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Social Cultural Characteristics of Farmers and Types of Plant Cultivated on Local Native Forage Sources in Kupang Regency

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ABSTRACT

The local native forage sources in Kupang Regency have their own specifications due to different management. This research is aimed at describing socio-cultural characteristics of farmers and the types of plant cultivated on local native forage sources planted in the farms in Kupang Regency. It was conducted in Oeletsala Village, Taebenu Sub-District, Kupang Regency from August 2015 to April 2017. The research method was survey, direct observation and measurement in the field as well as secondary data collection. The data were analyzed descriptively in the form of averages, tables and graphs. The results showed that amarasi farm were more widely distributed than dry mamar and selobua. Most of the farmers were at their productive age, have elementary school education, and 1-4 family members. The background of farming and the reasons for choosing the type of farms were varied. Likewise, the types of plants were also varied. Utilization of the types of plants have experienced a shift from conservation goals to multi-function. In amarasi, dry mamar and selobua farm were found 62, 77 and 53 types of plants. Forage which is commonly used at the farmer level were 13 species dominated by *Leucaena leucocephala*. While, 23 other commodities were not forage and they were harvested in certain seasons and for household needs. In conclusion, the farmers were at their productive age, with low education, and small family size. The background of establishing the farms and the reasons for choosing the type of farms varied. The types of plants have been shifted from conservation goals to being multi-purposes. The types of plants that were widely developed other than forage are dominated by food crops and horticulture. The three types farms can have a positive impact on feed and food security, source of farmer's income and land conservation.

Keywords: Amarasi farms, Dry mamar farms, Farmers, Forage crops, Local farms, Selobua

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Introduction

Beef cattle have contributed greatly to the income of farmers in East Nusa Tenggara as well as supplied national need for meat which is one of government program. Efforts to increase beef cattle production to support government program is hampered by limited forage. The problem of forage supply in livestock business is found everywhere. Various ways of solving the problem have been offered, but the results are far from expectations. This failure might be caused by inappropriate methods which did not consider agroecological factor, socio-cultural factor and benefit for the local community (Daka, 2000; Sutarayono *et al.*, 2010). In terms of socio-culture, the farmers still employ a traditional way to raising the cattle that has been passed from generation to generation. The farmers consider that raising cattle is a sideline business. Therefore, to meet feed usually use forage that can be found from the farms or surrounding land.

There are local wisdoms in several areas concerning forage crops for overcoming limited supply of cattle feed as a response to the climate, soil and social and cultural conditions of the community in the location. However, limited studies have been done to reveal it. For example, in Kupang Regency of East Nusa Tenggara Province, there were 14.2% of farmers did cattle fattening integrated with other farming activities (Pelokilla *et al.*, 2005). Farmers who fatten cattle in dry climate in Kupang Regency indicates have specific ways of supplying cattle feed. Some of the forage sources in Kupang Regency are found in farms. This is a local wisdom namely amarasi, dry mamar and selobua farms. These three types of farms have their own specifications due to different treatment or management. This is because each farmer has distinctive knowledge. Besides that it can also be caused by the background or history of the formation of the farms. Hence, this affects the diversity vegetation in the farms.

Leucaena leucocephala planted in amarasi farm in rows with close spacing. *Leucaena leucocephala* grows irregularly. Dry mamar is used to plant various long-lived plants including forage crops with irregular cropping patterns. Furthermore, selobua is a food crop farm with an intercropping pattern by including *Leucaena leucocephala* in each planting hole, then later the *Leucaena leucocephala* can be used as feed (Yuksel *et al.*, 1999; Roshetko and Mulawarman, 2002; Kapa, 2007; Sulistijo and Rosnah, 2014). Utilization these three types of forage sources in Kupang regency has been studied qualitatively by many researchers. However, quantitative research is limited and rarely discuss about socio-cultural characteristics and the types of crops. Limited information on this area especially about forage crops will lead to inaccurate information regarding farm capacity in meeting cattle feed needs. In return, this will cause uncertainty of information on energy availability and cattle growth which leads to income uncertainty. Therefore, to anticipate these problems, a study was conducted to describe the socio-cultural characteristics farmers of those three types offarms: amarasi, dry mamar and selobua along with the types of plant cultivated.

