Identifying the stakeholders and sustainability indicators for sonok breeding system

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Abstract. Sonok contest is a cultural event involving cattle in Madura Island, Indonesia. Sonok breeding strategy and event are unique since they involve only the female cattle. Many stakeholders participate in the value chain. This study was aimed to identify stakeholders in Sonok breeding system and to determine sustainability issues and indicators. The study was conducted by a literature review and discussion with experts. The procedures are consisted of 3 phases, including problem definition, identifying and analysis relevant stakeholders, then determining Economic, Ecological, and Societal (EES) relevant issues. Next step, the EES issues were translated into sustainability indicators. As a result, there were two stakeholders, primary and secondary stakeholders. Primary stakeholders consisted of cultural groups, farmers, and policymakers. Secondary stakeholders consisted of local government, inseminator/veterinarians, butchers, and traders. Several issues were elaborated at the farm level. Economically benefit, manure use and human well-being were important issues. Selected sustainability indicators were farmer income, cattle growth and reproduction, manure production, feed availability, farm size, cultural value, and cattle/human health and disease. According to the result, the present stakeholders and sustainability indicators need to tested and confirmed with data to assess the sustainability of Sonok breeding systems.

1. Introduction
Sonok is a cultural event involving cattle in Madura Island, northeast of Java Island, Indonesia. The main events in the sonok-based on the farmer's common practice in Madura. Cattle are tethered between two pillars named tacek in front of veranda's house about 9 am until 1 pm. The cattle’s forefeet stand on a piece of wood about 15 cm high, while they are tethered. This tethering practice allows farmers to show their great pride in caring for their cattle. In the meantime, farmers clean the cattle and the barn and undertake other activities, such as foot care and horn shaping [1].

Based on the common activities carried out by farmers, in 1927’s a group of farmers held pajengan event, which is tethered cattle simultaneously in the field. Currently, Pajengan are held once a week after the tobacco harvest season. To develop this cultural event, start in 1963 the farmers competed the best cattle, which selected from pajengan. The pairs of cattle, guided by a jockey, have to walk 25 m to reach a finishing line, designed like a gate, while their forefeet step in a harmonious manner. Sonok cattle are judged by conformation traits, such as height at withers, color, body conformation, body condition, health, and harmonious walking in a pair. A traditional Madura’s music called Saronen was played to accompany cattle performance. Sonok culture still exists, but it is not for competition, only as a contest but still affects the cattle value in the breeding and its price [1,2].
Sonok contest is unique since they only involved the female cattle, which is contrast with karapan, popular Madura cattle race event that only use the bulls. Moreover, sonok breeding systems are also unique because of the process in selection and stratification [2,3]. Based on the selection to select the best cattle, Madura cattle in the sonok area form strata levels. The first level is elite cattle as the best quality and used in sonok event. The second level is the multiplier, it is consisted of all pajengan cattle and has prospect to be selected as sonok candidate. When cattle shows good quality can be included in sonok event. The lowest level in the strata is common Madura Cattle, that doesn’t participating cultural event. When common Madura cattle mated with bulls from elite level, its offspring can enter the pajengan strata level. Determination of selection criteria for entry into the strata level is determined subjectively by farmers and communities based on quantitative and qualitative traits [4,5].

As a local culture, there may be many stakeholders playing important roles in this production system. Different stakeholders may have different goals and different perceptions about the relative importance of various components of the system [6–8]. Differences in perceptions on farmers of each stakeholders will lead to possible differences in issues. Issues in each stakeholder develop according to their respective interests. The issue can be divided into economic, ecological and societal issues. Based on the issues of each stakeholder, it can be translated as an indicator of sustainability. Sustainability indicators can be used to measure how sustainable a system [9]. Based on the unique characteristics of the sonok breeding system, it also allows stakeholders and indicators of sustainability. Therefore, a study is needed to identify stakeholders and sustainability indicators in the breeding systems. This paper aimed to identifying the stakeholders and sustainability indicators for Sonok breeding system.

