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Social Changes in the Development of Beef Cattle in Oil Palm Plantation Areas: Case of Jayakarta Village, Central Bengkulu Regency

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ABSTRACT

The development of beef cattle production requires social interaction in the context of space and time. The development of beef cattle areas cannot be separated from the dynamics of social change that occur at the microlevel in the rural areas, making it interesting to study. This research aims to analyze the factors that played a role in the development of the beef cattle population in Jayakarta Village, Talang Empat Subdistrict, Central Bengkulu Regency, between 1972 and 2022. Data was collected through in-depth interviews involving key informants using the snowball method and then analyzed using an interactive method with a social change theory approach to aspects of structural and cultural change in rural communities. The research results show that the development of beef cattle is caused by the gradual production and reproduction of various cattle-rearing systems. The development of the beef cattle population is encouraged through the Government Livestock Program and the massive expansion of oil palm plantations, especially by private plantations that provide a source of cattle feed in plantation areas. Structural changes led to the formation of a semi-intensive rearing system starting in 2010 and an extensive rearing system that started in 2013, causing a change in the culture of rural community beef cattle rearing system, which was initially only intensive.

Keywords: beef cattle, rearing systems, production area, social change

INTRODUCTION

An agricultural production area refers to an area that has the comparative advantage of producing specific agricultural commodities. For small-scale agriculture, production areas are formed due to agricultural intensification and extensification as a response to the lack of natural resources and economic vulnerability of rural communities (Marinus et al., 2023). Although it does not contribute significantly to the macroeconomic structure, the development of the smallholder agriculture sector plays a major role in reducing poverty levels in rural areas (Susilastuti, 2018). Smallholder beef cattle production areas in Indonesia are scattered in many regions and are highly dependent on the use of family labor (Gayatri et al., 2016). Beef cattle rearing in Indonesia is dominated by small-scale farmers (Agus & Widi, 2018) as a part-time business (Ishak et al., 2020), because it lacks an agribusiness orientation (Rusdiana et al., 2018). However, the beef cattle rearing business survives even though it is not agri-business oriented (Nendissa et al., 2019). Production areas require more technological innovation, particularly in the provision of feed (Baba et al., 2019; Mashur et al., 2022). In areas with potential grazing land to support natural feed availability, the extensification of beef cattle rearing is an option that will be more profitable for farmers and form a crop-livestock integration system (Ates et al., 2018). An example is the integration of cattle with oil palms (Agus & Widi, 2018). Integration of cattle with oil palm can be performed in various rearing systems, whether intensive, semi-intensive, or extensive (Silalahi et al., 2018).

The capacity of farmers to supply beef cattle feed determines the variety of intensive, semi-intensive, or extensive beef cattle-rearing methods (Romjali, 2019). In intensive rearing techniques, farmers must continuously provide feed to their livestock, while they are penned all the time. Cattles raised using a semi-intensive system were kept at night and grazed under close supervision during the day. In an extensive rearing system, livestock is continuously left free of grazing land. Each of these three maintenance systems has both positive and negative effects. Controlling the condition of cows in an intensive rearing system requires relatively higher costs and labor contributions compared to the other two rearing systems. In this case, the limited capital capacity makes it difficult for farmers to increase the scale of livestock rearing using an intensive rearing system. Nearly 95% of the beef cattle population in Indonesia is raised by 4.73 million farming households with a rearing scale of between two and four heads (Suganda et al., 2022) with an intensive rearing system. The contribution of beef cattle income to farming households ranges from 15 to 36% (Hartono & Rohaeni, 2014; Kapa et al., 2018).

The development of smallholder beef cattle production areas needs to be carried out with a suitable strategy so that the process is more sustainable by considering the technical conditions of livestock cultivation, the socio-economic and cultural context of farmers, and the utilization of potential natural resources and the environment. Technically, beef cattle feed is important because it contributes the highest to variable costs in beef cattle production, in addition to the cost of purchasing livestock (Achmad et al., 2019). Better quality of feed will accelerate the growth of beef cattle (Cowley et al., 2020). Besides feed management, the development of beef cattle populations in production areas is also influenced by the application of reproductive technology, animal health, and farm management (Burrow, 2019).

The use of agricultural waste as cattle feed allows for the intensive integration of livestock with crops. If grazing areas are available, integration can be conducted in an extensive rearing system (Burrow, 2019). The availability of extensive grazing land allows farmers to implement semi-intensive and extensive rearing systems to maintain a large number of beef cattle compared to intensive rearing systems. Oil palm agricultural areas are one option that can be used as grazing lands for beef cattle (Bremer et al., 2022a). Indonesia has the comparative advantage of being the country with the largest oil palm plantations in the world (Gaveau et al., 2022). The vast area of palm oil plantations has the potential to be utilized in cattle-oil palm integration systems in large areas. This could form an area of beef cattle production. Beef cattle can utilize understory plants as feed in oil palm plantations (Firison et al. 2019). Such integration will increase the production of palm oil plantations and reduce fertilization and weeding costs (Miswarti et al., 2021).

Various studies on beef cattle development in Indonesia have revealed that technology plays an important role in increasing livestock populations, especially in feed technology innovations (Baba et al., 2019; Mashur et al., 2022). Feed is an important limiting factor for livestock development (Dahlanuddin et al., 2017; Marisa & Sitepu, 2020). Therefore, feed technology innovation should aim to reduce production costs. The integration of cattle with oil palm is an alternative innovation in

livestock development that utilizes feed potential on plantation lands (Agus & Widi, 2018; Rusdiana et al., 2018; Silalahi et al., 2018). The profitability of livestock businesses can be improved by integrating livestock with crops (Asikin et al., 2020; Ates et al., 2018). The development of beef cattle production areas requires government support and the active participation of farmers (Gayatri & Vaarst, 2015) by involving local institutions and local culture (Williams et al., 2022) oriented towards farmer empowerment (Agus & Widi, 2018; Gayatri et al., 2016). Farmer empowerment increases due to the development of social relations internally in group organizations and externally with the social environment in beef cattle raising (Rustinsyah, 2019).

Research results regarding the development of beef cattle on palm oil plantations have not yet discussed the development of livestock populations from the aspect of social changes experienced by the community in a specific village area over a certain period. The development of livestock production areas is often only seen in the important roles of technology (Firison et al, 2019; Miswarti et al., 2021), economic development (Kapa et al., 2018; Achmad et al., 2019; Asikin et al; 2020), breeder institutions (Rustinsyah, 2019; Ishak et al., 2020; Suganda et al. 2022), and the importance of government policy (Agus & Eidi, 2018; Gayatri et al., 2016). Therefore, social changes in beef cattle production areas on palm oil plantations, such as those in this research locus, are interesting to enrich the study of beef cattle development from a social perspective. This can be an input for policymakers to formulate beef cattle development strategies by considering the social and cultural aspects of the community.

