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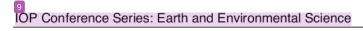
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Understanding the farming systems and cattle production in Tanah Laut, South Kalimantan

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Understanding the farming systems and cattle production in Tanah Laut, South Kalimantan

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Abstract. The Government of Indonesia has been promoting crop and cattle integration in several provinces to increase local cattle supply and reduce the reliance on imports. Tanah Laut district in South Kalimantan was one of those sites selected. Despite being the major cattle producer, more than 50% of beef demand in Tanah Laut district is met by imported frozen beef , and live cattle imports from interisland. This paper examined how the farming systems in Tanah Laut, including cattle production, have been shaped by technical, agro-climatic, socioeconomic and institutional factors. The main method used is informant interviews with farmer group leaders. Key results are: cattle is the main source of income; the cattle distribution program provided the initial breeding stock, but inadequate technical and extension support and inconsistent development programs have resulted in slow cattle population growth; Javanese and Balinese migrants were more inclined to adopt new technology; and women are involved in various farming activities, but their contribution is not acknowledged. The implication is that better understanding of farming systems and underlying socioeconomic and institutional factors is necessary for better development policies to increase local beef supply, as well as facilitating adoption and scaling out of improved technology.

1. Introduction

Demand for beef in Indonesia has been increasing due to growth in population and household income. However, demand has been outstripping supply, and the self-sufficiency ratio at the national level hovers around 65% in the past 10 years. That is, 30-40% of beef has been met by imports, mainly live cattle and frozen beef from overseas. To increase local cattle supply and reduce the reliance on imports, the Government of Indonesia has been promoting crop and cattle integration in 11 provinces since 2002. Tanah Laut district in South Kalimantan was one of those sites selected, and with mixed results. One the one hand, it was considered successful in terms of the increase in cattle population, but on the other hand not so successful in terms of achieving self-sufficiency. More than 50% of total demand in the district is met by live cattle imports from other provinces such as NTT, NTB, East Java and Sulawesi, and frozen beef from overseas. The objective of this paper is to examine how, and to what extent, the farming systems in Tanah Laut, which include cattle production, have been shaped by technical, agro-climatic, socioeconomic and institutional factors. Tanah Laut was chosen because it is

the major cattle producer in the province, and because it is diverse in terms of agro-ecology, farming system, and social and cultural characteristics that is ideal for comparative analysis.

2. Material and method

This study is based on a farming systems approach. Farming systems are determined by the biological, physical, economic, political and cultural environment in which they live, and over which they often only have limited control [1]. The Farming Systems Approach recognizes the heterogeneity that exists within such broad systems and offers a basis for comparative analysis. The method used in the initial investigation is based mainly on informant interviews. Three farmer groups were visited and their leaders were interviewed based on a semi-structured questionnaire. The questions focused on group formation, farming systems, income sources, cattle production and cattle marketing, as well as issues and opportunities facing them.

3. Results and discussion

The province of South Kalimantan consists of 13 districts and 4 million people, with Banjarmasin as the capital city. Tanah Laut, 65 km from Banjarmasin, is a district with high cattle population, and it has a large, and the only, cattle market in Kalimantan. The availability of cattle market in Tanah Laut supports the cattle distribution from NTB, NTT, East Java, and Sulawesi to South Kalimantan and other provinces in Kalimantan. Tanah Laut district has 11 sub-districts, with a human population of 340,909 people in 2018. The district is an agriculture dominated area, which consists of 205,847 ha of dryland and 81,836 ha of wetland [2]. For food crops, there are rice, corn, soybean and peanut, and for plantation crops, there are oil palm and rubber. The district is also socially and culturally diverse as a result of transmigration.

3.1. Cattle production

Cattle is a main component of the farming system in Tanah Laut. In 2017, it has 75,642 head of cattle, accounting for 46% of total cattle population in Kalimantan Selatan [2]. Main cattle areas are: Tambang Ulang, Batu Ampar, and Panyipatan sub-districts (Table 1).

Table 1. Beef cattle population in Kalimantan Selatan by district/city

No	District/City	2012	2013	2014	2015	2016	2017
1	Tanah Laut	62,235	51,190	56,571	61,225	65,289	75,642
2	Kotabaru	10,670	11,954	13,236	14,667	15,363	14,394
3	Banjar	19,605	16,228	16,645	16,700	17,388	17,980
4	Barito Kuala	7,226	7,608	7,864	8,119	8,464	8,546
5	Tapin	8,863	5,894	6,240	6,484	6,638	6,751
6	Hulu Sungai Selatan	4,630	4,550	4,689	4,836	5,211	5,136
7	Hulu Sungai Tengah	8,636	5,821	6,062	6,190	6,388	6,604
8	Hulu Sungai Utara	758	769	771	715	641	757
9	Tabalong	5,647	4,281	3,985	3,171	3,658	3,320
10	Tanah Bumbu	19,131	17,966	19,864	21,192	20,484	20,416
11	Balangan	2,131	1,719	1,766	2,017	2,043	2,084
12	Kota Banjarmasin	729	969	1,323	722	312	222
13	Kota Banjarbaru	2,234	2,784	2,430	2,258	2,268	2,367
	Total	152,495	131,733	141,446	148,296	154,147	164,219

