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Agriculture is the mainstay of the people of the most tropical countries where billion of people live. Within agriculture, a high priority is placed on livestock rearing by development groups or individuals due to the large role of farm animals play in the economies of the countries. Livestock is an integral part of agriculture system. Many poor rural households raise livestock, which is valued for its contribution to family nutrition and income, as a capital reserve, and for social obligations and prestige. There is very little on-farm and off-farm processing of livestock products; which translates to low income for farmers and little in the way of job creation. The government should therefore as a matter of urgency give industry investors incentives such as tax relief, or subsidized land to invest in agro-processing of livestock. Therefore, government as the facilitator and policy maker has to initiate the collaboration between rural farmers and animal industries. Industry of agro-processing at the farm level improves rural incomes by adding value to products at source thereby saving on transport cost. It delivers high-value/low volume products and creates opportunities for the use of by-products as inputs in other farm operations such as animal feeds, manure, and fuel. The link between government, companies, and community should go together with other institutional frames such as academic institution and non governmental organizations. All of these institutional frameworks recognize the opportunities livestock production and marketing systems offer poor people in terms of increasing food security, providing income opportunities and sustaining farm production. The question is now how do we translate research and development frameworks into practical implementation plans at international level and into useful activities at the local level to enhance the contribution of animal industry and livelihoods of the poor especially in the tropics?



The 7th International Seminar on Tropical Animal Production (ISTAP 2017) is a forum for the presentation of recent knowledge and technology regarding animal production. It provides a perspective and insight into tropical animal production systems and sustainable local resource management.

Topics of interest for paper submission :

- Feed and animal nutrition
- Animal biotechnology
- Animal breeding
- Animal health and welfare
- Poultry science and management
- Small ruminants production
- Cattle and buffalo production
- Animal waste and by-product
- Post-harvest technology
- Food technology
- Food Safety and Halal Food industry
- Livestock industrial machinery
- Livestock business and management
- Social and community involvement
- Environmental issues
- Other issues related to the theme of conference

Announcements

No announcements have been published.

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Canvassing the Complexity of Beef Cattle Farming; an Entry Point to Qualitative Modelling

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ABSTRACT

In Indonesia, most of the beef farming are embedded in a larger agricultural system. Beef farming becomes one activity among various activities which commonly managed by farmers household. This multifaceted roles makes beef farming a complex systems. Studying complexity requires an approach which designed to deal with such complexity. One of the alternative approach is qualitative modelling using Causal Loop Diagram (CLD). The entry point to develop a model is identifying the everyday flux of beef farming activities. However, this often constrained by the hesitance of farmers to engage in the discussion. Researcher need to build an engagement design which should be able to promote discussion and encourage people to start talking. This article aimed to discuss the methods and protocols required to engage people participation as an entry point to develop a qualitative modeling. A series of observation and interviews has been conducted to undertake the study. The research target were beef farmers in Kabupaten Banjarnegara. The study was initiated by undertaking separated preliminary discussion with beef farmers. This step was aimed to engage farmers' participation as well as harnessing their everyday activities related to beef farming and marketing. Then, second discussion was undertaken to identify potential problematic situations i.e. situation considered as uncomfortable. This was conducted by identify the activities, resources, and pressures of the systems. As a result, a Causal Loop Diagram (CLD) was generated describing the beef farming systems. The behavior underneath these CLD was then further discussed to analyze as an effort to tame the complexity of beef farming.

Keywords: Qualitative modelling, Causal Loop Diagram, Beef farming, Systems thinking, Systems modelling

INTRODUCTION

Beef farming is one of the focal point of Indonesia's livestock development program. In most part of Indonesia, beef farming is dominated by smallholders. Although it was considered to have a low productivity, yet beef farming is still play a crucial role on farmers' livelihood. For smallholders, cattle can be very important social and financial instruments. For many farmers, cattle are not only a source of income but are also a valuable asset (Patrick et al., 2010). Cattle are also have a certain socio-cultural value. It reflects wealth status, as well as family savings and security instrument (Stroebe et al., 2008, Huyen et al., 2010). Cattle have a significant role as a financial buffer for the household during times of drought or crop failure (Dowie et al., 2006) since farmers can easily sell their cattle if they need large amounts of cash (Siegmond-Schultze et al., 2007). These multi roles of cattle

makes the beef farming a complex systems. It is not merely focus on technical production aspect, but also on social, economics and even political dimension.

Learning such complexity of beef farming requires an approach which able to acknowledge and elaborate its complexity. Systems thinking emerges to study the complexity. Systems thinking approach has the capability to study the cause and effects, the loops which likely occurred in a real world situation, and even dealing with unavailable data parameter which also often experienced in a field study. One of systems instrument which widely used to describe any systems called Causal Loop Diagram (CLD), a qualitative model to describe systems behavior (Sherwood, 2002). However, working with a wide range of variables with all its interconnectivity also had consequences of increasing the complexity of the approach. This study aimed to show the method which can be used to help researcher using systems thinking approach to engage participants perspective to visualize the systems.

MATERIALS AND METHODS

This research focused on gaining information of a particular group of farmers, which was smallholderbeef farmer groups. Therefore to deepen the understanding of the cases, purposive sampling (Black, 2002) was used to select the farmer group. Sari Widodo farmers group was then selected as the respondent of this study. Sari Widodo farmer groups was established on the 7th of July, 1978 in Kabupaten Banjarnegara, Central Java Province. The group was initially formed by rice farmer to facilitate access to agricultural innovation. It grew as new members joined, not only from rice farmer but also fish and beef farmers. Currently, Sari Widodo has 22 active members. Therefore, this farmer group plays important role as an example for the surrounding farmer.