Social change is defined as the transformation that occurs in society over a certain period (Sztompka, 2010). Changes in rural communities in Indonesia cannot be separated from various aspects related to socioeconomic conditions, which cause changes in community structure and culture. Population growth, environmental changes, interactions with other societies, and the use of technology are some of the variables that contribute to social change (Wilterdink & Form, 2024). This is partly because of social conflict (Kinsep, 2021), ecological changes, capital expansion (Dharmawan et al., 2020), the use of technological innovation (Fahmi & Sari, 2020), and government program intervention (Kania et al., 2021). Changes in agricultural communities include changes in cultural values, livelihoods, social organizations, mindsets, and individual behavior in society (Marlianawati et al., 2019). In addition, changes in agricultural communities take the form of changes in agricultural production systems and agrarian changes (Ningrum, 2019).

Research is necessary to understand social changes in the development of beef cattle production from a sociological perspective that has not been extensively explored in previous studies. The research was carried out in Jayakarta Village because the village communities have been able to develop beef cattle with various rearing systems in the oil palm plantation area in the last 50 years. Thus, this study aimed to analyze the factors that played a role in the development of the beef cattle population in Jayakarta Village, Talang Empat Subdistrict, Central Bengkulu Regency between 1972 and 2022.

METHODS

This study uses a constructivist paradigm that seeks information from farmers as research subjects. The constructivist paradigm subjectively explores social reality (Pilarska, 2021). This study was conducted using a qualitative approach through case studies in Jayakarta Village, Talang Empat Subdistrict, and Central Bengkulu Regency. The choice of research location was deliberately done because in this village, farmers implement various beef cattle rearing systems (intensive, semi-intensive, and extensive)

Table 1. Research informants and interview topics

No.	Informants	Interview topics
1.	Agricultural extension worker	Government facilitation in developing beef cattle population
2.	Hamlet Head	Community interaction in rearing cattle
3.	Traditional Leader	Village history, oil palm expansion, patterns of cattle profit sharing in President Instruction for Rural Area Program (Inpres Desa Tertinggal / IDT Program)
4.	Public figure, Head of Farmers Group	Patterns of cattle profit sharing in Cattle–Oil Palm Integration Program
5.	Cattle trader, Head of Farmers Group	Cattle sales, patterns of cattle profit sharing in Affinity Program
6.	Cattle farmers	Beef cattle rearing system

and become beef cattle production centers in the Talang Empat Subdistrict. Field data collection was carried out from March to May 2023 through in-depth interviews with key informants, who were determined using the snowball technique. Table 1 lists the informants and interview topics (page 123).

The data coding process adapted from Saldaña (2013) divided categories based on codes adjusted to the research topic and theory used. Cultural and structural changes are two categories for describing the establishment of a beef cattle production area in Jayakarta Village. The cultural change category consisted of two codes: changes in the beef cattle rearing system and community interactions in the cattle profit sharing system. Meanwhile, structural changes were made into three codes, namely village development through the establishment of beef cattle production areas, expansion of oil palm plantations, and cattle development programs by the government. The data-coding technique is illustrated in Fig. 1.

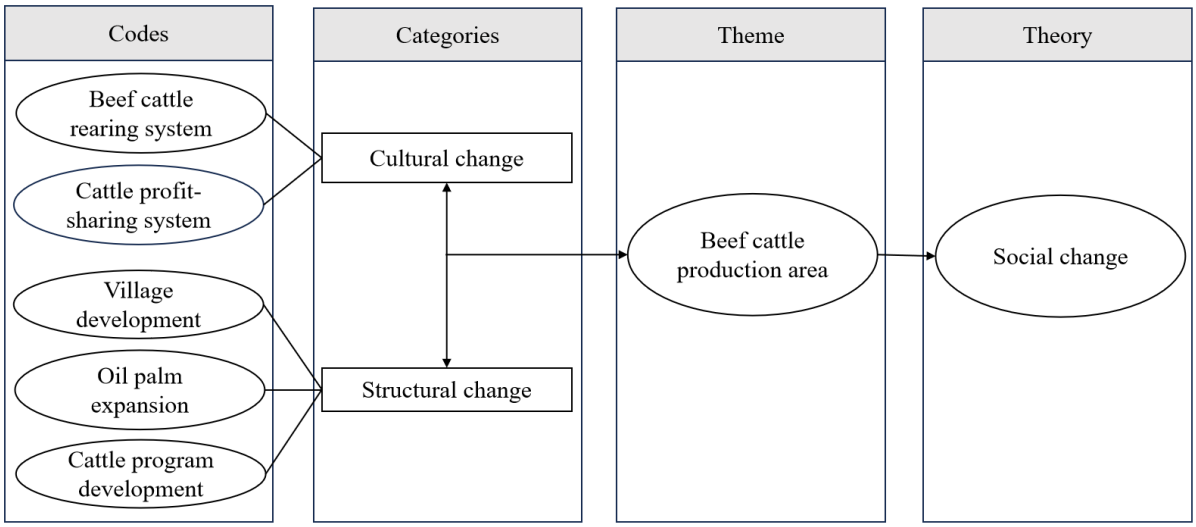

Figure 1. Research data coding (adapted from Saldaña, 2013)

The interview data were analyzed using the Miles and Huberman interactive model (Miles et al., 2014). Data collection was analyzed through reduction and presentation to produce the conclusion. Data collection, reduction, and presentation were repeated if the conclusion was not convincing. The process of collecting data up to the conclusion of this study formed a cycle. Primary data were collected through in-depth interviews with the key informants. In addition, secondary data on the development of the beef cattle population in oil palm plantation areas were collected. Data reduction was conducted to focus on the process of social change in the development of beef cattle areas at the research location. The relationship between the establishment of beef cattle production areas due to social interactions, structural changes, and farmer culture in the beef cattle rearing system is shown by the data reduction results presented in tables and figures. The conclusions are based on the interpretation of the results after triangulation between various types of data and information.

RESULTS AND DISCUSSION

Jayakarta Village as the Beef Cattle Production Area

Jayakarta Village is one of the 10 villages in the Talang Empat Subdistrict. The village area is 238 ha, or 5.85% of the sub-district area (4,103 ha). The population of Jayakarta Village is 781 people (242 households) living in three hamlets (BPS-Statistics of Bengkulu Tengah Regency, 2022). Jayakarta Village is not far from Bengkulu City (the capital of the Bengkulu Province). It has quite good access and only takes 15 minutes from Bengkulu City to reach the village. Jayakarta Village is dominated by the Javanese, who moved through the transmigrant program starting in 1972. Planting or working as an oil palm farm laborer is the main source of income for community members. Farm laborers harvest, fertilize, and control palm oil weeds, and farm laborers harvest oil palm fresh fruit bunches for 100–

200 thousand rupiah per day, depending on the volume of harvest obtained. Fertilizing or controlling palm oil weeds is paid to 80 thousand rupiahs each day.

