Vulnerability and adaptive strategies on duck breeder in Pinrang District, Indonesia

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Abstract. In Pinrang regency of South Sulawesi, there is a livelihood system based on duck integration with paddy field that is not permanent in a location but moves by using the harvested fields. The purpose of this study was to analyze the vulnerabilities faced by duck breeders and to identify adaptive strategies in addressing these vulnerabilities. This research using a qualitative approach and research design using a case study. The implementation of this research begins in Pinrang Regency which is the starting point of the movement of duck breeding farm then continues on location/region according to the movement of duck breeding farm. The results of the study found that the context of vulnerability faced by duck breeders were seasonal changes and location changes. An adaptive strategy for duck breeders to survive was to choose the location of duck transfer, entrust ducks to group members/friends if they did not get the location, borrow money, saving, selling the assets, and strategies to combine some livelihood funds. The moving duck farmers could survive by using the adaptive strategies and face up the vulnerability.

1. Introduction
In Indonesia, duck is one of poultry that plays an important role in supplying animal protein needs for the community, both from egg production and from meat production. The population of ducks in Indonesia in 2016 is 47,424,151, duck egg production reaches 292,035 tons, and meat production reaches 41,867 tons [1]. More than 19% of egg needs are sourced from duck eggs, and the contribution of meat producers is still low at 1.23% of the total meat requirement in Indonesia [1].

In South Sulawesi, there is a livelihood system based on duck integration with paddy field that is not settled on territory but moved. Duck farms are one of the livelihoods of the community in some districts in South Sulawesi Province namely Sidenreng Rappang, Pinrang, and Wajo. They do duck breeding business between villages, between sub-districts and between districts in South Sulawesi by utilizing harvested fields. The destination areas for duck farming are Pinrang, Sidrap, Wajo, Maros, Soppeng and Luwu Utara in South Sulawesi Province and Polewali Mandar Regency in West Sulawesi Province. Duck breeders
keep their livestock ducks moving because they avoid the cost of duck feeds large enough. If livestock is intensively maintained, feed cost components contribute 60-70% to production cost [2].

Work as duck breeders are the main source of daily livelihood and this work has been passed from generation to generation. Every morning till afternoon breeders grazing ducks in paddy fields to get the seeds of scattered paddy and biota in paddy fields as a source of feed. The condition of wetland for grazing livestock is that the soil must be watery, which is the source of water from rainwater, irrigation, water pump, well or another water source. The rice farming ecosystem is characterized by relatively long flooded fields each season, so flooding becomes the core of the ecotype born in its interaction with the wetland community, and the ecotype survives from generation to generation [3].

In conducting activities as duck breeders, there are vulnerabilities encountered. Duck farmers move to face the context of vulnerability based on environmental displacement. According to Ellis [4] the context of vulnerability consists of external and internal environments that affect the livelihood of individuals, families, and communities. The meaning of vulnerability includes both natural or made by humans shocks and pressures that affect the livelihoods of individuals, households, and communities in accessing resources or capital[5].

The context of this vulnerability gives rise to shocks, pressures, tendencies, and communities. These shocks, pressures, trends, and seasonality affect the ability of access and utilization of livelihood capital for duck breeder groups. For the vulnerability to be overcome, duck breeder groups move through various strategies for livelihoods from duck farmers to be sustainable. The ability of duck breeders to develop and run a strategy to interfere caused by vulnerability can be overcome. Experience in dealing with disturbances provides reflective knowledge to duck breeder groups so that the context of vulnerability can be adapted at any time.

The purpose of this study was to identify the vulnerabilities faced by duck breeders and to explain the strategy of duck breeders in the face of these vulnerabilities.

2. Methods
This research was conducted in Pinrang Regency which is the starting point of the movement of duck breeders. The research was conducted for three Month, that is from January to March 2018. This research uses the qualitative approach and research design using a case study.

Data collection techniques used in this study are: (a) a participatory observation that is observing and participating in grazing activities on a duck breeder basis; (b) depth interviews with duck breeders moving in their paddy fields and homes during the trip; (c) documentation of collecting documents from duck breeder, local government and other sources supporting this research. The collected data is written in a field notebook.

Data analysis technique used is descriptive analysis. Data from depth interviews and participant observations were reduced based on the scope of the study, then classified according to the research objectives, then presented with a focus on the description of the context of vulnerability and adaptive strategies adopted in addressing the vulnerability. The findings of the further research are linked to a conceptual framework of sustainable livelihood systems.

3. Results and Discussion

3.1. Vulnerability Context

3.1.1. Season Change. The context of vulnerability in the dry season leads to a decrease in the quantity of water in the paddy fields. Ducks that are grazed in the paddy fields only get food supplies from the remains of rice that are scattered after harvest. The decrease in water quantity in rice fields causes some
worms, small snails and biota to disappear. Duck breeders usually do not get results because the ducks do not lay eggs. Although food is abundant from the rest of the harvest, if there is no water in the fields, ducks do not lay eggs. Water functions for the ducks in addition to a source of drinking water as well as a place to swim. In the evening ducks stay in the cage, and in the morning headed into the paddy fields. When the sun is scorching, ducks are herded to a shady place, usually on the paddy fields shaded by trees. At that time breeders continue to provide water in the basin for duck consumption. At four o’clock in the afternoon the ducks are being led back to the paddy fields to eat, at six o’clock in the afternoon the ducks are put into the cage and stay there till the next morning.

