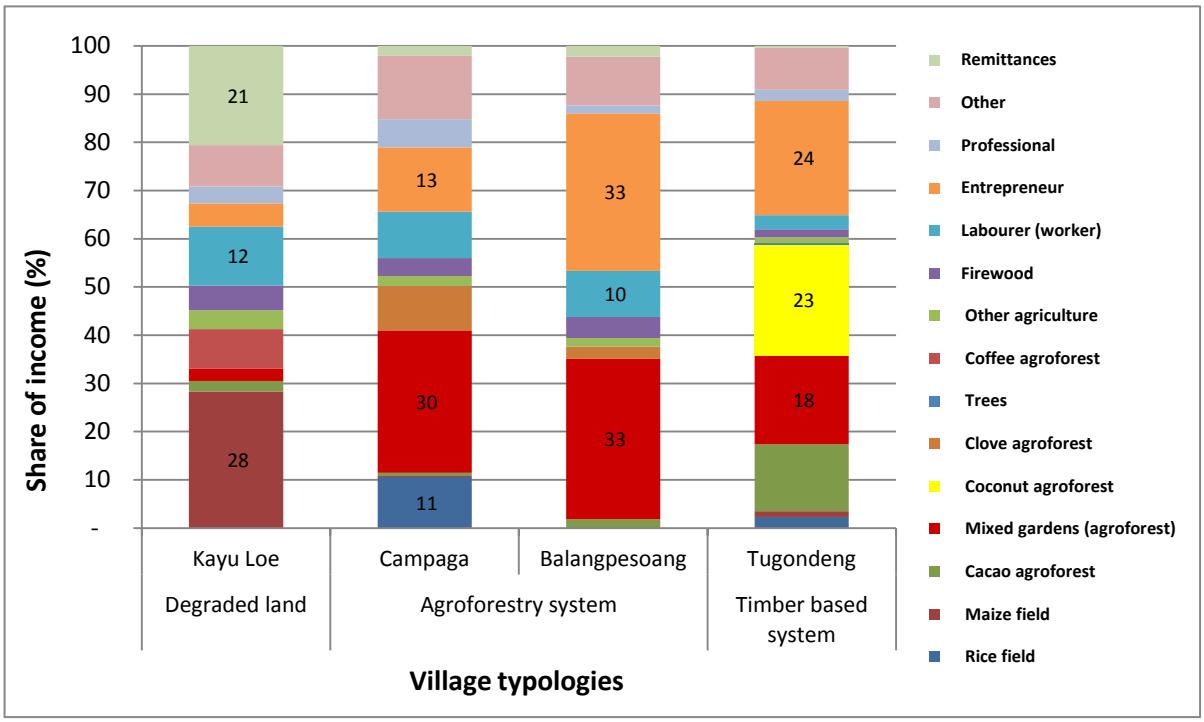

Figure 28. Sources of income by activity type in South Sulawesi in 2012

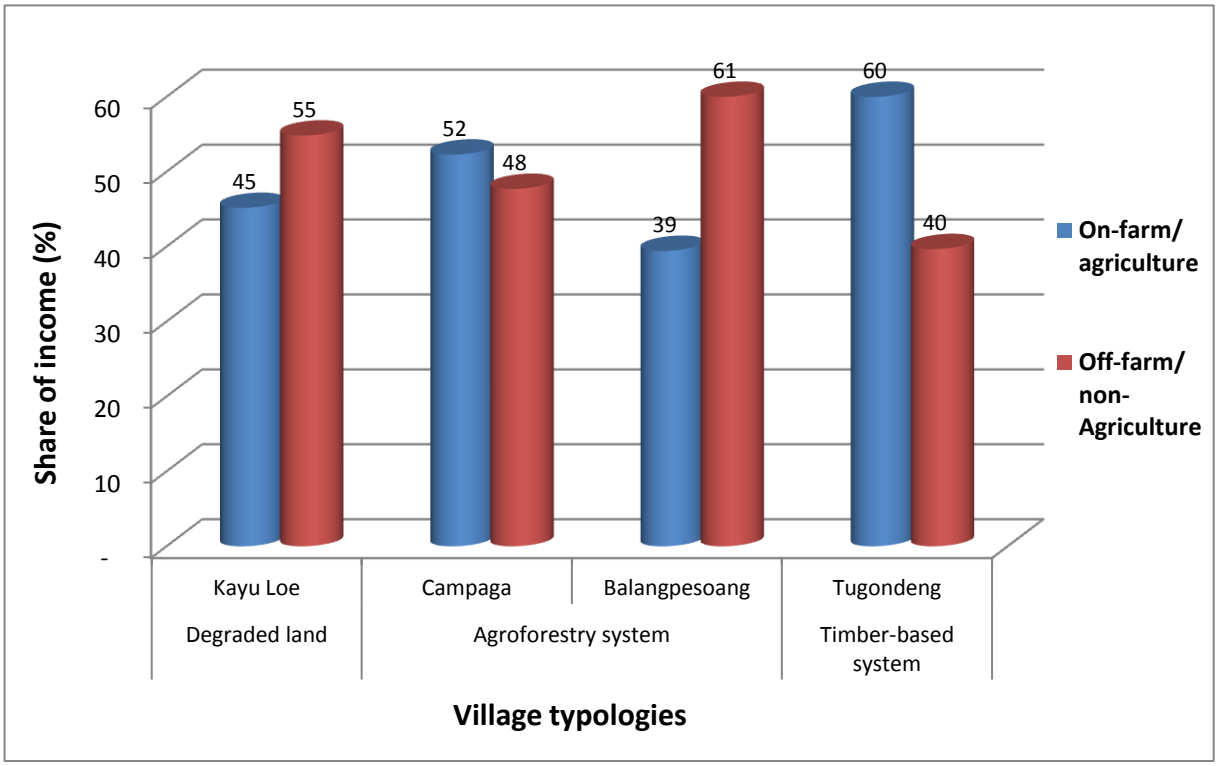

Figure 29. Sources of income in South Sulawesi in 2012

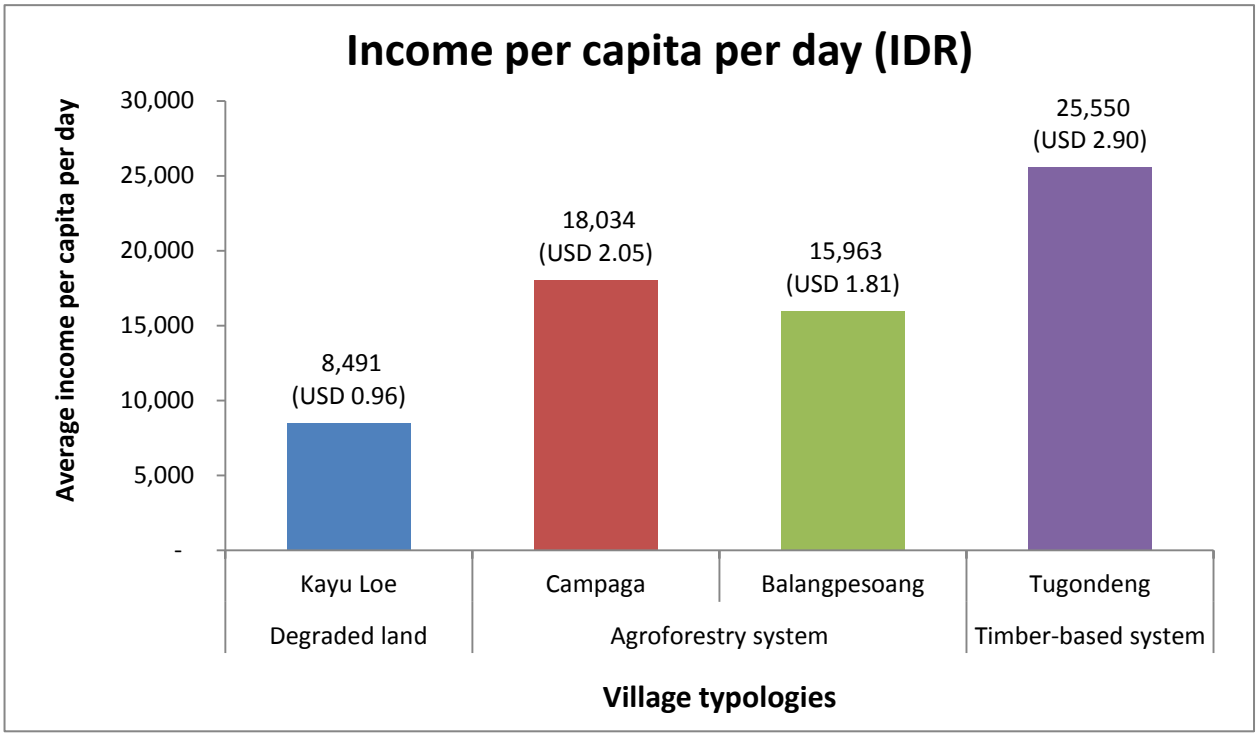

Figure 30. Income per capita per day in South Sulawesi in 2012

4. Gender in South Sulawesi

Table 29. The role of women in land management in South Sulawesi

Village typologies	Villages	n	The role of women in land management			
			A role exists		No role exists	
			n	%	n	%
Degraded land	Kayu Loe	30	29	97	1	3
Agroforestry system	Campaga	30	29	97	1	3
	Balangpesoang	30	27	90	3	10
Timber-based system	Tugondeng	30	30	100	0	0