Materials and Methods

Location and time of research

This research was conducted in Oeletsala Village, Taebenu Sub-District, Kupang Regency from August 2015 to April 2017.

Research material

Materials used in this research were the owners of the target farms and locally owned forage source farm. The tools were a list of questions, a monitoring form for feeding the cattle and harvested crops, secondary data related to the focus of research.

Research method

The method applied in this research was survey. The data was collected through interview, direct observation and measurement in the field, and secondary data collection. The sample of farm owners was randomly selected. It was 213 households or 90% of 231 farm owners taken from the preliminary survey. Each selected respondent was interviewed using a list of questions that had been prepared to reveal social data, farm ownership and description of background or history of the farms. A monitoring form for feeding the cattle and harvesting the crops was used to obtain information about the types forage and the distribution of commodities other than forage by month from each type of farm. A direct measurement in the field was used to reveal types of plant cultivated in each farm.

The sample was selected purposively. It was 5% out of households who owned each type of farm and they also fattened cattle. Furthermore,

the farm sample was taken from interviewing the households. It was 5 (five) percent of each farm and it was used to identify the type of plants. Secondary data collection used various sources or from related departments.

Research variable

The variables observed in this study were: farm distribution and ownership, social characteristics including age, education level and family size, cultural characteristics including background or history of farms and the reasons for choosing the type of farm, types of plants in the farm, especially for forage and commodities other than forage to meet household needs.

Data analysis

The data were analyzed descriptively in the form of averages, tables and graphs.

Results and Discussion

Farm distribution and ownership for local native forage source

According to the size of fields, it was found that 55.93% of the total fields was housing and yards, permanent farms, wet mamar, cashew farms, rocks, shrubs, and others. The remaining 44.07% of the field was used for farming to grow forage crops according to their local wisdom. Figure 1 describes the distribution. It reveals that amarasi farm dominated the other two types of farms. The size of each farm was 304.4 Ha (31.39%), 51.19 Ha (5.28%) and 71.78 Ha (7.4%) respectively for amarasi, dry mamar and selobua farms. Some of the research sites (38%) had a slope of >8% and had the potential for landslides to occur. To anticipate this condition, *Leucaena leucocephala* was used for reforestation since the 1960s. The cropping method just duplicated the methods that has been used for generations in Amarasi region (Yuksel *et al.*, 1999). Along the way, the farm is called amarasi farm. Therefore, amarasi farms is wider than the other types of farms. On the other hand, selobua farm is narrower than the other types of farms because it was only developed in the 1990s. It was created by the community who lived one of the sub-villages that had bad soil conditions. On the other hand, they needed forage to feed the cattle.

There were 213 households (71.52%) owned farms that were used to grow forage crops. There were 648 farms which were divided into 363 fields of amarasi farms, 201 fields of dry mamar and 84 fields of selobua. Figure 2 describes the ownership of the farms. It shows that not all respondents had a combination of three types of farms. The combination of two farms were only owned by 109 households (51.17%), i.e. a combination of amarasi farm and dry mamar farm.

The size of the fields ranged from less than 0.5 Ha to 3 Ha and even more (up to 9.5 Ha). Table 1 shows the distribution of farm owners based on the size of the fields. It indicates that

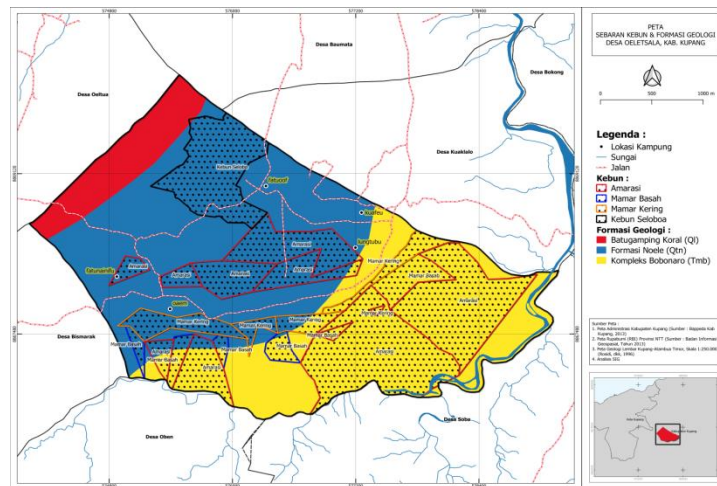


Figure 1. Map of the Distribution of types of forage source which is a local wisdom at the research site.