Main problem in raising cattle in Tanah Laut is insufficient feed supply during the dry season, which can be three months long [3]. At a minimum, feed supply can be increased through better utilisation of crop residues, such as rice straw, corn stalk, and palm fronds and leaves, as well as agro-industry by-products, such as rice bran, tofu waste and palm kernel cake. At a higher level, the performance of the whole farm can be improved through better integration of crop and livestock [4]. However, utilisation of by-products and livestock-crop integration have not been maximised despite some successful trials. One reason is that technology adoption by smallholder farmers is a complex issue and is often constrained by both technical, economic and human factors [5]. The results from cattle crop integration projects show that adoption of technology tends to be higher with transmigrants from Java Island than local Banjarnese. It seems that not only do the locals have no cattle farming tradition, and therefore lack of livestock keeping knowledge and experiences, but also they do not have the same level of motivation to change as the migrants.

3.2. Farmer groups
Main characteristics of the three farmer groups studied in Tanah Laut are summarised in Table 2.

Table 2. Main characteristics of farmer groups, Tanah Laut district

Characteristics	Farmer groups		
	Bunga Mawar	Budidaya	Wisma Nugraha
Location	Kuringkit village	Pulosari village	Durian Bungkuk village
Agro-ecology	Dry land and wet land	Dry land	Dry Land
Ethnicity	Banjarese	Banjarese /Javanese	Javanese
Main crops	Corn and rice	Corn	Rice and rubber
Cattle number in the village	740	372	850
Cattle production system	Extensive	Intensive	Intensive
Main cattle breeds	Bali cattle, Bali Cross, exotic breeds	Exotic breeds, Bali cattle	Bali cattle, exotic breeds
Cattle as a major source of income	No	Yes	No
The use of crop residues as feed	+	++	++
Technology adoption	-	++	+
Female involvement in farming activities	++	++	+

3.2.1. Bunga Mawar Group, Kuringkit Village. It has as many as 20 members. This group was formed in 2004 and officially registered in 2008. The purpose of establishing the groups was to increase and share knowledge. The commodities cultivated are rice (superior and local cultivars), maize, cattle, vegetables, oil palm, rubber and sweet corn. Each farmer has on average 2 ha of land for rice cultivation and 1-3 ha for corn. The group also leases land (100 ha) from Inhutani (a government-owned plantation company) to cultivate maize for livestock feed. Cattle ownership is about 2 head per farm household. Total number of cattle in the village is around 740. Cattle are raised mainly in an extensive system. Cattle breeds are Bali, PO and a small number of crossbreeds. Most cattle are raised for breeding purposes (75%) and the remaining for fattening (25%). The reason for raising cattle is "for savings", and therefore, cattle are sold when the farmer needs cash. The income from raising cattle makes up around 25% of total household incomes.

The problems faced by the farmer are the availability of feed in the dry season and lack of quality breeding stock. Crop residues has not been used as feed, The role of women in raising cattle is to find

grasses, take cattle out for grazing and bring them back to the pen, feed the cattle and give water to cattle.

3.2.2. Budidaya Group, Pulausari Village. The group was formed in 2012 with a total of 28 members. The motivations for group formation were to use it as a venue for discussion, knowledge sharing, and to coordinate and get assistance from the government. Farming systems include oil palm (1.5 ha), rubber (1.5 ha), corn (2-10 ha), cattle (5 head) and fish. While rubber and oil palm provide regular incomes, cattle are used as a savings device. The available agricultural by-products are rice straw, rice bran, corn cob, corn husk, corn stalks, cassava stems, palm fronds, and empty fruit bunches from oil palm. Cattle manure has been used on oil palm plantation and corn field, and some is sold at Rp. 6,000/sack. While the village has 372 head of cattle in total, 250 of which belong to the group. Sixty-five percent of which are for breeding and 35% for fattening. Most cattle (about 70%) are exotic breeds (Limousin, Simmental), and 30% are local br eeds (Bali and PO). Exotic breeds are considered more profitable than local breeds. Farmers prefer exotic breeds because the selling price is much higher. Farmers prefer to raise breeding cows is because it requires less capital, and they can keep the animals for a long time . Cow-calf is also cheaper to operate than fattening, which requires more grasses and supplementary feeding.

Problems in raising cattle are: the availability of feed during the dry season, the decreases in cattle selling price due to the entry of live cattle from interislands, and the dystocia. The role of women in cattle business is mainly on feeding and providing drinking water, and looking for forage, which accounts for 40% of their time. Women are also involved in corn cultivation, such as planting, fertilizing and harvesting (20%). The involvement of women in rubber farming is 15%, mainly for tapping. All marketing is done by men.