Oil palm is an important crop for the people of Jayakarta Village and other villages in the Talang Empat Subdistrict. The area of palm oil plantations in the Talang Empat Subdistrict is 3,841 ha (BPS-Statistics of Bengkulu Tengah Regency, 2022), or 93.61% of the subdistrict area. Most (80.21 %) of the oil palm plantation area is owned by private companies (3, 081 ha). Oil palm expansion began in the early 2000s with the opening of palm plantations by individual owners from outside the village by buying private land owned by community members and the opening of private companies that obtained the Right to Cultivate or Hak Guna Usaha (HGU) from the government. The practice of selling agricultural land due to the expansion of palm oil plantations has increased the price of land in Jayakarta Village. The price of agricultural land for plantation areas in the village has reached 50–100 million rupiah per hectare at this time, a drastic increase from only 5 million rupiah per hectare in the early 2000s, and the area of smallholder oil palm plantations continues to increase.

Social changes owing to the expansion of palm oil plantations have occurred in Indonesia. The results of a literature review by Ishak (2018) concluded that oil palm expansion has caused changes in the social stratification of rural communities, strengthening patron-client ties between farmers and oil palm factories, exploitation of plantation workers, marginalization of farmers, and escalation of agrarian conflicts. However, oil palm expansion also causes regional development and changes in land use and cover (Rustiadi et al., 2023). The absorption of rural community workers as palm oil plantation workers has a direct impact on the income of rural communities through the expansion of palm oil plantations in Indonesia (Kubitza et al., 2019).

In addition to being the main source of income for the community as farm laborers, palm oil plantations also provide feed resources for beef cattle in the form of an understory to produce palm oil stands. Firison et al. (2019) stated that one hectare of oil palm plantation can accommodate 0.7–1.3 beef cattle animal units by using understorey plants as feed. The total beef cattle population in the Talang Empat subdistrict is 2,480 heads, with an oil palm plantation area of 3,845 ha (BPS-Statistics of Central Bengkulu Regency, 2023). The number of beef cattle is increasing with the expansion of palm oil plantations. Based on statistical data, the number of beef cattle in the Talang Empat Subdistrict increased almost three times, while the area of oil palm plantations increased almost eight times in the 2012-2022 period (Figure 2).

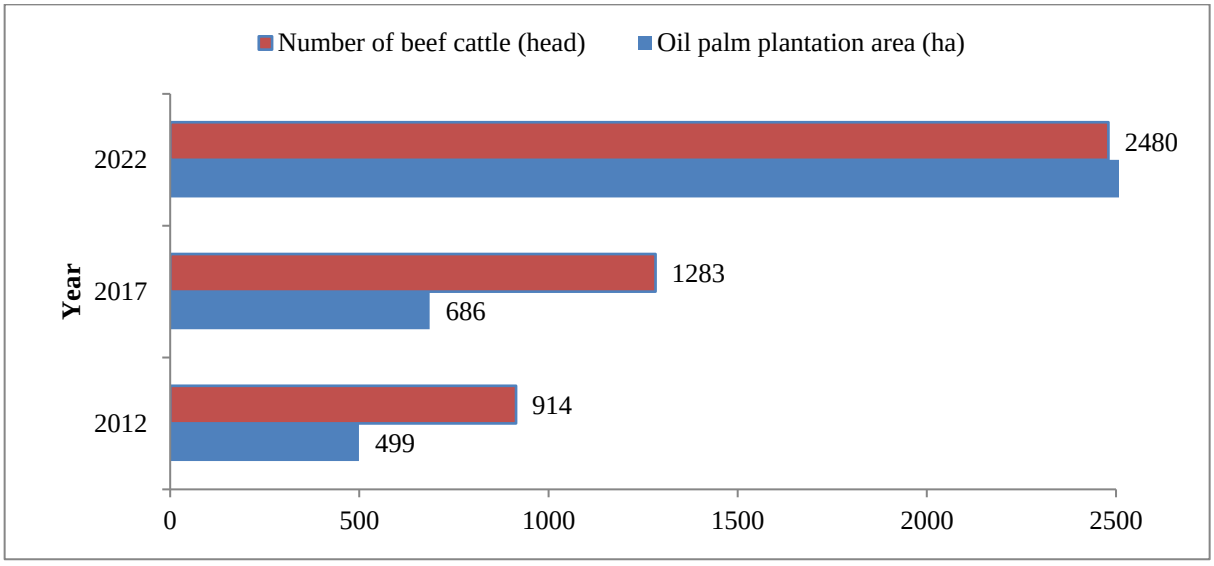

Figure 2. Oil palm plantation area and beef cattle population in Talang Empat Subdistrict (2012–2022)
Source: data processed from Central Bengkulu Regency in Figure, 2013; 2018; 2023 (BPS Statistics of Central Bengkulu Regency)

The Jayakarta Village community conducts beef cattle farming business to save money. The cultivation of beef cattle by small-scale farmers in Indonesia, including Bengkulu, is generally intended for family savings (Agus & Widi, 2018; Ishak et al., 2020). The beef cattle raised are Bali cattle that can be sold at

any time if the farmer requires a relatively large amount of money to meet family needs, such as sending children to school, buying land, renovating a house, or buying a vehicle. The total population of beef cattle kept by the Jayakarta Village community is estimated at 500 heads, most of which are kept extensively or released in private oil palm plantations. Grazing beef cattle on palm oil plantations has been widely practiced in Indonesia (Bremer et al., 2022) as a form of adaptation of beef cattle farmers to their environment.

Jayakarta village has become a beef cattle production area in the Talang Empat sub-district. Farmers rear cattle with the main objective of extensively developing the beef cattle population by releasing them into palm oil plantation areas. For farmers who own palm oil plantations, cattle are kept semi-intensively by grazing during the day at the plantation location and are penned at night. Mother cattle can give birth once per year through natural mating. In addition, farmers also intensively fatten cattle by keeping them penned for six to eight months. Fattened cattle were used as sacrificial cattle. Fattening cattle is an effort by farmers to increase the selling price of beef cattle. The price of sacrificial cattle in Jayakarta Village is between 15 and 17 million rupiah per head (Table 2). Selling cattle is easy because there are two intermediary traders in the village and consumers buy cattle directly from farmers. As a production area, Jayakarta village has become a buying destination for cattle traders who serve buyers from within and outside the surrounding areas of the Central Bengkulu Regency, especially for sacrificial cattle ahead of Eid al-Adha.