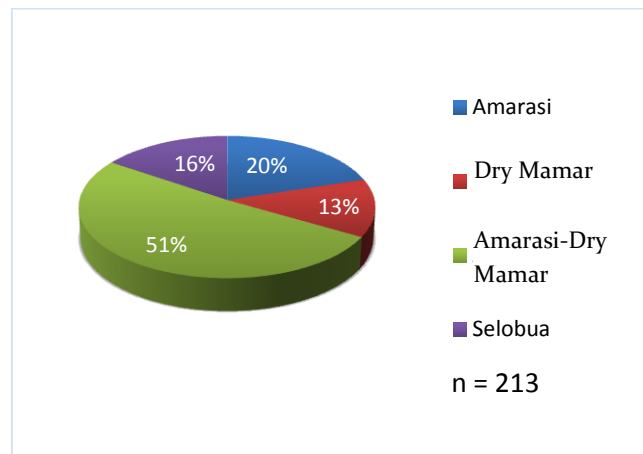


Figure 2. Distribution of households who owned local native forage source.

farmers who only had amarasi and dry mamar farms were often small farmers with the size of field less than 0.5 Ha (Sajogyo, 1977 *cit.* Mandang *et al.*, 2020). On the other hand, the size of combination farms such as amarasi farm and dry mamar or selobua farm is more than 1 ha. Households that own combination of amarasi farms and dry mamar farms generally have the kinship of the pioneers (first occupants of the area) and get involved in reforestation activities. Therefore, their land ownership is wider as a consequence of receiving more land distribution. The same thing happened to some of the households who own the selobua farms. The owner of the large selobua farms is also a family group that has a lineage with the first generation that came to the area where the farms were

developed. The size of the farms affected the amount of forage crops they produced. The wider the farms, the more forage they provide.

Social characteristics

The social characteristics of the respondents in this study were age, educational level and family size. This is described in the following Table 2.

The age of farmers in the research field ranged from 25 to 87 years old with an average of 53.23 ± 12.68 years old. Table 1 presents the distribution of farmers by age group. It shows that more than 67% of owners of amarasi, amarasi-dry mamar, and selobua farms were between 25 to 60 years old. This means that they were productive age farmers. On the other hand,

Table 1. Distribution of types of farms based on the size of the fields (%)

Type of Farms	Size of Fields (Ha)						
	up to 0.5	> 0.5-1	>1-1.5	>1.5-2	>2-2.5	>2.5-3	>3-9.5
Amarasi, n=43	51.16	20.93	9.30	4.65	0.00	2.33	11.63
Dry Mamar, n=28	75.00	21.43	0.00	0.00	0.00	0.00	3.57
Amarasi-Dry Mamar, =109	15.60	22.02	17.43	4.59	6.42	7.34	26.61
Selobua, n=33	27.27	18.18	15.15	6.06	9.09	3.03	21.21

Table 2. Distribution of age, education level and family size of research respondents based types of farms (%)

Social Characteristics	Farm Owners			
	Amarasi	Dry Mamar	ADM Combination*)	Selobua
Age group				
25-40 years old	18.60	7.14	22.02	15,15
41-60 years old	62.79	42.86	45.87	57.58
60-87 years old	18.60	50.00	32.11	27.27
Level of education				
Uneducated or Not Graduated from	13.95	7.14	18.35	9.09
Elementary School Elementary School Graduates	67.44	53.57	60.55	66.67
Junior High school graduates	4.65	25.00	12.84	6.06
Senior High School Graduates	9.30	10.71	6.42	12,12
University Graduates	4.65	3.57	1.83	6.06
Family size				
1 - 4 People	58.14	57.14	66.97	66.67
5 - 7 People	34.88	39.29	31.19	30,30
8 - 10 People	6.98	3.57	1.83	3.03

*) Combination of Amarasi and Dry Mamar Farms

farmers who owned dry mamar were between 25 - 60 years. The number of farmers between 25 - 60 years was as many as those who were more than 60 years.