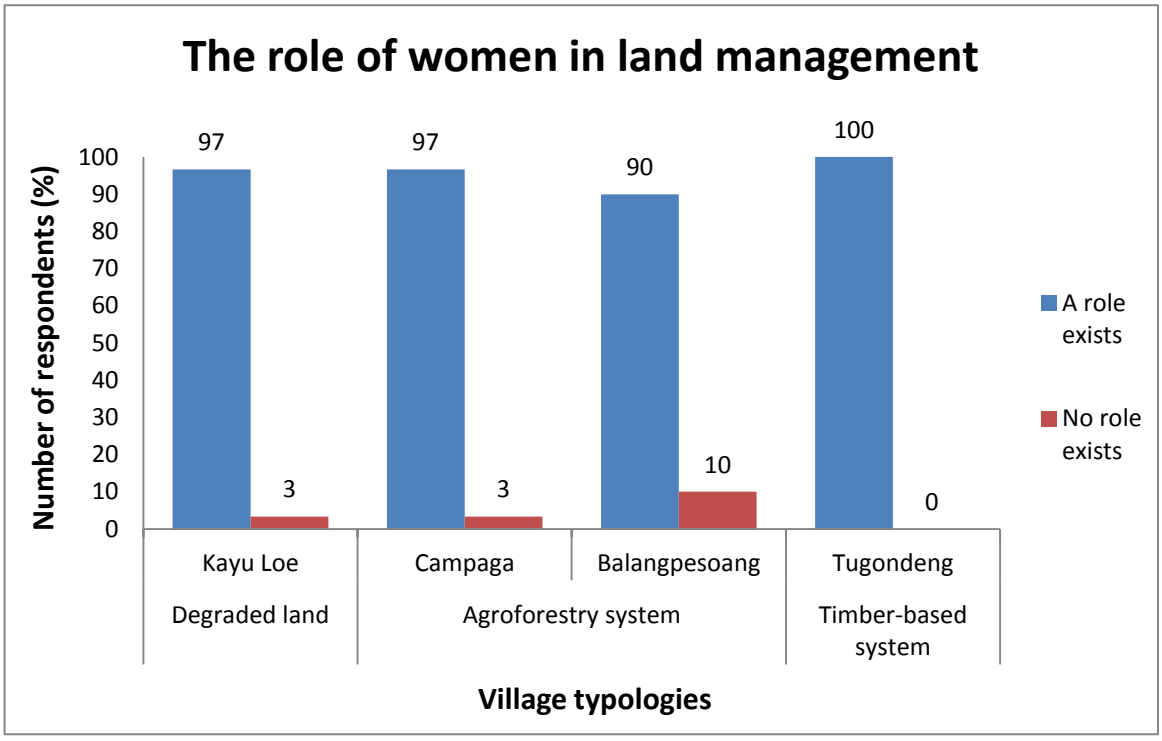

Figure 31. The role of women in land management in South Sulawesi

Table 30. The role of women in farming system activities in South Sulawesi

Activity	Villages	n	The role of women in farming system activities							
			Woman > man		Woman = man		Woman < man		No woman role	
			n	%	n	%	n	%	n	%
Land preparation	Kayu Loe	29	5	17	1	3	13	45	10	34
	Campaga	29	2	7	3	10	16	55	8	28
	Balangpesoang	27	1	4	1	4	15	56	10	37
	Tugondeng	30	2	7	3	10	15	50	10	33
Planting	Kayu Loe	29	10	34	9	31	9	31	1	3
	Campaga	29	5	17	5	17	15	52	4	14
	Balangpesoang	27	1	4	0	0	16	59	10	37
	Tugondeng	30	3	10	5	17	14	47	8	27
Crop care	Kayu Loe	29	4	14	2	7	22	76	1	3
	Campaga	29	2	7	3	10	24	83	0	0
	Balangpesoang	27	1	4	2	7	15	56	9	33
	Tugondeng	30	1	3	5	17	21	70	3	10
Harvesting	Kayu Loe	29	6	21	10	34	13	45	0	0
	Campaga	29	3	10	10	34	16	55	0	0
	Balangpesoang	27	1	4	8	30	14	52	4	15
	Tugondeng	30	6	20	13	43	10	33	1	3
Post-harvesting	Kayu Loe	29	12	41	7	24	10	34	0	0
	Campaga	29	18	62	8	28	3	10	0	0
	Balangpesoang	27	18	67	5	19	4	15	0	0
	Tugondeng	30	20	67	6	20	4	13	0	0
Marketing	Kayu Loe	29	15	52	4	14	6	21	4	14
	Campaga	29	21	72	4	14	4	14	0	0
	Balangpesoang	27	23	85	3	11	1	4	0	0
	Tugondeng	30	25	83	2	7	2	7	1	3

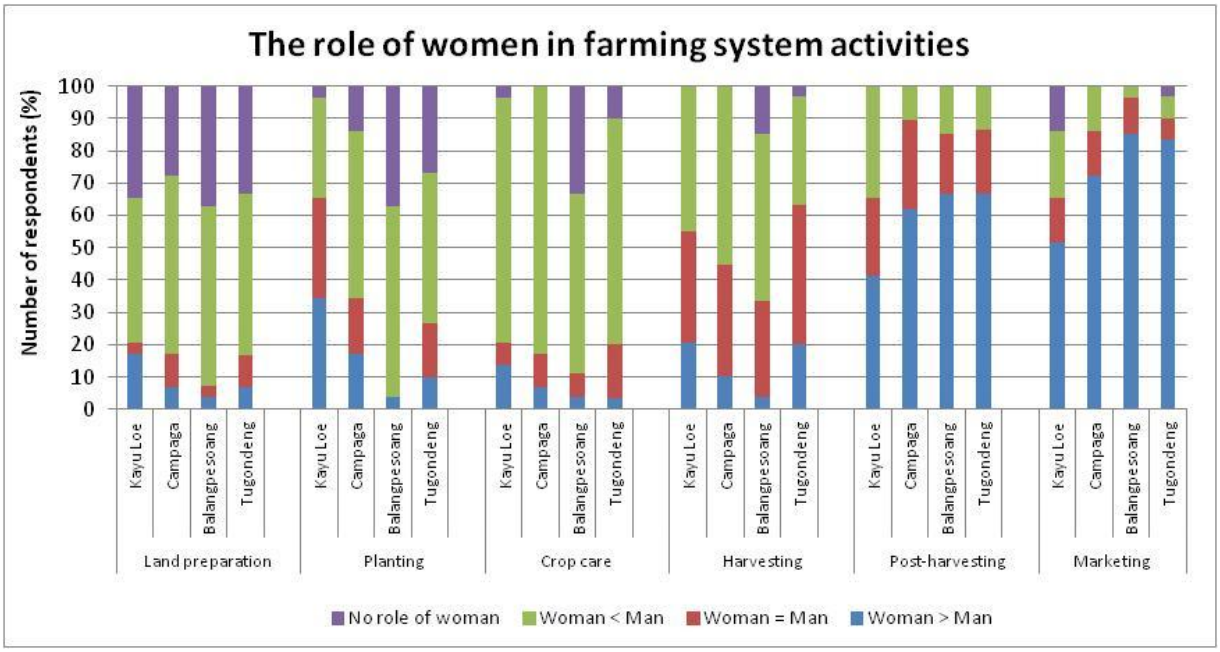

Figure 32. The role of women in farming system activities in South Sulawesi

Table 31. The role of women in decision making in South Sulawesi

Activity	Villages	n	The role of women in decision making			
			Man		Woman	
			n	%	n	%
Type of plant to be planted	Kayu Loe	29	26	90	3	10
	Campaga	29	25	86	4	14
	Balangpesoang	27	26	96	1	4
	Tugondeng	30	29	97	1	3
Time to start planting	Kayu Loe	29	26	90	3	10
	Campaga	29	26	90	3	10
	Balangpesoang	27	26	96	1	4
	Tugondeng	30	27	90	3	10
Planting other plants	Kayu Loe	29	24	83	5	17
	Campaga	29	25	86	4	14
	Balangpesoang	27	26	96	1	4
	Tugondeng	30	27	90	3	10
Applying fertilizer and medicine	Kayu Loe	29	26	90	3	10
	Campaga	29	25	86	4	14
	Balangpesoang	27	26	96	1	4
	Tugondeng	30	26	87	4	13
Marketing agricultural yield	Kayu Loe	29	12	41	17	59
	Campaga	29	7	24	22	76
	Balangpesoang	27	3	11	24	89
	Tugondeng	30	5	17	25	83

