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[03:07 Modeling smallholder beef farming: a systems thinking's step by step approach](#) Novie Andri Setianto, Nunung Noor Hidayat,

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novie.setianto@unsoed.ac.id Abstract. Smallholders are characterized by the complexity of the connectivity of allocating limited

resources to support their multi activities in agriculture. Learning smallholders requires an approach which able to acknowledge and

elaborate the nature of their complexity. Systems thinking is one of the disciplines of thinking focused on analyzing the

interconnectedness among elements within a system. This study aimed to highlight a step by step process in developing a model for

smallholder beef farming. The study has been undertaken in rural Central Java at two beef farmers group. Numbers of semi-structured

interviews followed by focus group discussions and in-depth interviews to clarify the findings have been conducted involving a total of

50 respondents of farmers. The study revealed operational process which needs to be followed to undertake five steps of standard

qualitative modeling practices, i.e., observing the everyday activities of the farming, problem identification, developing a conceptual

framework, canvassing the maps of qualitative modelling using Causal Loop Diagram (CLD), and identifying the systems archetypes

within the CLD. Qualitative maps of CLD describing the behaviour of the systems of smallholders beef farming. 1. Introduction [Beef](#)

[farming is a complex](#) socioeconomic activity [which](#) involves numbers [of stakeholders whose](#) aim and interest [are varied](#) [1,2,3]. In

many parts of Indonesia beef farming is just one activity among many different activities undertaken by farmer on their daily basis.

Beef farming is nested within bigger agricultural systems. Further, beef farming plays varied roles to the community. It never plays a

single role as an income source, but always have other roles as household saving, buffer, or social status. Within a beef farming

systems, a lot of stakeholders involved, such as local traders, farmers, extension agents, local government, or even researchers. Each

stakeholder has their objectives which shape the beef farming systems in certain area. For decades, although smallholders dominate

the supply of national beef [4] their productivity tends to be low [5]. Also, smallholders are characterized for their limited number of

cattle per farmers, limited capital owned, labour intensive, limited land area [6], limited access to financial institution, mostly un-

bankable, and traditional managerial practices. This lead to limited income generated from beef farming. Thus, drive farmers to do

other income generating activities either agricultural-related or non-agricultural activities. The ability for farmers to wisely allocate their

limited resources plays a crucial role to sustain their livelihood, thus challenging to be studied further. The fundamental problem needs

to be addressed to explore the possible [intervention strategy to improve the productivity of the](#) smallholders. However, to study such

[complex systems](#) requires [an approach which sensitive](#) and acknowledge the [complexity](#) of a beef farming system. One emerging

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[Publishing Ltd](#) 1 idea [to](#) study a complex system is systems thinking [7,8,9] which focused on the relationship among elements within a

system. [In the body of systems thinking](#), numbers of methods [have been](#) introduced. However, [in](#) principle, it divides into two

disciplines; qualitative and quantitative approach. Each approach has strengths as well as limitations. It should be used as a

complementary rather than a substitution. Further, a methodology which has been developed to undertake those approaches were

widely varied such as systems dynamics [10], [soft systems methodology](#) [11], [Critical Systems Heuristics](#) [12], Soft Systems Dynamic

Methodology [13]. Recently, [2] published an enhanced SD approach which nominated as the most suitable systems thinking