The age of the head of the family will affects the ability to manage the farms or fatten the cattle. It is a crucial factor that determines the success of their farming business. Age will affect the efficiency of a business. Tukan *et al.* (2020) claim that farmers at their productive age have better ability to manage their cattle.

The education level of the respondents ranged from uneducated to tertiary education. Education serves to improve cognitive, affective and psychomotor skills. Table 2 shows that 81.39% of owners of amarasi farms, 60.71% owners of dry mamar, 78.90% owners of amarasi-dry mamar farms and 75.76% owners of selobua farms just graduated from Junior High School. This indicates that the level of education of the farmers were still low. Since they have low level of education, they might not able to understand or respond to various innovation and technology for managing farms as forage source and for fattening the cattle. Such conditions might lead to unexpected results (Tukan *et al.*, 2020). Although the owners of the farms have low formal education, they get exposed to informal education through training, counselling and so on. In addition, knowledge is passed down from ancestors and also comes from fellow farmers.

Family size describes how many family members in a household. The number of family members plays an important role in agricultural activities, especially for productive-age members. Family labor might assist to manage the farms and cattle. The results show that the respondents had a family of 1 to 10 (4 members in average). Three family members were at their productive age (25 to 60 years old). They are expected to assist the head of the family in cultivating farms or livestock.

Table 2 indicates that 57-58% of owners of amarasi farms and dry mamar farms had small

family. While, 66-67% farmers who owned amarasi-mamar farms and selobua farms had small family too. This makes the family had limited resources to meet the needs of cattle feed.

Background or history and reasons for starting farming

The background and process of starting amarasi, dry mamar and selobua farms were different. Amarasi, dry mamar and selobua farms were not started at the same time. The dry mamar farm was started before the other types of farms. This means that selobua farms was created the last. Dry mamar began by constructing "fences" in the 1950s. Fences were built to separate settlement from cattle. Fences were built also to protect plants in the settlement from cattle that grazing freely. Several years later, village officials and community leaders advised residents to plant various types of long-lived crops such as coconut, banana, bamboo, kapok and others inside the fences. Then, in the 1960s, residents who lived in irregular farm houses (the old village) were asked to move to a new village which was located (concentrated) around the roadside. Along the way, various plants around the fields were left to grow naturally and also used to feed the cattle. At certain times, farmers visit the fields to harvest plants that might be used to fulfill household needs. Generally, dry mamar has never been cleared to grow food crops. Based on these conditions, the vegetation of long-lived plants found in dry mamar farms were more than in other types of farms.

Amarasi farms were originally created for land conservation through reforestation. This is similar to amarasi farms developed by King Koroh 1930 in Amarasi Region (Yuksel *et al.*, 1999; Nulik *et al.*, 2000). In that reforestation program, *Leucaena leucocephala* was planted. Local *Leucaena leucocephala* was planted in the 1960s, *Leucaena leucocephala sub sp glabrata* was planted in the 1970s and 1980s. The targeted locations of the reforestation program were areas

that were prone to landslides and other locations including rocky areas. According to Yasa *et al.* (2011), *Leucaena leucocephala* is appropriate to be cultivated in the Amarasi farm because it is a conservation plant. It plays a key role to improve soil fertility. Besides, it is also used as a living fence because it can prevent erosion and drought resistance.