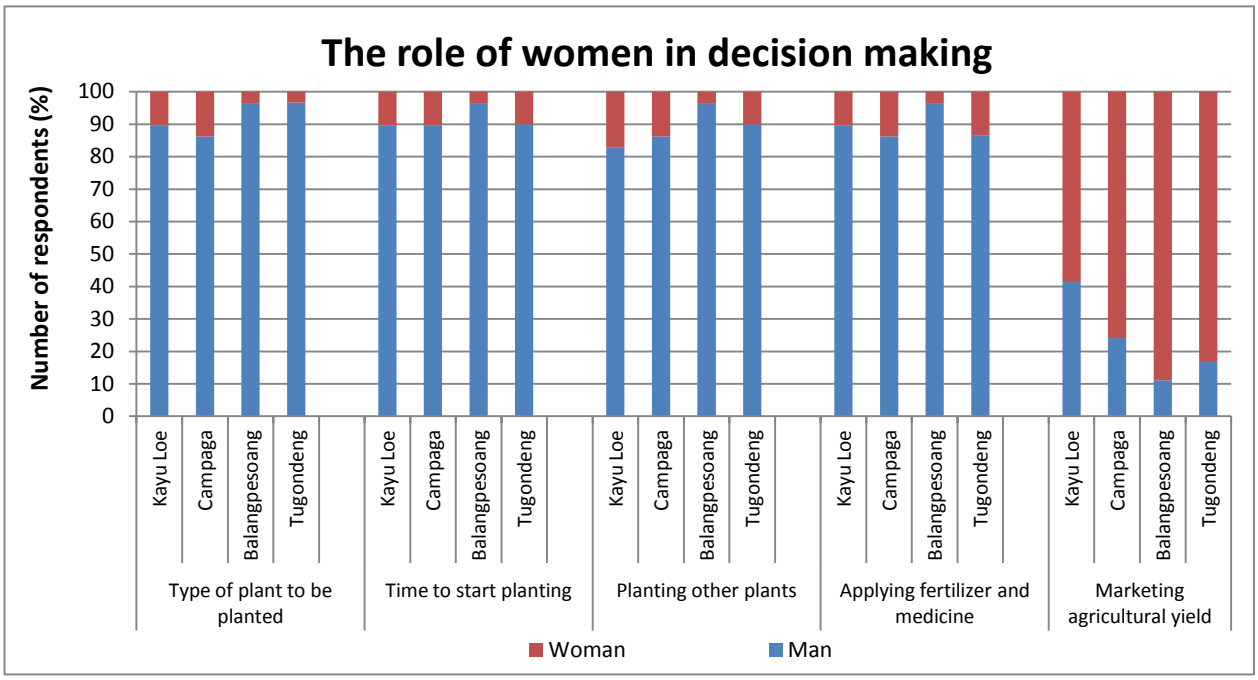

Figure 33. The role of women in decision making in South Sulawesi

Table 32. The role of women in various types of land use in South Sulawesi

Type of land	Villages	n	The role of women in various types of land use							
			Woman > man		Woman = man		Woman < man		No woman role	
			n	%	n	%	n	%	n	%
Rice fields	Kayu Loe	0	0	0	0	0	0	0	0	0
	Campaga	16	2	13	3	19	11	69	0	0
	Balangpesoang	1	0	0	0	0	1	100	0	0
	Tugondeng	4	1	25	1	25	2	50	0	0
Maize fields	Kayu Loe	26	4	15	4	15	18	69	0	0
	Campaga	4	0	0	1	25	3	75	0	0
	Balangpesoang	1	0	0	0	0	1	100	0	0
	Tugondeng	3	1	33	1	33	1	33	0	0
Cacao agroforest	Kayu Loe	2	0	0	0	0	2	100	0	0
	Campaga	6	0	0	1	17	5	83	0	0
	Balangpesoang	5	0	0	0	0	5	100	0	0
	Tugondeng	5	0	0	1	20	3	60	1	20
Mixed-gardens (agroforest)	Kayu Loe	6	0	0	0	0	6	100	0	0
	Campaga	26	3	12	3	12	20	77	0	0
	Balangpesoang	23	0	0	2	9	21	91	0	0
	Tugondeng	18	1	6	6	33	11	61	0	0

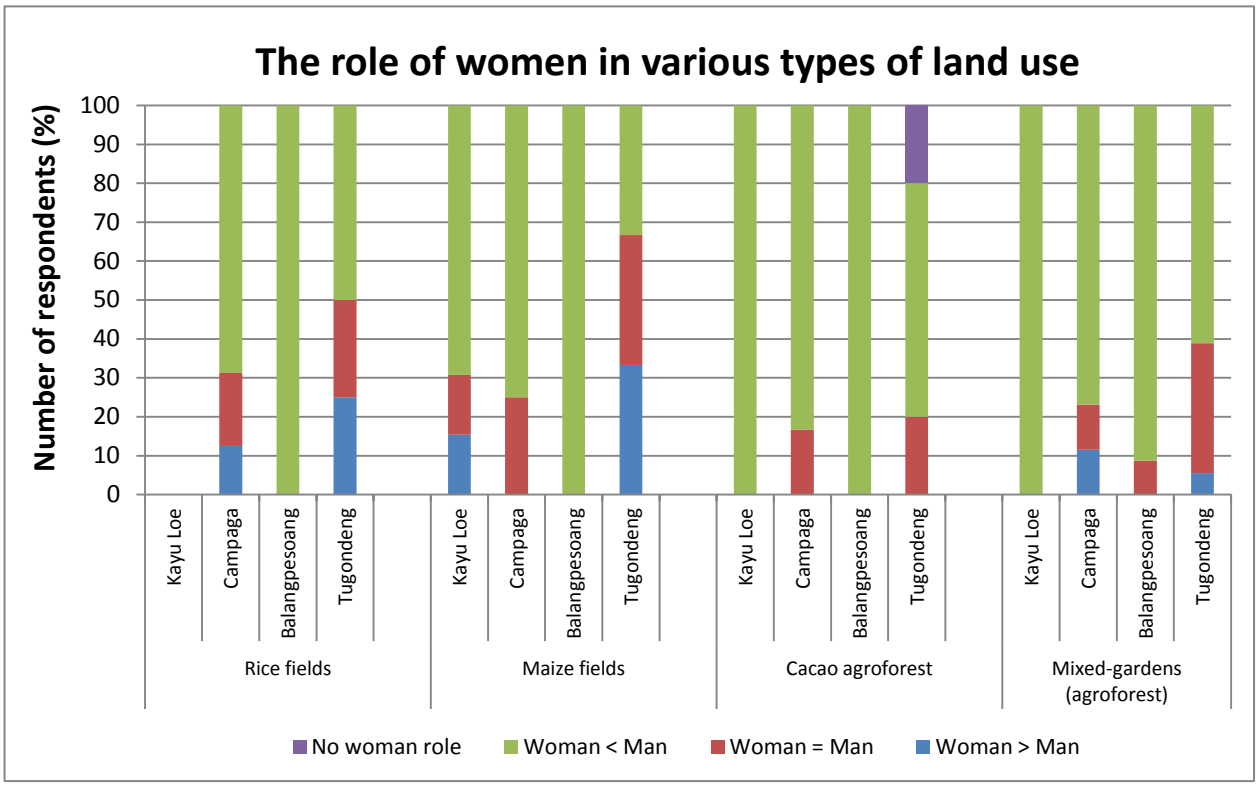

Figure 34. The role of women in various types of land use in South Sulawesi

Table 33. Labour use in various land uses by village in South Sulawesi

Village typologies	Land use by village	Labour use															
		Family				Exchange				Hire				Total			
		Man		Woman		Man		Woman		Man		Woman		Man		Woman	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Rice fields																	
Degraded land	Kayu Loe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agroforestry system	Campaga	187	58	134	42	43	26	120	74	194	41	277	59	423	44	531	56
	Balangpesoang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	83	53	73	47	0	0	2	100	33	38	55	62	116	47	130	53
Maize fields																	
Degraded land	Kayu Loe	1243	66	628	34	80	44	101	56	35	32	76	68	1358	63	805	37
Agroforestry system	Campaga	44	73	16	27	7	56	6	44	0	100	0	0	51	70	22	30
	Balangpesoang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	29	60	19	40	2	19	10	81	2	100	0	0	33		29	47
Cacao agroforest																	
Degraded land	Kayu Loe	29	64	17	36	0	0	0	0	0	100	0	0	30	64	17	36
Agroforestry system	Campaga	69	79	18	21	0	0	0	0	9	100	0	0	78	81	18	19
	Balangpesoang	80	68	37	32	0	0	0	0	0	0	0	0	80	68	37	32
Timber-based system	Tugondeng	203	59	143	41	1	50	1	50	78	46	90	54	282	55	234	45
Mixed-garden/agroforest																	
Degraded land	Kayu Loe	106	87	15	13	0	0	1	100	6	31	13	69	112	79	30	21
Agroforestry system	Campaga	1253	73	453	27	20	60	13	40	131	43	174	57	1405	69	640	31
	Balangpesoang	1166	86	184	14	26	100	0	0	214	78	60	22	1406	85	244	15
Timber-based system	Tugondeng	574	44	738	56	5	100	0	0	440	52	414	48	1019	47	1151	53