Table 2. Bali cattle prices in Jayakarta village

Cattle Specifications	Cattle age	Cattle price (million rupiah)
Weaning cattle		
- Male	8 months–1 year	6–7
- Female	8 months–1 year	4.5–5
Fattening cattle	1.5–2 years	9–10
Heifer cattle	1.5–2 years	7.5–8
Mother cattle	2–3 years	9–12
Sacrificial cattle	2–3 years	15–17

Source: Results of field interviews

Livestock Population Development through Profit sharing Program

Cattle for farmers in Jayakarta were initially used as labor in cultivating paddy fields. Farmers tried to open rain-fed paddy fields to plant rice and secondary crops at the beginning of migrants' arrival in this area. The difficulty in clearing agricultural land in the new area caused some migrants to leave the transmigration area between 1975-1980. In 1980-1990, the community cultivated rubber plants on dry land as a source of family income, in addition to the annual crop business. In addition to farming on their land, working as farm laborers and doing odd jobs outside agriculture became a source of income for the people of Jayakarta Village. The diversification of on-farm and off-farm farming to fulfill economic needs characterizes the rural communities in Indonesia (Setiyowati & Rahman, 2019).

The development of the cattle population in Jayakarta Village is an on-farm business that is inseparable from the government-facilitated livestock profit sharing program. Initially, 35 cattle were raised by farmers through the IDT Program in 1989, with the assistance of the Livestock Service Office. Farmers' interest in raising cattle was because cattle development was significant, as cattle could be used for plowing rice fields. The government program is beneficial for farmers to develop the cattle population because of the difficulty in raising cattle independently due to limited capital. The village government manages the livestock transfer program and has successfully increased the availability of livestock for farming families that want to raise cattle. The IDT program ended in 2001. The Government's livestock profit sharing program is one way to develop the Indonesian cattle population. The Government's program to develop cattle continues with the aim of increasing the population and accelerating the distribution of superior livestock (Basyar, 2021).

The community has widely applied intensive cattle rearing since 2000 owing to the success of the IDT Program. The development of the population has led to the use of cattle not only for labor to plow fields, but has also become a savings for farming families. In addition to the IDT Program, livestock assistance was also obtained by farmers in Jayakarta Village through Government facilitation of Farmer Groups. In 2010, the government distributed cattle assistance through the Food Independent Village Program with the allocation of funds from the Food Security Agency of the Ministry of Agriculture for as many

as four mothers to be rolled out to 27 low-income families who formed Affinity Groups. In 2010, 34 cattle were distributed to a 17-member Sri Rejeki Farmer Group through the Cattle-Palm Integration Program of the Central Bengkulu Regency Agriculture Office. These three cattle profit sharing programs were conducted between farmers as herders and those distributing livestock assistance. In addition to profit sharing cattle from the government's livestock assistance program, farmers also herd cattle owned by individuals from the farming community within the village or capital owners outside the village.

A cattle profit sharing program is one way to increase beef cattle population. According to information from the Field Agricultural Extension Worker (PPL) of Jayakarta Village, this village has the largest cattle population among the ten villages in the Talang Empat Subdistrict, with around 500 heads, mainly reared extensively in oil palm plantation areas. According to the PPL, farmers from several other villages in the Talang Empat Subdistrict have joined the cattle rearing business in oil palm plantation areas after learning about the success of farmers in Jayakarta Village. The profit sharing system of cattle farming in Jayakarta Village varies according to the agreement between farmers and cattle owners. The mother who was initially fostered then became the farmer's property. Farmers must return their herds after giving birth to the Affinity Group in the Food Independent Village Program. The mother returns when the child is weaned to be rolled back to other farmers in the Affinity Group. Meanwhile, in the Cattle-Palm Integration Program, farmers owned cattle from the beginning. Farmers are obliged to deposit five million rupiahs obtained from the sale of cattle after the cattle were successfully developed to be used as capital for the group to form savings and loan cooperatives. Profit sharing between farmers and cattle owners is 50:50, which means that the profit from the sale of cattle is divided after the initial capital for the purchase of cattle is issued to the cattle owner. Based on the description above, four patterns of cattle profit sharing were formed in the farming community in Jayakarta Village with different obligations and rights of the herders, as described in Table 3.

Tabel 3. Beef cattle development using the profit sharing system in Jayakarta Village.

Profit sharing system	Year and Amount of aid	Obligations of the farmer	Farmer rights
Profit sharing with groups through Government facilitation:			
1. IDT program	1989 35 cattle	Handing over weaned cattle to the group for breeding to other members	Obtaining brood cattle
2. Self-sufficient village program	2010 4 cattle	Returning the calf mother to the group after calving and weaning to mate, to other members.	Obtaining weaned cattle
3. Cattle- oil palm integration program	2010 34 cattle	Depositing IDR 5 million to the group for savings and loan co-operative capital after successfully developing cattle.	Obtaining brood cattle
Profit sharing with individual livestock owners	-	Deposits 50% of the profit from the sale of cattle after the capital purchase of the cattle is returned to the owner of the livestock	Receive 50% of the net profit from the sale of livestock

Source: Field interviews.

Table 3 shows the various patterns of cattle profit sharing in Jayakarta Village. The distinction is that under the government-facilitated livestock profit sharing program, cattle are handed over to other members of the farmer group or funds are deposited to strengthen the group. This is a form of social responsibility within farming communities. In contrast, in individual profit sharing between farmers and livestock owners, there is No. social responsibility for the community imposed on farmers. Farmers interact only with livestock owners.

Interaction between Actors in Beef Cattle Profit sharing

The successful development of the cattle population in Jayakarta Village through the livestock profit sharing program facilitated by the government is inseparable from the mutually reinforcing interactions between farmers and herders in the community facilitated by the program's recipient group. The government requires norms for the group as a basis for interaction in the form of the rights and obligations that farmers must obey as herders. The rights and obligations in the community of program

beneficiary groups are regulated to allow social control in the form of punishment if herders violate group rules and cause the herd to die or disappear.

According to several informants, farmers are obliged to replace cattle if they die or are lost if the cause of the incident is due to the farmer's intentions or negligence. According to the group agreement, the replacement value can be the sum of money or livestock replacement. In fact, according to the community leaders interviewed, about five cases have been reported to the police because of farmers who deliberately sold their livestock and did not want to replace their livestock. This decision was made after an agreement was reached, based on the results of a meeting within the group community supported by the village government. These strict group rules were put in place to avoid moral hazards that would lead to the failure of the government-facilitated livestock profit sharing program. Moral hazards are the leading cause of failure of various livestock assistance programs from the government to farmers (Fadhil et al., 2021; Khaddafi et al., 2016).

The rules of cattle profit sharing between farmers and individual livestock owners differ from those in the profit sharing of government-assisted livestock managed by groups. Herders and cattle owners make agreements based on mutual trust. The livestock owner chooses the herder he/she trusts. This trust is gained through the interaction between the two parties. Individual profit sharing can be done between livestock owners and herders in the same community, or between livestock owners outside the village and those in Jayakarta Village. In addition to the trust built previously, the sharecropper's capacity or ability to raise cattle optimally is also considered when implementing beef cattle herding cooperation.