Another impact of vulnerability generated during the dry season is rat pests attack. In Pinrang, pests of mice attacked the rice fields around June, while in Sidrap district in late May and early June. The non-aqueous paddy field conditions resulted in a rapidly increasing pest population. This rat pest spends the remnants of the harvest and makes the cage in the paddy field, so the location of ducks will be reduced. In this situation, the farmer moves the ducks in his yard and guarantees the duck feed in the form of bran. They are willing to spend capital on the purchase of duck food. Principles of duck breeders move, although duck not laying the important ducks can survive. Such conditions make duck farmers move not to benefit, even suffered the loss of having to spend the cost of living for the location and the cost of transports back and forth.

The context of vulnerability in the rainy season is flooding. This vulnerability occurs when high rainfall and river water overflows, resulting in flooded paddy fields. Duck farmers suffer losses because water currents carry the ducks. If ducks have been swept away, then it is very difficult to find them again. According to the interview of one of the informants, the risk of losing ducks due to floods in Tonrongnge at the end of May 2018, resulting in the loss of more than 100 ducks laying more. This happened suddenly at night, at that time, no one was keeping in the rice field house. Duck farmers go home to stay overnight because the location of rice fields is still about 6 km. Breeders did not expect the event to occur. The cage where ducks live overnight, and farm roads and the paddy field is submerged in water. This incident occurred because of the location of paddy fields close to the river. This condition is detrimental to duck breeders.

Other vulnerability contexts that also occur during the rainy season, i.e., cages where duck livestock to stay wet and ducks experience cold. If the rainfall is high, the cage where the ducks live overnight can be submerged and muddy. Ducks do not favor this situation. Ducks cannot sleep, and their appetite decreases and affects the ducks productivity. This condition makes the ducks do not want to lay eggs and breeders have decreased income.

The vulnerability context to uncertain season condition affects the duck populations. Ducklings aged 1 month and just learning to be grazed in the fields have not been able to adapt to the environment. Seasonal changes will decrease the health of ducks. Ducks experience stress because suddenly it immediately rains in conditions that were previously hot. This condition makes ducks easily affected by flu, paralysis, and death. This will harm duck farmers.

3.1.2. Location Change. The context of vulnerability to location changes in duck breeders is the vulnerability in the transport process from the initial location to the next location. The vulnerability was commonly encountered when the transportation process goes further. For example, the case of Pinrang District was transferred to Wajo and Luwu districts. During the transportation process, the hot weather will have an impact on ducks. Ducks can die of heat, especially if the traffic jams or there is a police check on the road. Also, if the body condition of the duck is fat and the capacity of the car is not by the number of duck animals that are transported, it will cause the ducks to get stuck in the car which can cause death. At the time of transportation, ducks do not eat and do not drink. This condition will affect the production of duck eggs when they arrive at the location. On the first day usually until the seventh day the eggs only up to 20 grains, although in the initial location of egg production is good. If the location of paddy fields is
available for food and water, the production continues to rise. But if there is no water, the ducks will stop laying eggs.

The context of vulnerability regarding location change is the movement from the initial location to the next location. When duck breeders move their ducks to the next location, ducks need to adapt themselves to the environment. If the duck breeders move to the second location, duck production is affected. In the initial location there was still a lot of food and water, but farmers had already wanted to plant rice, so the farmers had to move locations. At the time of transfer at other locations food from the remaining rice is scattered a lot, but the condition of the paddy field is not watery. The water available is only for ducks. This condition results in reduced egg production and then stops laying eggs. Terms of duck livestock are lying if many food and paddy field watery. This situation is the best way that taken by duck breeder. The principle of duck breeders, which is important not to pay the cost of feed and its ducks survive.

The context of vulnerability that also faced by duck breeder in the event of a change of location that is acceptance of paddy field owner or farmer. Duck breeders move, may not immediately to move, but must contact the location determinants. If the location determinants have ordered duck breeders raised the ducks, then duck breeders can come to the location. When you arrive at the location, there are still fields that have not been harvested, so the duck breeders are not allowed to drain the water in the fields. The reason farmers do not allow because there are still locations of paddy fields that have not been harvested. If the rice fields are flooded with water, the soil will be muddy, the harvest car is difficult to enter in the fields and can damage the paddy fields. So duck breeders have to wait for the first location of rice fields until it has been harvested, then new water flowed. So egg production has not been normal because the available location is still narrow because the capacity of paddy fields cannot accommodate the number of ducks that continue to rise

3.2. Adaptive Strategies; What to do in Facing Vulnerability

3.2.1. Setting the Right Duck Movement Location. Strategy to determine the correct location of duck is a strategy used by duck breeders to move to meet the availability of duck feed. The achievement of the right location is inseparable from the group he owns. Collaboration between moving duck breeders groups provides benefits in the form of; ease of access location, water source, has a cage overnight which is located a bit high and there is also a paddy field house for an overnight. This happens because duck breeders already have a network to be invited cooperation in the movement of ducks. In this case, there are still norms that must be obeyed by the agreement so that this activity can still survive without having to find a location to other areas.