Coconut agroforest																	
Degraded land	Kayu Loe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agroforestry system	Campaga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Balangpesoang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	1662	57	1272	43	0	0	3	100	75	55	61	45	1737	57	1337	43
Clove agroforest																	
Degraded land	Kayu Loe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agroforestry system	Campaga	232	59	164	41	43	100	0	0	4	19	15	81	278	61	179	39
	Balangpesoang	116	61	73	39	2	100	0	0	1	100	0	0	118	62	73	38
Timber-based system	Tugondeng	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trees																	
Degraded land	Kayu Loe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agroforestry system	Campaga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Balangpesoang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	53	92	4	8	0	0	0	0	4	33	8	67	57	82	12	18
Coffee agroforest																	
Degraded land	Kayu Loe	369	81	89	19	0	0	3	100	4	100	0	0	373	80	91	20
Agroforestry system	Campaga	29	97	1	3	9	100	0	0	2	66	1	34	40	96	2	4
	Balangpesoang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Timber-based system	Tugondeng	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Collective/group marketing in South Sulawesi

Table 34. Respondents who had heard of the term 'group marketing' in South Sulawesi

Village typologies	Villages	n	Recognition of the term 'group marketing'			
			Yes		No	
			n	%	n	%
Degraded land	Kayu Loe	30	4	13	26	87
Agroforestry system	Campaga	30	8	27	22	73
	Balangpesoang	30	8	27	22	73
Timber-based system	Tugondeng	30	11	37	19	63

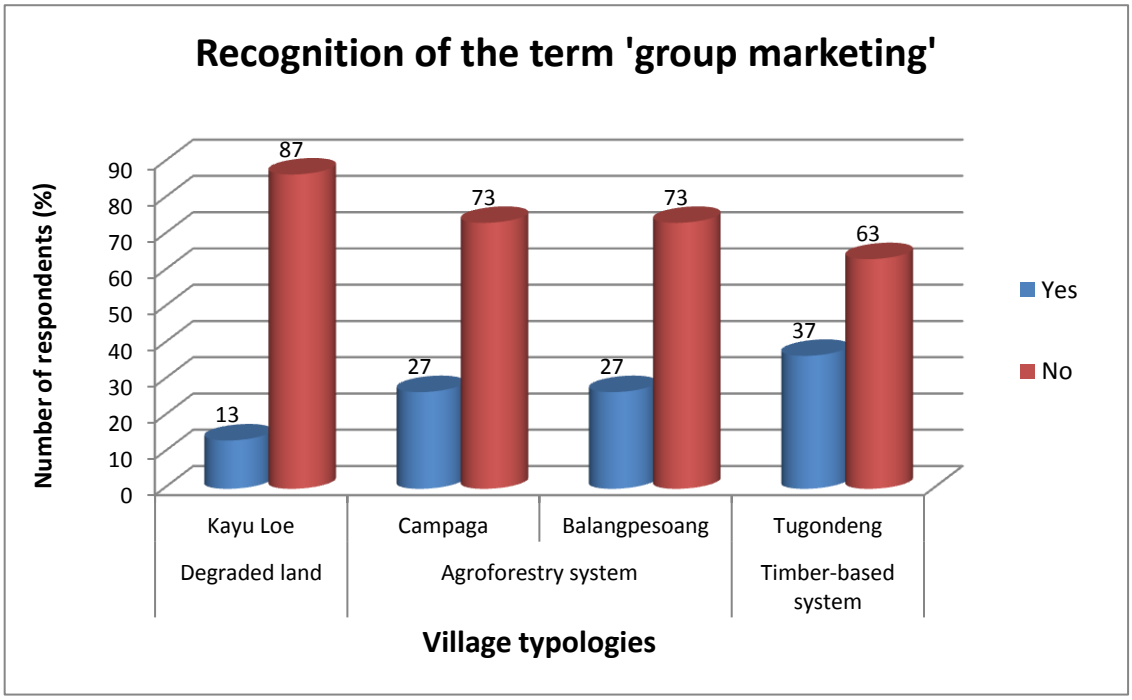

Figure 35. Respondents who had heard of the term 'group marketing' in South Sulawesi

Table 35. Respondents who were interested in learning more about group marketing in South Sulawesi

Village typologies	Villages	n	Interested to learn more about group marketing			
			Yes		No	
			n	%	n	%
Degraded land	Kayu Loe	30	19	63	11	37
Agroforestry system	Campaga	30	19	63	11	37
	Balangpesoang	30	19	63	11	37
Timber-based system	Tugondeng	30	25	83	5	17

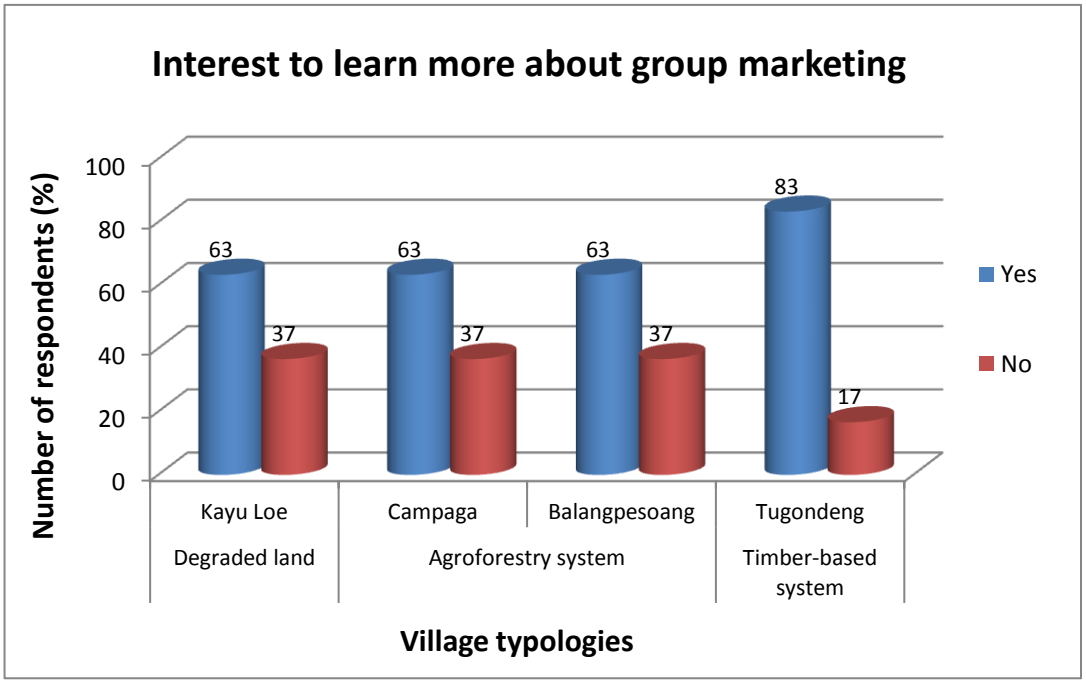

Figure 36. Respondents who were interested to learn more about group marketing in South Sulawesi

Table 36. Respondents who were interested to market together as a group in South Sulawesi

Village typologies	Villages	n	Interested to market together as a group			
			Yes		No	
			n	%	n	%
Degraded land	Kayu Loe	30	17	57	13	43
Agroforestry system	Campaga	30	16	53	14	47
	Balangpesoang	30	14	47	16	53
Timber-based system	Tugondeng	30	21	70	9	30

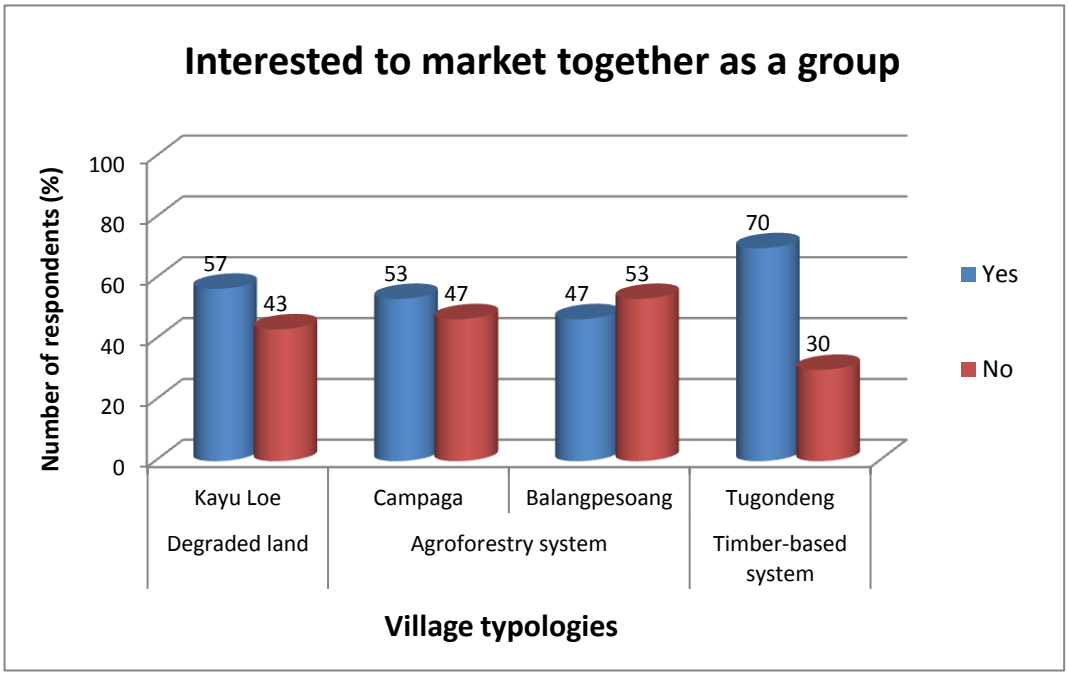

Figure 37. Respondents who were interested to market together as a group in South Sulawesi