The study started with an initial assessment of the beef farming activities. This scoping process was undertaken to gain mutual understanding among researcher and participants regarding the objectives and the approaches of the study. This aimed to improve their sense of being acknowledged, which was expected to promote future cooperation(Poppi et al., 2011). The next step was started to structure the problematic situation of their beef farming. This was conducted by asking each and every participants of what situation which they consider as “uncomfortable situation”. Then, the drivers of that uncomfortable situation were explored, and their relationships were mapped. To structure the identification, this participants were asked to mention the activities relates to the problem, the resources affected by those activities, and the pressures affecting both activities and resources. Descriptive statistics were used to explain and describe the nature and polarity of the connectivity and generate the Causal Loop Diagram (CLD) (Stermann, 2000, Maani and Cavana, 2007). Vensim® software were used to draw the diagram.

RESULTS AND DISCUSSION

Beef cattle are commonly raised in mixed crop-livestock farming. Based on the purpose, beef cattle farming can be categorized into two major types, breeding and fattening (Ensminger and Perry, 1997). The main purpose of breeding is to produce calves which will be sold at weaning or at one year old as yearlings(Boykin et al., 1980) whereas fattening refers to fattening up of calves and steers to produce high quality meat. In Indonesia, breeding is conducted mostly on smallholder farms. Although breeding is considered to be a key factor contributing to the development of beef farming and the demand for steers is continually increasing, the industry is not attracted to the idea of establishing breeding farms.

The limited turn-over and the long investment period are two major limiting factors for this (Boediyana, 2007).

Activities. A total of six activities were able to be identified during the discussion; fattening, breeding, calving, feeding, cattle purchasing and cattle selling. Participants were then asked to identify any possible direct interaction among activities (Fig 1).

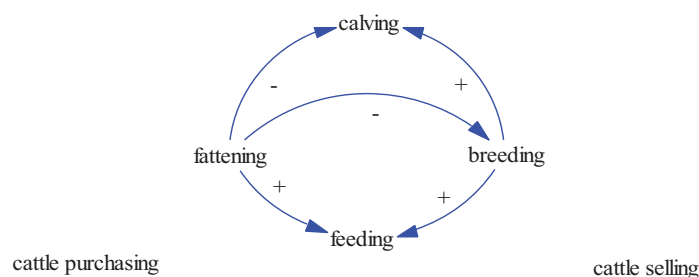


Figure 1. Activities of beef farming

Among those six activities, four relations existed:

1. As fattening and breeding share the same resource (labour) thus, increasing fattening activities will result in decreasing breeding.
2. Fattening will reduce the number of newborn calves. As more cattle were allocated to fattening, less were allocated to produce calves.
3. Breeding will increase the number of newborn calves. As the nature of breeding is to produce offspring, then more cows allocated to breeding will produce more calves.
4. Both fattening and breeding require sufficient feeding. This means that more fattening and breeding will result in less forages availability.

Resources. After identifying the activities, participants were then asked to discuss resources which are affected by activities in Fig 1. As a result, a total of four resources were able to be identified; cattle for fattening, cattle for breeding, calves, and forages carrying capacity. Next, participants identify the possible direct linkages among resources, followed by direct linkages among resources and activities (Fig 2).

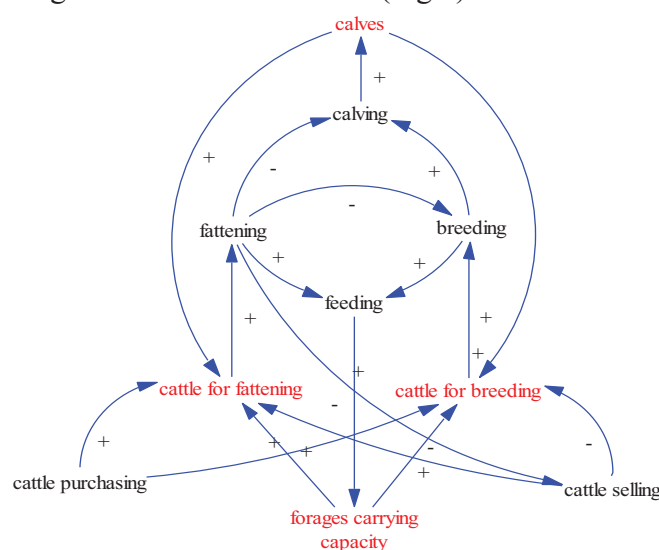


Figure 2. Activities and resources of beef farming

increase farmers' preferences to fatten females and increase the proportion of purchasing for fattening purposes as a response to minimize risk. On the other side, imports decrease sales earning. These effects impact on the official system purposes which are to increase both the cattle population and farmers' incomes. Increasing allocation of females for fattening and slaughter reduces the proportion of cattle for breeding. As this happens, the balancing loop is negatively affected which results in smaller cattle population. Moreover, as sales earning reduce, this will increase gap between expected and actual earning which will further reduce the number of cattle purchased and increase the number of cattle sold which results in less cattle population and less earning.

CONCLUSIONS

Study showed that taming the complexity of smallholder beef farming could be done by implementing a step by step approach. Requesting participants to identify their daily activities was able to help participants to engage in the discussion as participants. Adding a reasonable number of resources and pressures were proven to be able to provide an ample Causal Loop Diagram (CLD) as a visualization of the systems.

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