The tree stands in the amarasi farms, later on, will be cleared. The purpose of clearing is to harvest sufficient size stem of *Leucaena leucocephala* to make sticks. In addition, clearing is also aimed at opening new land for cultivating food crops. As in the dry mamar farms, plants in this farm will vary. In addition, *Leucaena leucocephala* stands which are the characteristic of amarasi farms found more in this farm than the other two farms. Currently, *Leucaena leucocephala* is the main forage for cattle fattened by farmer families in this area. They used it for 85.2% of the total ration (Rosnah and Yunus, 2018) or even up to 90% (Sulistijo *et al.*, 2021). This is because *Leucaena leucocephala* grows dominantly in the farm which is easily accessed (Bakrie *et al.*, 1996). In addition, *Leucaena leucocephala* contains high crude protein which ranges from 18.4% to 31.8% (Edwards *et al.*, 2012; Sulistijo *et al.*, 2020). It is above the recommended standard (12%) to meet the needs cattle (National Research Council, 2000; Smith, 2002).

Selobua farms were created purposively by the community in one of sub villages as a response to the land conditions. In addition to the rocky soil, the size of the farms in this sub-village is smaller than the other sub-villages. The field is expected to grow both food crops and forage crops. Recognizing limited size of fields and huge demand of forage, site specific food crops has been developed in the field since the 1990s. This model was developed from Salome model. The Salome model is a model for planting food crops by inserting corn, rice beans, pigeon peas and pumpkin seeds in one hole (Benu and Mudita, 2013; Sulistijo and Rosnah, 2015). The stages for preparing the selobua farms are similar to amarasi farms. To create selobua farms, *Leucaena leucocephala* seeds are also inserted to each planting hole. In certain parts of the farms, peanut seeds and cassava stems are also planted separately. *Leucaena leucocephala* that has grown can be used as forage source to in the future.

Along the way, this type of farm is cleared like amarasi farms to cultivate food crops again. Selobua farms are cleared more often than amarasi farms due to limited fields. Planting patterns and dynamics after creating the farms make us easily to find *Leucaena leucocephala*, food crops and other plants.

Currently, these three types of farms are local native forage sources for cattle fattened by farmer families in addition to other potential land. Table 3 describes the reasons for farmer families to maintain each type of farms.

Table 3 shows that the function of amarasi farms for conservation has shifted. Initially, the amarasi farms was built for conservation purposes (through a reforestation program). Along the way, it turned into multi-purposes farms to supply food (42.11%) and feed (89.47%). While, 24.34% of the field is expected to maintain conservation. The dry mamar farms are expected more to support family economy (56.93%), save money (long-lived plants) (47.45%), and feed (56.93%). According to the background of starting selobua farms, they were mostly cultivated to supply food (100%) and feed (100%). This is in accordance with the research conducted by Sulistijo and Rosnah (2015) which found that selobua farms did not only produce food crops for the farmer but also supported feed security for their livestock. Furthermore Epanchin-Niell *et al.* (2022), states that the shift in land function was influenced by perspectives on economics, sociology and psychology so that it can have an influence on the function of farm management.

Types forage in the local native farms

This study identified 62 plants in Amarasi Farms, 77 plants in Dry Mamar Farms and 53 in Selobua Farms. The social characteristics of the farmers of the three types of farms such age, education and family size were similar. Therefore, the variation of vegetation was caused more by the background or history of the establishment the farms as being described in the sub-discussion on the background or history and reasons for starting farming. These various types of plants can be used by the farmers to supply forage for the cattle (Table 4) and to food their family (Table 5).

Table 4 indicates that types of forage in these three types of farms are similar to what were found by previous researchers, both in

Table 3. Reasons for farmer families to cultivate Amarasi, Dry Mamar and Selobua Farms (%)

Reason/background	Type of farms		
	Amarasi (n=152)	Dry Mamar (n=137)	Selobua (n=33)
Food	42.11	30.66	100
Feed	89.47	56.93	100
Economy	25.66	56.93	36.36
Land optimization	5.26	16.79	60.61
Fertility	11.18	0	12.12
Conservation	24.34	1.46	0
Wooden stick	15.13	0	0
Long-lived plants/ trade/building (sold when needed)	9.87	47.45	0