Table 37. Respondents who were interested in forming small-scale enterprises in South Sulawesi

Village typologies	Villages	n	Interested in forming small-scale enterprises			
			Yes		No	
			n	%	n	%
Degraded land	Kayu Loe	17	14	82	3	18
Agroforestry system	Campaga	16	15	94	1	6
	Balangpesoang	14	13	93	1	7
Timber-based system	Tugondeng	21	21	100	0	0

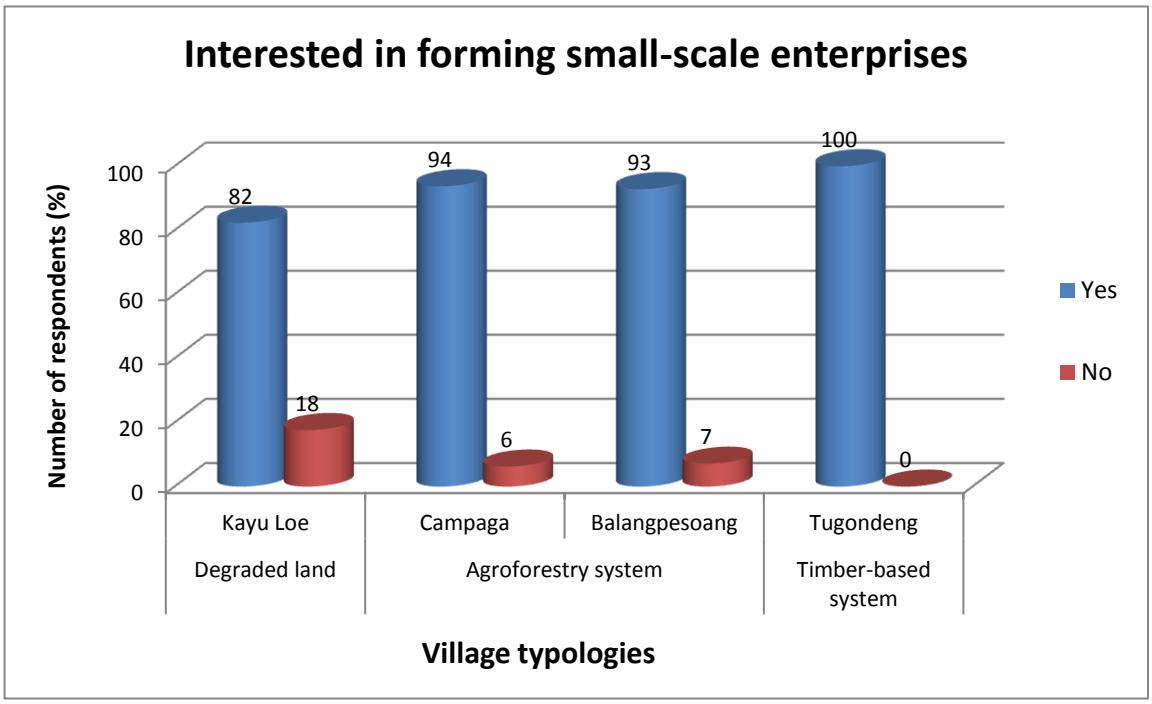

Figure 38. Respondents who were interested in forming small-scale enterprises in South Sulawesi

Table 38. Respondents who were interested in learning about how to form enterprises in South Sulawesi

Village typologies	Villages	n	Interested in learning about how to form enterprises			
			Yes		No	
			n	%	n	%
Degraded land	Kayu Loe	14	12	86	2	14
Agroforestry system	Campaga	15	13	87	2	13
	Balangpesoang	13	13	100	0	0
Timber-based system	Tugondeng	21	20	95	1	5

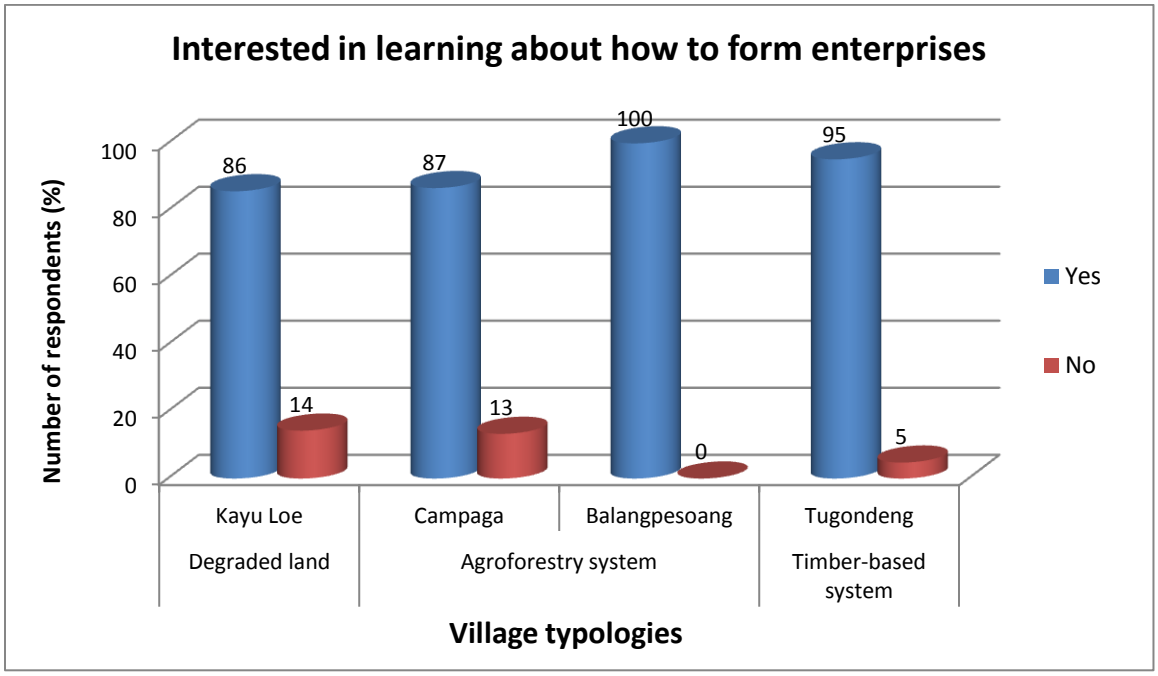

Figure 39. Respondents who were interested in learning about how to form enterprises in South Sulawesi

Tabulation of agricultural technical services in South Sulawesi.

Table 39. Respondents who received agricultural extension services in South Sulawesi

Villages	n	Received agricultural technical services			
		Yes		No	
		n	%	n	%
Kayu Loe	30	21	70	9	30
Campaga	30	20	67	10	33
Balangpesoang	30	10	33	20	67
Tugondeng	30	24	80	6	20