In addition to the differences in the rules of cattle profit sharing, the objectives of cattle rearing are also slightly different between the pattern of cattle profit sharing facilitated through the Government Program and the pattern of individual cattle profit sharing. Community profit sharing is aimed at livestock development, while individual profit sharing is more flexible in that it can be either livestock development or fattening, depending on the agreement of both parties. Therefore, profit sharing can increase the cattle population in the farming community of Jayakarta Village. Fattening aims to increase the profit value of cattle rearing. The fattening business was conducted intensively for cattle for to 6-8 months to sell at the highest consumer bid price during Eid al-Adha. The social interactions in cattle profit sharing in Jayakarta Village are presented in Table 4.

Table 4. Social interaction in cattle profit sharing

	Description	Community-based profit sharing	Individual-based profit sharing
1.	Actors involved	Herd farmers and community groups receiving beef cattle assistance through the Government Program	Herd farmers with individual livestock owners from within and outside the village
2.	Norms in interaction	Group rules	Trust between actors
3.	Form of interaction	Livestock rotationya	Profit sharing from livestock sale
4.	Purpose of interaction	Livestock population development depend on farming communities	Economic benefits between actors

Table 4 shows that the development of the cattle population in Jayakarta Village occurred because of social interaction in the form of community-based cattle profit sharing. Therefore, the role of the government is indirectly important in establishing a cattle production center in Jayakarta Village through community-based profit sharing. The Government's role will only be successful if the beneficiary community can manage it well, including adjusting the cattle rearing system by utilizing potential grazing land in the oil palm plantation area. The government, with its various programs, has become a significant structure in efforts to develop the beef cattle population, even long before Indonesia's independence (Basyar, 2021).

Adaptation of Beef Cattle Rearing System and Establishment of Production Area

Rearing cattle is a culture of the people in Jayakarta Village that has been practiced in the area of origin on the island of Java. People have a culture of intensively cultivating cattle for many generations (Saili, 2020). In addition to having an economic function as a source of income, cows also became labor in plowing agricultural land for Javanese people with an agrarian character. Following this tradition, the Javanese ethnic community in Jayakarta Village intensively cultivated cattle. The cattle were kept in a permanent cage, and the farmer prepared forage by cutting and carrying it daily. The ability of farmers

to provide feed limits the number of cattle kept. One farming family in Jayakarta Village can only intensively raise a maximum of four cattle.

The cattle rearing system practiced by the community in Jayakarta Village is increasingly diverse, with the potential for grazing land in palm oil plantations. Farmers apply various cattle-rearing systems by utilizing potential grazing land. Cattles are reared intensively, semi-intensively, or extensively. Semi-intensive and extensive rearing was performed by utilizing oil palm plantation land as a grazing area. The various rearing systems are a form of community adaptation following the environmental conditions in Jayakarta Village. The available feed resources in the vast oil palm plantation area allow farmers to raise cattle semi-intensively and extensively. The cattle kept in the plantation area benefit from oil palm plants as a source of organic matter that fertilizes the oil palms, making it profitable for plantation owners. Cattle rearing on privately owned palm oil plantations began in 2013.

Initially, rearing cattle extensively by grazing them in oil palm plantation areas was not carried out by breeders. People believe that those who release cattle into plantation areas are lazy because of their habit of keeping cattle in pens. However, after seeing the success of breeders who graze cattle on palm oil plantations, many people began to follow this business because they could raise a larger number of beef cattle without looking for feed. This transformation ultimately changed the culture of raising beef cattle in the Jayakarta Village community. In this case, social change occurs because of changes in the perceptions of norms that guide behavior in society (Tankard & Paluck, 2016).

The cattle are grazed on oil palm plantations over five years of age. Cattle cannot reach tall oil palm fronds, so they do not eat oil palm leaves that will cause damage to the plants. Cattle are tied to the trunks of oil palms during the day for easy control in the semi-intensive rearing system, or released and controlled at any time, such as once a week in the plantation area in the extensive rearing system. The mutually beneficial interaction between farmers and oil palm plantation owners results in continued production and reproduction of farmers' actions in semi-intensive and extensive livestock development. The advantage for farmers is that the number of cattle kept is higher in the semi-intensive and extensive rearing systems than in the intensive rearing system, because feed availability is no longer a limiting factor. In addition, farmers do not need to allocate family labor to find fodder grass. Community adaptation in economic activities or farming occurs because of farmers' benefits. The integration of cattle with crops can increase farming efficiency (Asikin et al., 2020; Ates et al., 2018). Beef cattle can be raised intensively, semi-intensively, and extensively in oil palm plantation areas (Silalahi et al., 2018).

Establishing semi-intensive and extensive cattle rearing systems increased farmers' ability to rear between 5-20 animals compared to a maximum of 4 animals in the intensive system. The adaptation of cattle rearing culture is the rationality of farmers in Jayakarta Village because of the opportunity to utilize available fodder resources in palm oil plantations. The number of livestock farmers can raise is now expanded by their ability to prepare, cut, and carry feed for their livestock. The adaptation of this rearing system is described chronologically in Figure 3.

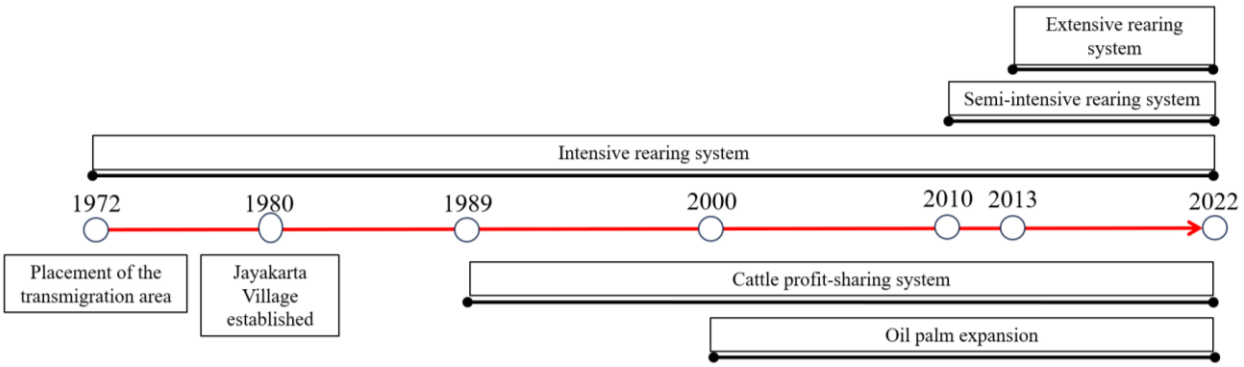

Figure 3. Chronology of cattle rearing systems due to oil palm expansion

Figure 3 shows that two external factors caused the adaptation of the cattle rearing system in Jayakarta Village from intensive to semi-intensive and extensive systems. These factors reinforce each other. First, the increasing livestock population due to cattle profit sharing, which began in 1989, made it impossible

for farmers to continue to raise livestock intensively because of the limited ability of family labor to provide forage feed if they wanted to raise more livestock. Second, the expansion of palm oil plantations, especially those owned by private companies since 2000, has provided potential feed and grazing land for livestock. However, this adaptation of the livestock rearing system did not cause farmers to abandon the intensive rearing system. Interestingly, the semi-intensive rearing system started earlier in 2010 than the extensive rearing system that started in 2013. Farmers can still provide animal feed by utilizing their spare time to find forage, especially for cattle fattening, and the intensive cattle rearing system remains a farming culture. The adaptation expanded the livestock rearing system from the intensification of cultivation that characterized the Javanese ethnicity to the intensification and extensification of cultivation and formed Jayakarta Village into a production area.