Table 4. Types of forage to feed the cattle according to type farms and seasons

Forage	Types of farms and seasons to identify type of forage								
	Amarasi			Dry Mamar			Selobua		
	EDS	LDS	RS	EDS	LDS	RS	EDS	LDS	RS
Leguminous tree									
River tamarind (<i>L. leucocephala</i>)	[Shaded]								
River hemp (<i>Sesbania sesban</i>)	[Shaded]								
"Kabesak" (<i>A. leucophloea</i>)	[Shaded]								
Grass									
Natural grass*)	[Shaded]								
Non-leguminous trees									
"Kapok" (<i>Ceiba petandra</i>)	[Shaded]								
"Busi" (<i>Melochia umbellate</i>)	[Shaded]								
Ficus (<i>Ficus sp</i>)	[Shaded]								
"Timun" (<i>Timonius timun</i>)	[Shaded]								
"Fenu"	[Shaded]								
Food crops/horticulture									
Banana stem (<i>Musa paradisiaca</i>)	[Shaded]								
Peanut straw (<i>Arachis hypogea</i>)	[Shaded]								
Corn stalks (<i>Z. maize</i>)	[Shaded]								
Cassava stem/leaves (<i>Manihot esculenta</i>)	[Shaded]								

EDS: Early of Dry Season LDS: Late of Dry Season RS: Rainy Season
 *) includes red grass (*Sorghum timorensis*) and white grass (*Penisetum macrostachium*).

Table 5. Types of commodities other than forage and months of harvesting those three types of local native forage source

Commodities other than forage	Type of farms and month of harvesting each type of commodity		
	Amarasi	Dry Mamar	Selobua
Young/old corn	3, 4	-	3
Pumpkin fruit and shoots	1, 2, 3, 4, 5, 6, 7	-	2, 3, 4, 5, 6
Kindling	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	1, 2, 3, 4, 5, 6, 10, 11, 12	4, 5, 6, 7, 8, 9, 10, 11, 12
Wooden stick	2, 5, 6, 12	-	-
Cassava leaves	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	4, 5, 6, 7, 8, 9, 10, 11, 12
Cassava	5, 6, 7, 8, 9	-	5
Papaya fruit/flower/leaf	1, 2, 3, 4, 5, 7, 8, 12	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12	-
Young/dried coconut	1, 3, 4, 5, 6, 8, 9, 10, 11, 12	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	-
Rice beans	4, 5	-	4, 5
Pigeon peas	6, 7	5, 6	6
Peanuts	-	-	4, 5
Tamarind	7, 8, 9	7, 8	6, 7, 8
Flower of river hemp	-	5, 6, 7, 8	-
Banana fruit/blossom	-	Jan to Dec	-
Banana leaf	-	7, 12	-
Betel	-	8, 11	-
Moringa	-	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12	-
Bamboo shoots	-	1, 12	-
Bamboo	-	4, 7, 8, 12	-
Betel nut	-	8	-
Jackfruit	-	1, 6, 7, 8, 9, 10, 11	-
Mango	-	9, 10, 11, 12	-
Cashew	-	-	11

Notes: 1 is January, 2 is February, 3 is March, 4 is April, 5 is May, 6 is June, 7 is July, 8 is August, 9 is September, 10 is October, 11 is November, and 12 is December.

mainland Timor and its surroundings (Rosnah and Yunus, 2018) as well as in other areas such as Java Island (Handayanta *et al.*, 2014). These forage are easily found near the farmers settlement. Table 4 indicates that forage crops found in the three types of farms were in the class of legumes, grasses, non-leguminous tree and food/horticultural crops. The types of forage produced in Amarasi Farms were *L. leucocephala*, *S. sesban*, *A. leucophloea*, natural grass, *C. petandra*, *M. umbellate*, *Ficus sp.* and banana stem (*M. paradisiaca*). The types of forage produced in Dry Mamar were *L. leucocephala*, *S. sesban*, *A. leucophloea*, natural grass, *C. petandra*, *M. umbellate*, *Ficus sp.*, *T. timun*, banana stems (*M. paradisiaca*), peanut straw (*A. hypogea*), cassava leaves and stems (*M.*

esculenta). In Selobua farms, farmers cultivated *L. leucocephala*, *S. sesban*, natural grass, *C. petandra*, *M. umbellate*, "fenu", banana stems (*M. paradisiaca*), peanut straw (*A. hypogea*), and corn stalks (*Z. maize*) for forage. The dominant forage used from the three types of farms is *L. leucocephala* with the proportion in the ration reaching 90%. According to Handayani *et al.* (2021) *L. Leucocephala* can increase livestock production, supply feed and conserve the land. Yasa *et al.* (2011) also claimed that *L. leucocephala* was resistant to drought, contain high protein, and good for conservation to prevent erosion.