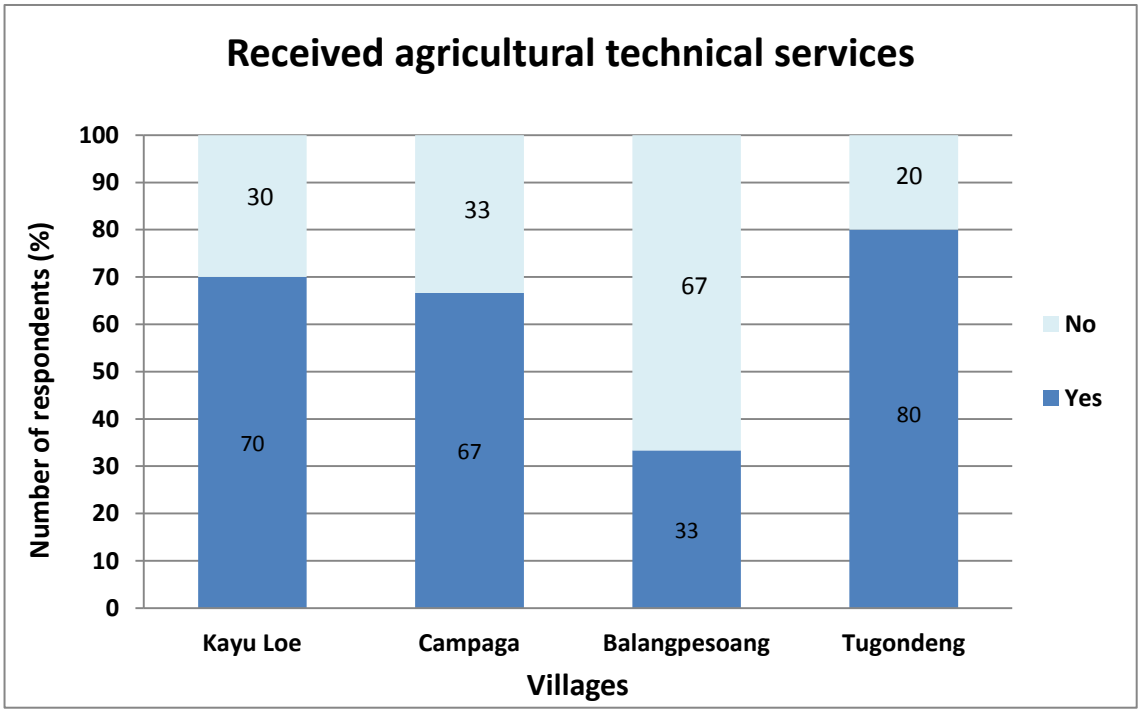

Figure 40. Respondents who received agricultural extension services in South Sulawesi

Table 40. Types of agricultural extension services received by farmers in South Sulawesi

Villages	n	Agricultural extension services received							
		Training		In-class activities		Ag. aids		Cross-visits	
		n	%	n	%	n	%	n	%
Kayu Loe	25	5	20	1	4	18	72	1	4
Campaga	31	8	26	9	29	13	42	1	3
Balangpesoang	11	1	9	2	18	8	73	0	0
Tugondeng	41	9	22	6	15	26	63	0	0

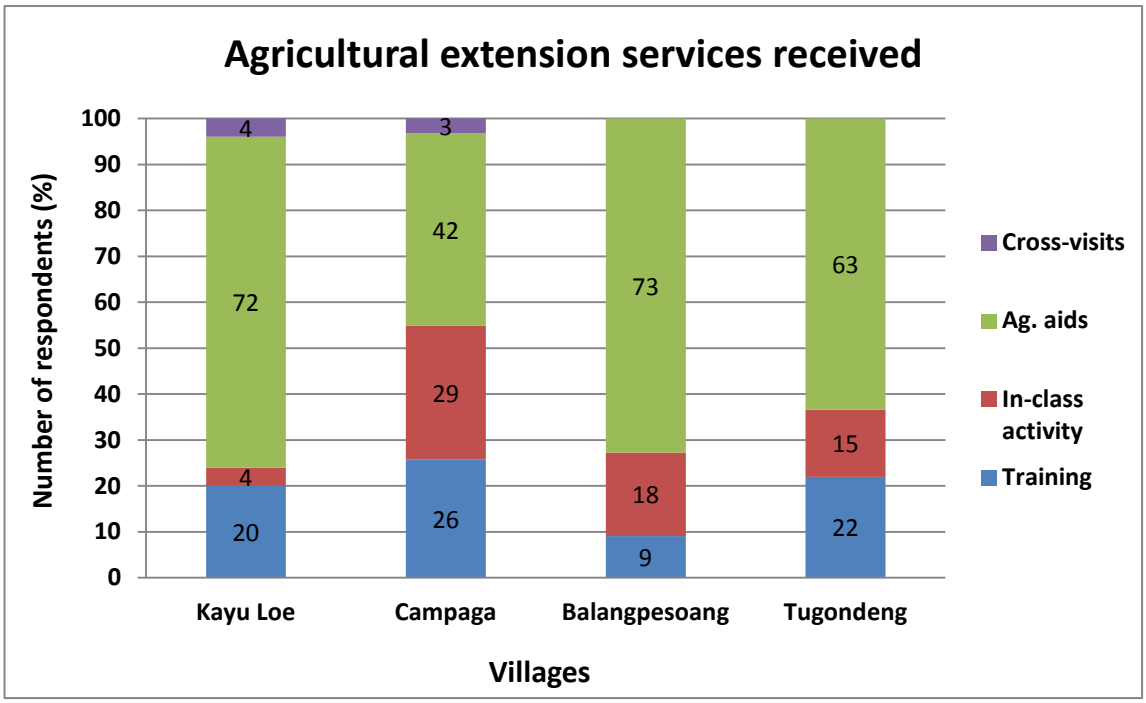

Figure 41. Types of agricultural extension services received by farmers in South Sulawesi

Table 41. Types of agricultural extension subjects provided to farmers in South Sulawesi

Villages	n	Types of agricultural extension subjects													
		Cacao		Fruit species		Timber trees		Vege-tables		Land manage-ment		Ag. inputs		Infor-mation	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%
Kayu Loe	25	1	4	0	0	5	20	16	64	1	4	0	0	2	8
Campaga	31	9	29	1	3	0	0	7	23	7	23	4	13	3	10
Balangpesoang	11	0	0	4	36	5	45	0	0	0	0	1	9	1	9
Tugondeng	41	14	34	1	2	16	39	6	15	0	0	3	7	1	2

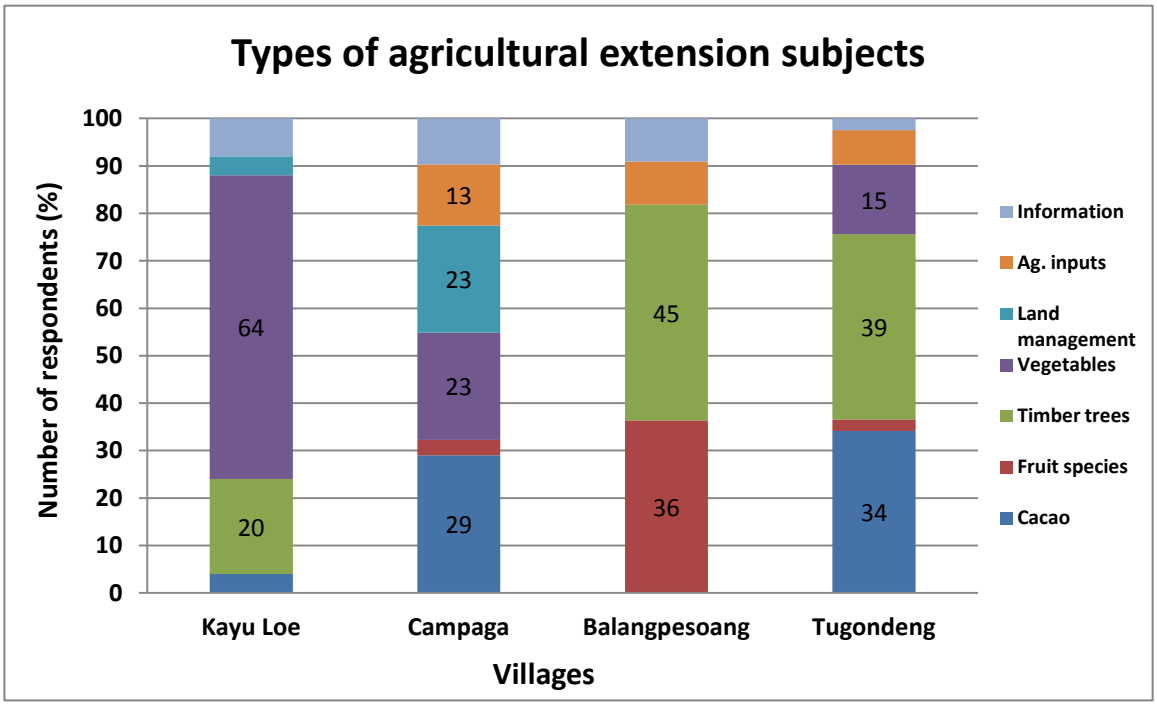

Figure 42. Types of agricultural extension subjects provided to farmers in South Sulawesi

Table 42. List of institutions that were sources of agricultural extension services in South Sulawesi

Villages	n	Sources of extension services received							
		Ag. gov agency		Forestry gov agency		Local NGOs		Private sector	
		n	%	n	%	n	%	n	%
Kayu Loe	25	18	72	5	20	1	4	1	4
Campaga	31	27	87	2	6	0	0	2	6
Balangpesoang	11	6	55	4	36	1	9	0	0
Tugondeng	41	22	54	17	41	0	0	2	5