2. Methods
The method used in this study refers to the common steps adapted from Bell and Morse [10], Mollenhorst [11] and Widi [12]. There are four phases: problem definition, identifying and analysis relevant stakeholders, determining Economic, Ecological and Societal (EES) relevant issues. Last phase is EES issues were translated into sustainability indicators (SI).

Stakeholder identification were done through literature review and discussion with key informants. The selected key informants consisted of the chief of the sonok community, farmers, local government, veterinarians and inseminators who are experts in the sonok breeding system. Literature review were carried out by reviewing research publication based on Madura cattle production systems and general production systems in Indonesia or in the World.

Relevant issues were identified based on the literature review and expert consultation. The issue was developed as an indicator if met criteria of sustainability indicator. There are some criteria to select sustainability indicator, it were relevance, simplicity, sensitivity, validity, target value and accessible data. In this paper, qualitative or quantitative indicators were selected.

3. Results and discussion

3.1. Stakeholder for sonok breeding system
Stakeholders revealed during literature review and discussion with key informants were consisted of two distinct stakeholders, primary and secondary stakeholders (Table 1.), considering their importance role at stake. Primary stakeholders were cultural groups, farmers and policy makers. For secondary stakeholders, there are local government, inseminator / veterinarians, butchers and traders.

Farmers are the main stakeholders in the sonok breeding system and contests. Farmers are the main actors who carry out sonok culture, because the origins of sonok culture are those of the farmers' practice. Every farmer as a decision maker to manage input, process and output of their breeding activity. This is because the interests of farmers in raising cows are different, some are raising them as the main income, manure source or as a social status [6,13].

Cultural groups have an important role because sonok was developed from the culture of society. The development of sonok breeding will not survive if the farmers' groups do not maintain the sonok
In addition, cultural groups maintain cultural events using only native Madura cattle by selecting the best cattle. Cultural group rules disallow crossbred cattle or other cattle breeds to participate in sonok event [13,14]. Policymaker plays a role in providing Sonok event easy access to be able to still exist in carrying out their culture [13].

As a secondary stakeholder, the local government has an interest in promoting this culture to the broader community. With a higher appeal, the Sonok event becomes a more attractive culture. Veterinarians and inseminators have a role in keeping livestock from getting other cattle breed artificial insemination. In addition, veterinarians and inseminators can direct farmers to keep an eye on cattle pedigree so they can avoid inbreeding [13,15]. Butchers in the sonok breeding system have an important role in choosing livestock to slaughter. There is a Butcher in the Sonok development area who always chooses bad animals to cut in the hope that only high-quality livestock will be left. While traders have an important role in channeling livestock from one farmer to another farmer. Although in Sonok culture there is often trade between farmers, but the role of the trader is still quite important [13,16].

**Table 1.** Primary and secondary stakeholders in the Sonok breeding system

| Stakeholders                        | Importance to system                                                                 | Interest                                      |
|-------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------|
| **Primary stakeholders**            |                                                                                      |                                               |
| Farmers                             | Primary producer, key decision maker over resource use and farm output                 | High capital needed, social status            |
| Cultural groups                     | Maintain sonok event                                                                  | Develop sonok breeding system                 |
|                                     | Only allow Native Madura cattle to participating sonok event                          | Pajangan and Sonok Contest                    |
|                                     | Establish selection criteria                                                         |                                               |
| Central Government (policy maker)   | Promote event                                                                        | Tourist attraction                            |
|                                     | Produce policy about cattle breeding                                                 | Support national programs                     |
| **Secondary stakeholders**          |                                                                                      |                                               |
| Local Government                    | Give permission to cultural event                                                    | Improve tourism                               |
| Inseminator/Veterinarians           | Avoid disease and inbreeding                                                         | Acceptability to the artificial insemination  |
| Butchers                            | Selection to slaughter                                                               | Profit                                       |
| Traders                             | Cattle trading                                                                        | Profit                                       |
|                                     | Cattle movements                                                                     |                                               |

Source: Widi [17] Patrick et al [18]

### 3.2. Sustainability indicators for sonok breeding system

Several issues and sustainability indicators were elaborated at the farm level. Sustainability indicators can be divided into 4 levels, namely farm level, regional level, population and global. We chose to elaborate on farm levels because the availability of sonok specific information is developing at the farm level. Based on the criteria to select sustainability indicators, Table 2 present selected sustainability indicator that possible to access in sonok breeding system.