Table 3. Cropping patterns and farming systems

	Location/Farming System	%
Budidaya	Desa Pulosari	
1	Oil palm + Cattle	30
2	Corn – corn + Oil palm + Cattle	20
3	Rice + Rubber + Cattle	15
4	Corn – Corn + Rice + Oil palm + Rubber + Cattle	15
5	Rice + Vegetable + Oil palm+ Cattle	10
6	Corn – Corn + Rubber + Oil palm + Cattle	5
7	Corn – Corn + Rubber + Cattle + Chicken	5
Bunga Mawar	Desa Kuringkit	
1	Rice + Cattle	50
2	Rice – Rice + Corn – Corn + Cattle	30
3	Rice + Vegetable + Cattle	15
4	Rice- Rice + Corn + Rubber + Oil palm	5
Wisma Nugraha	Desa Durian Bungkuk	
1	Cattle + Rubber + Rice	35
2	Cattle + Rubber	25
3	Rubber + Rice	14
4	Cattle + Chicken + Rubber	10
5	Rubber + Goat	10
6	Vegetable + Rubber + Chicken	5
7	Rubber + Oil palm	1

3.2.3. Wisma Nugraha, Durian Bungkuk village. Durian Bungkuk village was established in 1976 through a transmigration program. In the very beginning, the community was given 100 ha of land in total, plus cows and seeds for planting rice, clove, banana and cassava, as well as a one-year of guarantee in food supply. In 1983, they received some Brahman cattle from a program funded by the

Asian Development Bank. In 1993, there was a policy shift from the original upland rice farming to rubber plantation. As a result, the size of the rice field was reduced from the original 100 ha to 51 ha, and cattle population was reduced from 1500 head in 1990 to approximately 850 head now. The main breed of cattle is Bali cattle (80%), and the rest are Limousin and Simmental. In 2004, the village again received 100 head of cattle from the local government. From 2009 to now, they have received several farming equipment, including rice thresher, tractor, rice seeds, cultivator, and water pump. In 2013, the Wisma Nugraha group received another 10 cows, plus buildings and equipment for processing manure.

The main issues in cattle production are lack of feed in the dry season, and diseases, especially Bovine Ephemeral Fever (BEF). Rice is planted twice a year, first season is from December to April, and second season in May-August. Rice (Ciherang and Mekongga) are planted on 0.25-1 ha of land. In addition, each household in the village also has cattle (2-5 head), rubber (1.5 ha), vegetables (1 borong), and chicken.

3.3. Farming systems
Based on discussions with farmer groups in three villages in Tanah Laut, we found that the farming systems employed are diverse, but also with commonality. Farming systems and cropping patterns in the three villages studied are shown in Table 3.

In the Pulausari village, the most dominant farming system is oil palm and cattle, accounting for 30% of all farming systems combined. In Kuringkit, it is rice and cattle (50%) and in Durian Bungkuk, it is cattle, rice and rubber (35%). Overall, the farming systems in Pulosari and Durian Bungkuk are more diversified, than that of Kuringkit.

The discussions indicated that the farming systems have been changing, driven both by government policies and by relative commodity prices. For example, some farmers have switched from rice and rubber to oil palm because the latter is more profitable, and less labour intensive. These changes has a negative impact on cattle production, such as cattle ownership has been reduced from 5 to 2 head per household because of reductions in grazing land and pasture. As a result, in some areas, crop/cattle farming has become secondary to oil palm production as an income source. Given that the oil palm and rubber prices are subject to the vagaries of the international market, the longer term impact of the new farming systems on cattle production and farmers' livelihoods needs more investigation.

4. Conclusion
The farming system in Tanah Laut is diverse, ranging from 4-7 different systems per village. Cattle is a main component of farming systems, and contributing to approximately 25% of total household incomes. Women play a key role in the farming systems, but is restricted to laborious and unskilled work. Better understanding of farming systems and underlying socioeconomic and institutional factors will help produce better-informed development policies to improve local beef supply, as well as facilitate adoption and scaling out of production technology.

References
[1]   Dixon J, Gulliver A, and Gibbon D 2001 *Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World* (Washington: FAO and World Bank)
[2]   BPS Provinsi Kalimantan Selatan 2018 *Kalimantan Selatan Province in Figure 2018* (Banjarbaru: BPS Provinsi Kalimantan Selatan)
[3]   Rohaeni E S 2014 *Proceedings of the National Seminar of Specific Location Technology Agricultural Innovation* (Banjarbaru) pp 493-501

[4]   Widiati R., Santosa K A, Widodo S and Masyhuri 2002 *Agro Economy* **9** 65–79
[5]   Rogers, E M 1983 *Diffusion of Innovations* (New York: Free Press)

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