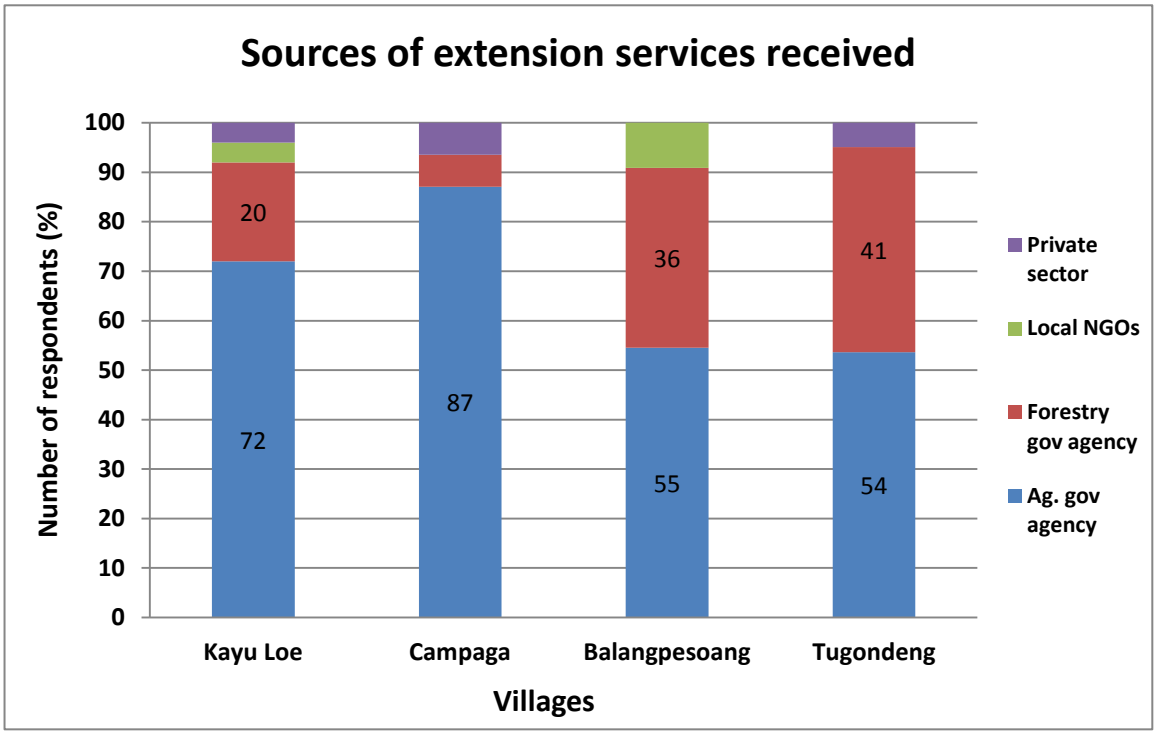

Figure 43. List of institutions that were sources of agricultural extension services in South Sulawesi

Table 43. Intensity of agricultural extension services received by farmers in South Sulawesi

Villages	n	Extension services received per year									
		≤ 2008		2009		2010		2011		2012	
		n	%	n	%	n	%	n	%	n	%
Kayu Loe	25	6	24	0	0	9	36	9	36	1	4
Campaga	31	7	23	3	10	2	6	14	45	5	16
Balangpesoang	11	4	36	4	36	2	18	1	9	0	0
Tugondeng	41	6	15	4	10	15	37	10	24	6	15

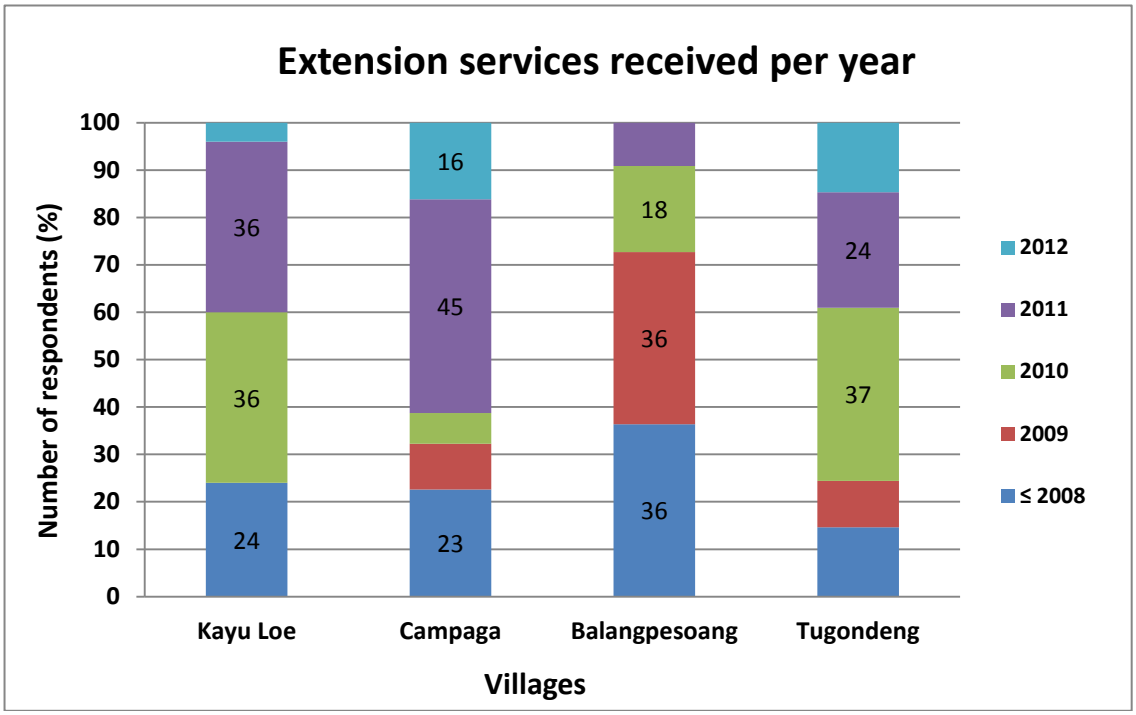

Figure 44. Intensity of agricultural extension services received by farmers in South Sulawesi

Table 44. Gender of farmers who registered to receive agricultural extension services in South Sulawesi

Villages	n	Agricultural extension service beneficiaries					
		Male		Female		Female and male	
		n	%	n	%	n	%
Kayu Loe	25	15	60	2	8	8	32
Campaga	31	20	65	1	3	10	32
Balangpesoang	11	10	91	0	0	1	9
Tugondeng	41	28	68	1	2	12	29

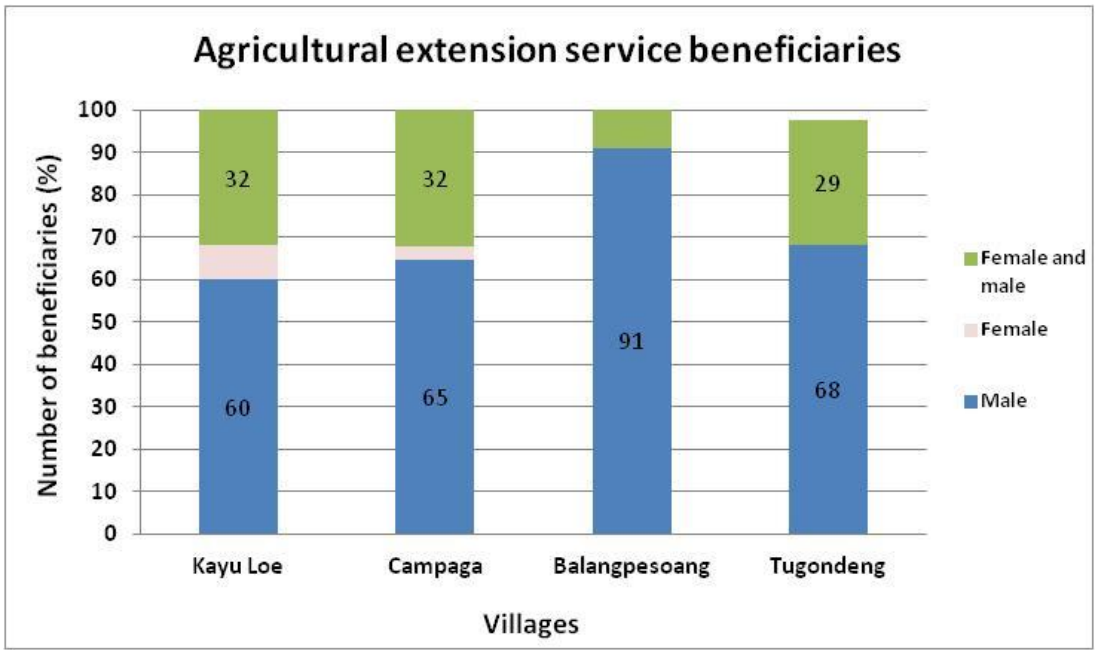

Figure 45. Gender of farmers who registered to receive agricultural extension services in South Sulawesi

Table 45. Level of advantages received by farmers from agricultural extension services in South Sulawesi

Villages	n	Benefits received from extension services					
		None		Few		Many	
		n	%	n	%	n	%
Kayu Loe	25	0	0	18	72	7	28
Campaga	31	1	3	15	48	15	48
Balangpesoang	11	0	0	11	100	0	0
Tugondeng	41	0	0	27	66	14	34