Table 5 shows that the types of commodities other than forage were dominated by food crops and horticulture. In addition, long-lived

plants were also found. Commodities other than forage that produced in amarasi farms were corn, pumpkin, firewood, stick wood, cassava, papaya, coconut, rice beans, flower of river hemp and tamarind. While in dry mamar farm, commodities other than forage produced include firewood, cassava leaves, papaya, coconut, pigeon peas, tamarind, flower of river hemp, banana blossom, banana leaf, betel, moringa, bamboo shoots, bamboo, betel nut, jackfruit and mango. Furthermore, commodities other than forage that produced in selobua farms were corn, pumpkin, firewood, cassava leaves, cassava, rice beans, pigeon peas, peanuts, tamarind and cashew nuts. Referring to several commodities other than forage, it indicates that the three types of farms can also produce several commodities to generate family income because they can sell some of crops or eat them as stated by Sulistijo and Rosnah (2015). The table also identifies several types of commodities found in those three types of farms. Some of the commodities were found only in two or one type of farms. Furthermore, seasonal plants or food crops were harvested in certain month. While, other types of commodities might be harvested throughout the year in an irregular pattern. The commodities produced in one type of farm at certain time depends on household needs and crops planted in the farm. The three types of farms which are the local wisdom have a positive impact on food security, household income, forage source and land conservation. According to Epanchin-Niell *et al.* (2022) the shift in land function and the influence of plants planted in farms which are generally as conservation lands are influenced by economic, sociological and psychological factors. Hence, decision makers play important role to influence the farm owners.

Conclusions

In terms of social characteristics, the farmers on local native forage sources in Kupang Regency were at their productive age and are low level of education. They have one to four members of the family. Cultural characteristics related to the background of establishing the farms, the reasons for choosing the type of farms varied, the types of plants have been shifted. Initially, the farms were established for conservation. However, it has been shifted to multi-purposes farms. Amarasi farms is not only for conservation but also for food and forage sources. Dry Mamar farms is cultivated for earning money, savings and feed. While, the Selobua farms was mostly used for food and feed. The types of plants that were widely developed other than forage sources are food crops and horticulture. The types forage produced in Amarasi farms were *L. leucocephala*, *S. sesban*, *A. leucophloea*, natural grass, *C. petandra*, *M. umbellate*, *Ficus sp.* and banana stem (*M. paradisiaca*). Other commodities besides forage were corn, pumpkin, firewood, stick wood,

cassava, papaya, coconut, rice beans, flower of river hemp and tamarind. The types of forage produced in Dry Mamar farm were *L. leucocephala*, *S. sesban*, *A. leucophloea*, natural grass, *C. petandra*, *M. umbellate*, *Ficus sp.*, *T. timun*, banana stems (*M. paradisiaca*), peanut straw (*A. hypogea*), cassava leaves and stems (*M. esculenta*). While, several commodities were also produced here such as firewood, cassava leaves, papaya, coconut, pigeon peas, tamarind, flower of river hemp, banana blossoms, banana leaves, betel, moringa, bamboo shoots, bamboo, betel nut, jackfruit, and mango. In Selobua farms, farmers cultivated *L. leucocephala*, *S. sesban*, natural grass, *C. petandra*, *M. umbellate*, "fenu", banana stems (*M. paradisiaca*), peanut straw (*A. hypogea*), and corn stalks (*Z. maize*) for forage. Other commodities were also produced there such as corn, pumpkin, firewood, cassava leaves, cassava, rice beans, pigeon peas, peanuts, tamarind and cashew nuts. *L. leucocephala* was the main forage from those three types of farms. The three types farms which were local wisdom have been contributed to food security, source of farmer's income, forage sources and land conservation.

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