The expansion of palm oil plantations is an important technical factor that provides grazing land for beef cattle development. Other important factors that led to the development of the livestock population in Jayakarta Village were government policy support through a profit sharing system, the economic motivation of farmers to increase family income, and the rationality of farmers to adapt to various beef cattle rearing systems. Therefore, social changes in the formation of beef cattle production areas in Jayakarta Village are caused by various factors that support each other. If simplified further, the social changes that occurred in the formation of the beef cattle production area in Jayakarta Village were caused by structural and cultural changes (Figure 4). Structural changes are related to technical and policy changes, while cultural changes are related to changes in social institutions and farmers' behaviors. Social changes in rural areas are caused by interactions between rural communities and the external environment. These changes have affected the diversification of sources of livelihood, the formation of market-oriented institutions, and the improvement of social networks (Li et al., 2019).

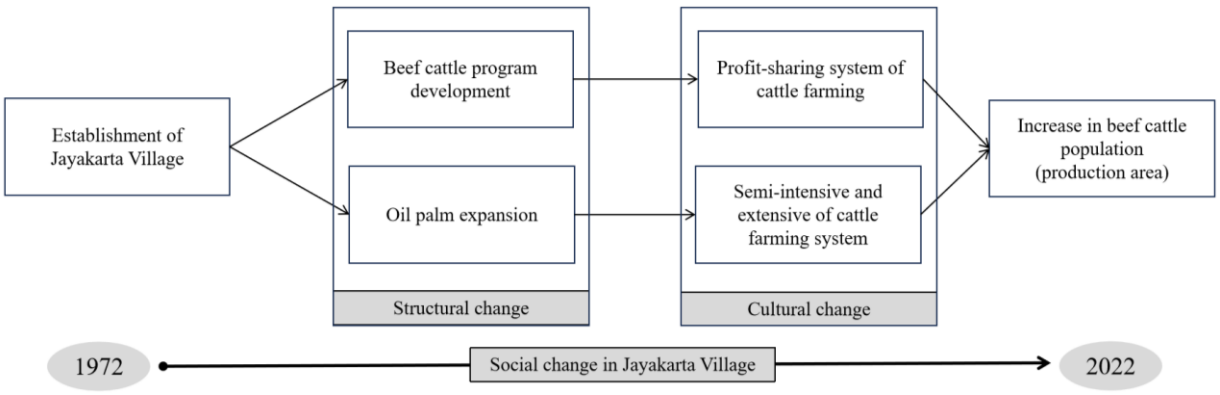

Figure 4. Establishment of cattle production centre in Jayakarta Village through changes in the structure and culture of beef cattle cultivation

Figure 4 shows that the formation of production areas resulted from adapting rearing systems that were neither intentionally designed nor naturally occurring. Community interactions in cattle profit sharing and oil palm expansion have led to the diversity of husbandry systems. The community structure changed from a non-producing to a producing cattle area. Culturally, cattle-rearing systems are also increasingly diverse, including intensive, semi-intensive, and even extensive. The social changes in Jayakarta Village to become a cattle production center in Central Bengkulu Regency occurred for 50 years (1972-2012) from the establishment of Jayakarta Village in 1972 until the area became a cattle production area. It can be said that the social changes that occurred in Jayakarta Village in the development of the beef cattle production area structurally came from outside the community, which in turn changed the culture of cattle farming and the social interaction of the community in the profit sharing system to become increasingly diverse.

Social changes, such as those that occurred in Jayakarta Village, were also reported from the results of previous research on the transformation of agricultural communities. Structural changes are usually driven from outside the village, causing changes in the behavior and culture of rural communities. These changes were caused by program intervention from the government, technological changes, and agricultural commercialization, which encouraged changes in agricultural culture in rural areas. For example, Novianto and Romadhon (2021) revealed that the formation of smallholder plantation production areas was due to the transmigration program, causing changes in the structure of society due

to increasing population and the availability of agricultural labor, as well as changes in community culture in the form of ways to cultivate agricultural commodities. The construction of dams and irrigation canals is also a structural change that creates rice production areas in Indonesia and impacts the culture of rural communities that are increasingly intensive in rice cultivation (Tirtalistyani et al., 2022). Agricultural modernization in rural communities has also caused structural and cultural changes in farmers. Technology causes agricultural systems to change from shifting cultivation to intensive crop farming, rain-feeding to irrigation farming, mixed farming to monoculture, and subsistence to industrial farming (Syuaib, 2016).

CONCLUSION

The formation of the cattle production area in Jayakarta Village, Central Bengkulu Regency, took place over a relatively long period. The formation process was caused by structural changes from outside the village, namely the expansion of oil palm plantation areas by private companies and the intervention of the government's cattle development program. The influence of structural changes is a slowly changing social interaction in the profit sharing of livestock farming and farmers' perceptions of beef cattle rearing systems. The increase in the number of beef cattle in Jayakarta Village is due to changes in farmer behavior, which has created a variety of beef cattle rearing systems, namely intensive, semi-intensive, and extensive. Social changes in the formation of a beef cattle production area in Jayakarta Village began with structural changes (expansion of oil palm areas and government policy in cattle development programs), which had implications for cultural changes within the community (the establishment of various patterns of profit sharing systems and beef cattle rearing systems).