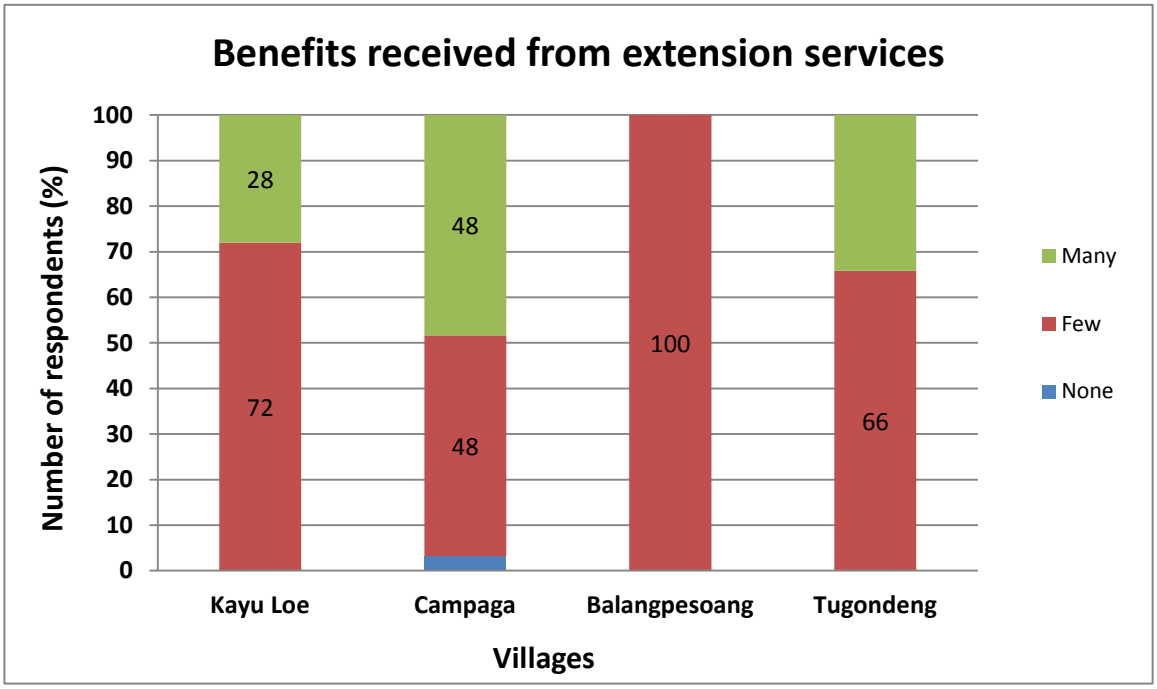

Figure 46. Level of advantages received by farmers from agricultural extension services in South Sulawesi

Table 46. Percentage of respondents who requested agricultural extension services in South Sulawesi

Villages	n	Requested agricultural technical services			
		Yes		No	
		n	%	n	%
Kayu Loe	30	20	67	10	33
Campaga	30	28	93	2	7
Balangpesoang	30	24	80	6	20
Tugondeng	30	30	100	0	0

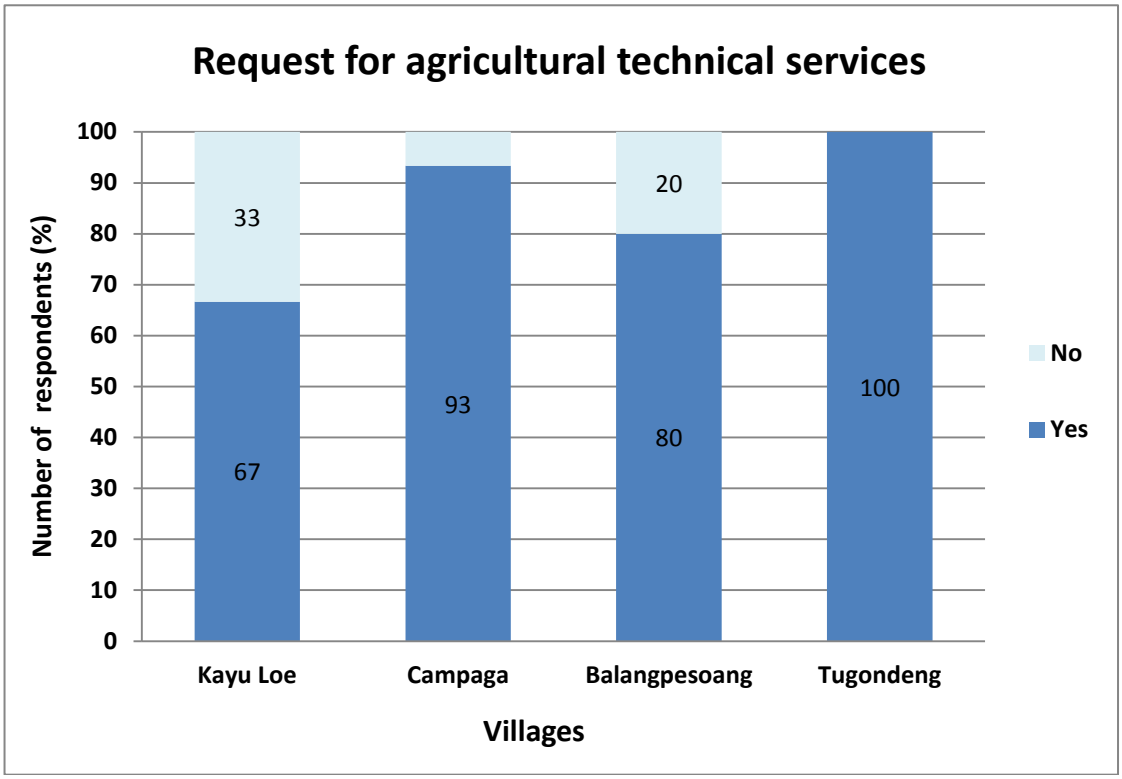

Figure 47. Percentage of respondents who requested agricultural extension services in South Sulawesi

Table 47. List of requested agricultural topics for in-class extension services in South Sulawesi

In-class topics	Number of respondents per village				Total respon-dents	Percent-age
	Kayu Loe	Campaga	Balang-pesoang	Tugon-deng		
Garden management	7	11	8	7	33	29.5
Cultivation	8	3	6	13	30	26.8
Pest and disease handling	0	10	2	5	17	15.2
Tree maintenance	1	4	7	2	14	12.5
Fertilizing technique		3	1	1	5	4.5
Agricultural information	1	1	1	1	4	3.6
Identification of superior varieties	2	1	0	1	4	3.6
Livestock management	0	2	0	0	2	1.8
Garden rejuvenation	0	0	0	1	1	0.9
Marketing	0	0	0	1	1	0.9
Organic fertilizer	1	0	0	0	1	0.9

Sources: Semi-structured interviews with n=30 respondents per village

Table 48. List of requested agricultural training topics for extension services in South Sulawesi

Training topics	Number of respondents per village				Total respon-dents	Percent-age
	Kayu Loe	Campaga	Balang-pesoang	Tugon-deng		
Garden management	6	4	9	8	27	25.7
Cultivation	8	6	0	10	24	22.9
Pest and disease handling	1	6	5	4	16	15.2
Tree maintenance	4	2	8	2	16	15.2
Nursery	1	5	1	0	7	6.7
Vegetative propagation	0	2	1	1	4	3.8
Post-harvest handling	0	1	0	2	3	2.9
Fertilizing techniques	0	0	2	0	2	1.9
Organic fertilizer	1	1	0	0	2	1.9
Livestock management	0	1	0	0	1	1
Farmer field school	0	1	0	0	1	1
Harvesting	0	0	0	1	1	1
Marketing	0	0	0	1	1	1

Sources: Semi-structured interviews with n=30 respondents per village

Table 49. List of species for planting materials requested by farmers for livelihood enhancement in South Sulawesi

Species requested	Number of respondents per village				Total respondents	Percentage
	Kayu Loe	Campaga	Balang-pesoang	Tugondeng		
Clove	25	14	7	1	47	19.7
Cacao	14	11	2	12	39	16.4
Maize	17	14	0	5	36	15.1
Rubber	0	0	3	16	19	8
Durian	2	6	10	0	18	7.6
Paddy	0	8	0	4	12	5
Coffee	11	0	0	0	11	4.6
Nutmeg	0	3	6	0	9	3.8
Mangosteen	0	1	6	0	7	2.9
Rambutan	1	3	2	1	7	2.9
Coconut	0	0	0	7	7	2.9
Potato	5	0	0	0	5	2.1
Apple	0	0	3	0	3	1.3
Onion	3	0	0	0	3	1.3
Gaharu	0	0	0	2	2	0.8
Longan	1	1	0	0	2	0.8
Teak	0	1	1	0	2	0.8
Gmelina	1	0	0	0	1	0.4
Lansium	0	0	1	0	1	0.4
Mahagony	0	0	1	0	1	0.4
Mango	0	1	0	0	1	0.4
Oil palm	0		0	1	1	0.4
Patchouli	1	0	0	0	1	0.4
Peanut	0	1	0	0	1	0.4
Pepper	0	0	1	0	1	0.4
Vegetables	0	1	0	0	1	0.4

Sources: Semi-structured interviews with n=30 respondents per village