The most important economic issue for cattle in smallholder breeding systems is their contribution to farmers' income. Cattle are the primary income for farmers, besides agriculture. In the cattle
breeding system, farmers can get profit from selling their calves, heifer, or cow. Ploughing rice fields used cattle draught power still exists in Madura Island especially in Sonok area; it can provide added economic value. The economic value of cattle can also be assess from its growth, both body weight, and body size. Reproductive quality is also an important economic value because calf birth and life potential are key to breeding success. Farmers referred to their cattle as a saving that provides security (Rudi Haryanto, personal communication). In our economic evaluation, this can be represented by insurance and saving, depending on the purpose of raising livestock.

Some studies use complex indicators in assessing environmental indicators, such as air, water and soil pollution. On the other hand, environmental issues are not an important issue for smallholder farmers in Sonok area, air, water, and soil pollution from livestock is rarely considered. Key informants said that environmental issues that were considered by farmers were land use and manure use (Rudi Haryanto, personal communication). Farmers use agricultural residues as animal feed, while manure is used as fertilizer for agricultural land. Sustainability indicators that allow for assessment in sonok breeding systems are total land use, feed availability, manure production, chemical fertilizer use, and soil fertility.

**Table 2.** Selected sustainability indicators for sonok breeding system

| EES Issues | Issues | Sustainability Indicators |
|------------|--------|---------------------------|
| Economic   | Economically benefit | Farmers income<sup>1,2,3,5,6</sup> |
|            | Performance of cattle | Draught power<sup>5</sup> |
|            | Additional economic value | Growth<sup>5,6</sup> |
|            |                    | Reproduction<sup>5</sup> |
|            |                    | Saving<sup>3,5</sup> |
|            |                    | Insurance<sup>3,5</sup> |
| Environmental | Manure use        | Manure production<sup>1,2,5</sup> |
|              |                    | Chemical fertilizer use<sup>3</sup> |
|              |                    | Soil fertility<sup>4,6</sup> |
|              | Land use           | Total land use<sup>2,3,5</sup> |
|              |                    | Feed availability<sup>2,3,4,5</sup> |
| Social     | Cattle management  | Farm size<sup>2,4,5,6</sup> |
|            |                    | Feeding system<sup>5</sup> |
|            |                    | Housing<sup>1,3</sup> |
|            | Human well-being   | Time allocated for cattle<sup>5</sup> |
|            | Farmer educational level<sup>1,2,4,5</sup> |
|            | Social status<sup>1,5</sup> |
|            | Cultural value<sup>3,5,6</sup> |
|            | Health and diseases | Cattle diseases or health problems<sup>2,3</sup> |
|            | Human health and safety<sup>1,2,3,4,6</sup> |

Source: 1 Ramadhan et al [19]  
2 Siswandari [20]  
3 Gayatri et al [21]  
4 Marandure et al [22]  
5 Widi [17]  
6 Budisatria [23]

*Sonok* breeding system is a pearl of local wisdom, social issues become a fundamental issue. In terms of cattle management, *Sonok* cattle are highly considered by farmers. Cattle were tethered in front of the house every morning; then the farmer cleans the cattle and cages. So that the time allocation that is used by farmers and the number of livestock that allows it to be raised is an important issue and can be an indicator of sustainability. Although *Sonok* cattle are well cared for, cattle cannot be free from disease, so animal health and disease are essential issues. Madura cattle were used to
study the unique interaction between cattle and culture. As part of culture, cows become a part of social status. Farmers feel they have a high social status if they have high-value livestock.

4. Conclusion

Based on the result, it can be concluded that there were two stakeholders, primary and secondary stakeholders. Primary stakeholders consisted of cultural groups, farmers and policy makers. For secondary stakeholder consisted of local government, inseminator/veterinarians, butchers and traders. The sustainability indicators that can be used were economic benefits, management of cattle, and performance of cattle and additional function of cattle. The present stakeholders and sustainability indicators need to tested and confirmed with data to assess the sustainability of Sonok breeding systems.

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