BIBLIOGRAPHY

Achmad, F., Mulyo, J. H., Masyhuri, & Subejo. (2019). Factors affecting profit analysis of small-scale beef cattle farmers in the special region of Yogyakarta, Indonesia. *American-Eurasian Journal of Sustainable Agriculture*, *13*(2), 1–12. https://doi.org/10.22587/aejsa.2019.13.2.1

Agus, A., & Widi, T. S. M. (2018). Current situation and future prospects for beef cattle production in Indonesia - a review. *Asian-Australasian Journal of Animal Sciences*, *31*(7), 976–983. https://doi.org/10.5713/ajas.18.0233

Asikin, Z., Baker, D., Villano, R., & Daryanto, A. (2020). Business models and innovation in the Indonesian smallholder beef value chain. *Sustainability*, *12*, 7020. https://doi.org/10.3390/su12177020

Ates, S., Cicek, H., Bell, L. W., Norman, H. C., Mayberry, D. E., Kassam, S., Hannaway, D. B., & Louhaichi, M. (2018). Sustainable development of smallholder crop-livestock farming in developing countries. *IOP Conference Series: Earth and Environmental Science*, *142*(1). https://doi.org/10.1088/1755-1315/142/1/012076

Baba, S., Dagong, M. I. A., Sohrah, S., & Utamy, R. F. (2019). Factors affecting the adoption of agricultural by-products as feed by beef cattle farmers in Maros Regency of South Sulawesi, Indonesia. *Tropical Animal Science Journal*, *42*(1), 76–80. https://doi.org/10.5398/tasj.2019.42.1.76

Basyar, B. (2021). Beef cattle farm development policies to overcome beef distribution problem in indonesia: a literature review. *American Journal of Animal and Veterinary Sciences*, *16*(1), 71–76. https://doi.org/10.3844/AJAVSP.2021.71.76

BPS-Statistics of Bengkulu Tengah Regency. (2013). *Talang Empat Subdistrict in Figures 2013*. BPS-Statistics of Bengkulu Tengah Regency.

_____. (2018). *Talang Empat Subdistrict in Figures 2018*. BPS-Statistics of Bengkulu Tengah Regency.

_____. (2023). *Talang Empat Subdistrict in Figures 2023*. BPS-Statistics of Bengkulu Tengah Regency.

Bremer, J. A., de Bruyn, L. A. L., Smith, R. G. B., & Cowley, F. C. (2022). Knowns and unknowns of cattle grazing in oil palm plantations. A review. *Agronomy for Sustainable Development*, *42*(17). https://doi.org/10.1007/s13593-021-00723-x/Published

Burrow, H. (2019). Strategies for increasing beef cattle production under dryland farming systems. *WARTAZOA*, *29*(4), 161–170. https://doi.org/10.14334/wartazoa.v29i4.2452

Cowley, F. C., Syahniar, T. M., Ratnawati, D., Mayberry, D. E., Marsetyo, Pamungkas, D., & Poppi, D. P. (2020). Greater farmer investment in well-formulated diets can increase liveweight gain and smallholder gross margins from cattle fattening. *Livestock Science*, *242*. https://doi.org/https://doi.org/10.1016/j.livsci.2020.104297

Dahlanuddin, Henderson, B., Dizyee, K., Hermansyah, & Ash, A. (2017). Assessing the sustainable development and intensification potential of beef cattle production in Sumbawa, Indonesia, using a system dynamics approach. *PLOS ONE*, *12*(8). https://doi.org/10.1371/journal.pone.0183365.

Dharmawan, A. H., Mardiyaningsih, D. I., Komarudin, H., Ghazoul, J., Pacheco, P., & Rahmadian, F. (2020). Dynamics of rural economy: a socio-economic understanding of oil palm expansion and landscape changes in East Kalimantan, Indonesia. *Land*, *9*(7), 213.

Fadhil, R., Yusuf, M. Y., Bahri, T. S., Maulana, H., & Fakhrurrazi. (2021). Agricultural insurance policy development system in Indonesia: a meta-analysis. *Journal of Hunan University (Natural Sciences)*, *48*(2), 121–132.

Fahmi, F. Z., & Sari, I. D. (2020). Rural transformation, digitalisation and subjective wellbeing: a case study from Indonesia. *Habitat International*, 98, 102150.

Firison, J., Wiryono, Brata, B., & Ishak, A. (2019). Identification of understoreys at palm oil stands and their utilization for beef cattle feed. *Jurnal Littri*, *25*(2), 59–68. http://dx.doi.org/10.21082/littri.v25n2.2019

Gaveau, D. L. A., Locatelli, B., Salim, M. A., Husnayaen, Manurung, T., Descals, A., Angelsen, A., Meijaard, E., & Sheil, D. (2022). Slowing deforestation in Indonesia follows declining oil palm expansion and lower oil prices. *PLOS ONE*, *17*(3). https://doi.org/10.1371/journal.pone.0266178

Gayatri, S., Gasso-tortajada, V., & Vaarst, M. (2016). Assessing sustainability of smallholder beef cattle farming in Indonesia: a case study using the FAO SAFA framework. *Journal of Sustainable Development*, *9*(3), 236–247. https://doi.org/10.5539/jsd.v9n3p236

Gayatri, S., & Vaarst, M. (2015). The implementation of Indonesia's Beef Self-Sufficiency Programme (BSSP) as seen from a farmer-family perspective. *Journal of Rural and Community Development*, *10*(2), 166–186. https://journals.brandonu.ca/jrcd/article/view/1140

Hartono, B., & Rohaeni, E. S. (2014). Contribution to income of traditional beef cattle farmer households in Tanah Laut Regency, South Kalimantan, Indonesia. *Livestock Research for Rural Development*, *26*(8), 10–18. http://www.lrrd.org/lrrd26/8/hart26141.htm

Ishak, A. (2018). *The Dynamic of Social Practices in Countryside (Case of Cyclical Conversion of Rice Field – Palm Oil – Rice Field on Air Manjunto Irrigation Area Bengkulu)* [Dissertation]. IPB University.

Ishak, A., Ramon, E., Efendi, Z., Wulandari, W. A., Firison, J., Kusnadi, H., Fauzi, E., & Sastro, Y. (2020). The role of social capital in developing smallholders' beef cattle in Bengkulu. *Sodality: Jurnal Sosiologi Pedesaan*, *8*(3), 194–204. https://doi.org/10.22500/8202034481.

Kania, I., Anggadwita, G., & Alamanda, D. T. (2021). A new approach to stimulate rural entrepreneurship through village-owned enterprises in Indonesia. *Journal of Enterprising Communities: People and Places in the Global Economy*, *15*(3), 432-450.

Kapa, M. M. J., Henuk, Y. L., Hasnudi, & Suyadi. (2018). Contribution of local beef cattle production on farmer's income in the dryland farming of Kupang Regency, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *122*(1). https://doi.org/10.1088/1755-1315/122/1/012118

Khaddafi, M., Heikal, M., Wahyuddin, Falahuddin, & Lubis, A. I. (2016). Micro finance model of agriculture in supporting economic growth in Aceh. *International Journal of Academic Research*

in Business and Social Sciences, *6*(11), 631–643. https://doi.org/10.6007/ijarbss/v6-i11/2447.

Kinseng, R. A. (2021). Socio-cultural cange and conflict in the coastal and small island community in Indonesia. *Sodality:Jurnal Sosiologi Pedesaan*, *9*(1), 1-17.

Kubitza, C., Dib, J. B., Kopp, T., Khrisna, V. V., Nuryantono, N., Qaim, M., Romero, M., & Klasen, S. (2019). Labor savings in agriculture and inequality at different spatial scales: The expansion of oil p*alm in Indonesia* (26). https://nbn-resolving.de/urn:nbn:de:gbv:7-webdoc-3991-2

Li, Y., Westlund, H., & Liu, Y. (2019). Why some rural areas decline while some others not: an overview of rural evolution in the world. *Journal of Rural Studies, 68*, 135-143.

Marinus, W., van de Ven, G. W. J., Descheemaeker, K., Vanlauwe, B., & Giller, K. E. (2023). Farmer responses to an input subsidy and co-learning program: intensification, extensification, specialization, and diversification? *Agronomy for Sustainable Development*, *43*(40). https://doi.org/10.1007/s13593-023-00893-w

Marisa, J., & Sitepu, S. A. (2020). Relationship Analysis between production factors with business production of beef cattle livestock in Binjai Barat District, Indonesia. *Asian Journal of Advanced Research and Reports*, *9*(1), 1–7. https://doi.org/10.9734/ajarr/2020/v9i130208

Marlianawati, F., Setyowati, D. L., & Martitah. (2019). Social change in farming community to the development of West Java Internasional in Sukamulya Village. *Journal of Educational Social Studies*, *8*(2), 127–134. https://doi.org/10.15294/jess.v8i2.35095

Mashur, Bilad, M. R., Kholik, Munawaroh, M., Cheok, Q., Huda, N., & Kobun, R. (2022). The sustainability and development strategy of a cattle feed bank: a case study. *Sustainability*, *14*, 7989. https://doi.org/10.3390/su14137989

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis - A Methods Sourcebook* (3rd ed.). SAGE Publication.

Miswarti, Ishak, A., Wulandari, W. A., Firison, J., Rosmanah, S., Ramon, E., Nurmegawati, Calista, I., Yahumri, & Sastro, Y. (2021). Effect of weeds management toward understorey species diversity and soil fertility under oil palm plantation. *E3S Web of Conferences*, *306*. https://doi.org/10.1051/e3sconf/202130605013

Nendissa, D. R., Anindita, R., Hanani, N., Muhaimin, A. W., & Henuk, Y. L. (2019). Concentration of beef market in East Nusa Tenggara (ENT) Province, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *260*(1). https://doi.org/10.1088/1755-1315/260/1/012023

Ningrum, V. (2019). Agriculture liberalization and marginalized young local people: evidence from a food plantation in Lampung. *Jurnal Ilmu Sosial Dan Ilmu Politik*, *22*(3), 230–244. https://doi.org/10.22146/JSP.37654

Novianto, V., & Romadhon, I. (2021). Social changes after transmigration in South Sumatera since 1990. *Proceedings UPY International Conference on Applied Science and Education*. https://www.proceeding.upincase.upy.ac.id/index.php/Proceedings/article/view/58

Pilarska, J. (2021). The Constructivist Paradigm and Phenomenological Qualitative Research Design. In A. Pabel, P. Josephine, & A. Anderson (Eds.), *Research Paradigm Considerations for Emerging Scholars* (pp. 64–83). Channel View Publications.

Romjali, E. (2019). Local beef cattle breeding program in Indonesia. *WARTAZOA*, *28*(4), 199–210. https://doi.org/10.14334/wartazoa.v28i4.1813

Rusdiana, S., Sulaiman, R., Amiruddin, Daud, R., Zainuddin, & Sabri, M. (2018). The effort of beef needs supplying for coming years in Indonesia. *Int. J. Trop. Vet. Biomed. Res*, *3*(1), 48–59. www.jurnal.unsyiah.ac.id/IJTVBR

Rustiadi, E., Pravitasari, A. E., Priatama, R. A., Singer, J., Junaidi, Zulgani, & Sholihah, R. I. (2023). Regional development, rural transformation, and land use/cover changes in a fast-growing oil palm region: the case of Jambi Province, Indonesia. *Land*, *12*(1059). https://doi.org/10.3390/land12051059

Rustinsyah. (2019). The significance of social relations in rural development: a case study of a beef-

cattle farmer group in Indonesia. *Journal of Co-Operative Organization and Management* , *7*(2), 100088. https://doi.org/https://doi.org/10.1016/j.jcom.2019.100088

Saili, T. (2020). Production and reproduction performances of Bali Cattle in Southeast Sulawesi-Indonesia. *IOP Conference Series: Earth and Environmental Science*, *465*(1). https://doi.org/10.1088/1755-1315/465/1/012004

Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers* (J. Seaman, Ed.; Second Edition). SAGE Publications. www.sagepublications.com

Setiyowati, S., & Rahman, Y. A. (2019). Business diversification in increasing the income of farmer households. *Economics Development Analysis Journal*, *8*(3), 232–241. http://journal.unnes.ac.id/sju/index.php/edaj

Silalahi, F. R. L., Rauf, A., Hanum, C., & Siahaan, D. (2018). The characteristic and problems of beef cattle - palm oil integration in Indonesia. *IOP Conference Series: Earth and Environmental Science*, *205*(1). https://doi.org/10.1088/1755-1315/205/1/012016

Suganda, A., Salman, D., Baba, S., & Fahmid, I. M. (2022). Cattle corporation village program as small-scale farmer group empowerment to support national beef self-sufficiency. *IOP Conference Series: Earth and Environmental Science*, *1114*(1). https://doi.org/10.1088/1755-1315/1114/1/012041

Susilastuti, D. (2018). Agricultural production and its implications on economic growth and poverty reduction. *European Research Studies Journal*, *21*(1), 309–320. https://www.um.edu.mt/library/oar/handle/123456789/30202

Syuaib, M. F. (2016). Sustainable agriculture in Indonesia: Facts and challenges to keep growing in harmony with environment. *Agricultural Engineering International: CIGR Journal*, *18*(2), 170–184. http://www.cigrjournal.org

Sztompka, P. (2010). *Sosiologi Perubahan Sosial* (1st ed.). Prenada.

Tankard, M. E., & Paluck, E. L. (2016). Norm perception as a vehicle for social change. *Social Issues and Policy Review*, *10*(1), 181-211.

Tirtalistyani, R., Murtiningrum, & Kanwar, R. S. (2022). Indonesia rice irrigation system: time for innovation. *Sustainability (Switzerland)*, *14*(19). https://doi.org/10.3390/su141912477.

Williams, L. J., van Wensveen, M., Dahlanuddin, Grünbühel, C. M., & Puspadi, K. (2022). Adoption as adaptation: household decision making and changing rural livelihoods in Lombok, Indonesia. *Journal of Rural Studies*, *89*, 328–336. https://doi.org/10.1016/j.jrurstud.2021.12.006.

Wilterdink, N., & Form, W. (2024). Social Change. Encyclopedia Britannica, https://www.britannica.com/topic/social-change.