3.2.2. Pressing Production Cost. The strategy of suppressing the cost of production on the condition there is no leftover rice in the rice field, but there is water. To overcome the lack of food in ducks, they must guarantee their duck with corn. Farmer's strategy is to waste corn in the fields. Before the corn was first bathed first soaked in water one day one night. Ducks fed with corn on wetland, the ducks can lay eggs but produce less, because the amount of feed given is also limited. The results obtained only to cover the cost of feed and daily needs.

Strategy to reduce the cost of production is when farmers have fallen rice fields. These condition duck breeders have to leave the paddy field occupied. At the moment there is no open rice location for migration. Duck farmers to move ducks in the yard runny. Feed is given in the form of bran or corn. The composition of feed given does not match the requirement of duck feed per day/recorder. They reduce the cost of production because the price of bran and corn is high when farmers start to descend the fields. Ducks are prepared only to drink at any time and corn twice a day. If feeding is in the form of corn, duck livestock is not skinny, but if bran duck bark because bran purchases must be continuous but behind the price of the expensive brand. This condition is still ducked not lay eggs because the availability of aquatic
soil does not exist, so farmers take a strategy to reduce feed costs. Principles of breeders, which is important ducks survive.

3.2.3. Delivering Ducks to Members. Conditions in the rainy season, farmers began working on rice fields. Farmers who own paddy fields or holding rice fields, then duck farmers are doing this strategy to entrust their ducks to their members. The rule of thumb is that the result of the maintenance of the ducks during the deposit is the preserving right, provided that the number of ducks kept from the beginning should be the same if the owner returns the ducks. Other conditions also occur if duck farmers do not get grazing location, then they also entrust ducks to their members with the same rules of the game. Duck breeders principled let no benefits obtained as long as the ducks can survive.

3.2.4. Mortgaging and Selling Assets. In times of famine and droughts prolonged, there is no food for ducks. Duck breeders need capital to ensure their duck is to buy alternative feed. One strategy is to mortgage or sell assets owned by farmers. If breeders require large capital sometimes sell gold or motorcycle. If sometimes mortgaged gold if the required capital is not large. Duck farmers are not a problem selling or pawning gold because of the purchase of gold and motorbikes from the duck as well. They do the sale of assets so that the ducks can survive because if not given food, ducks will die and if ducks are sold we start capital from scratch again. An example case of Mrs. H. Gold pawning time of February 2018. Some ducks 1000 head. Address: Toe Kec.Tiroang is pining. The amount of money from the pledge of 5 million rupiahs.Used to buy a good quality brand for ducks.

3.2.5. Owe With Egg Traders. In times of famine and dry season prolonged, duck breeders have difficulty regarding capital. This capital is used for everyday needs and to guarantee ducks. Involvement of traders is one of the networks owned by duck farmers to get out of capital difficulties. The merchant provides loan money. The rules of the game that became the agreement that when the ducks lay eggs, then this duck breeder must pay the debt. Vice versa, when traders take their duck breeder eggs, then the money is stored first in the trader, later the breeders need newly requested or already want to leave the location. This cooperation generally takes place in the research location. Egg price given by traders is based on market price. Sample case on Mr. S. with some ducks 100 tail. The address is in Lanrisang District. Debt time of February 2018.Total loan in merchant 5 million.Used to buy corn ducks.

3.2.6. Using Savings. Adaptive strategies made by duck breeders are using savings. The use of savings as an alternative that made duck farmers move during a famine condition. This savings comes from the sale of eggs when the production of eggs of ducks increases. Duck breeders usually keep their money in traders. The process is when moving in one location, for example in Sidrap, then during Sidrap duck breeders eggs at the merchant egg without taking the money. Except for the needs of the sudden and also for daily needs. At the time want to move the location, then the breeder asked for money at the merchant. From this result breeders usually, save money in Bank BRI or buy gold. So if the breeder experiencing capital difficulties during the famine season and must guarantee the ducks, then the source of capital is to take from the savings.

Some farmers have anticipated the famine by preparing savings when they need funds both related to the production process of ducks and for household needs. Examples of cases that have been done Mr. S. with some ducks 1000 head. Lanrisang Address. Saving time at the end of February 2018. Total savings took 4.000.000. Used to buy corn for ducks.

3.2.7. Combine Amount of Livelihood Capital. One strategy that duck breeders use to survive is to combine social capital to access natural capital. Social capital used is networking and trust. Duck breeders
have this group. The members of the group are in the village, and there are also from other areas. They work together regarding location and grazing activities. If in Pinrang there is a harvest, then they call their members from other regions, vice versa. They help each other and trust each other. Among them, there already trust each other. Before entering the location, members in the location must report to location determinants. Determinants of this location are usually farmers, but there are also breeders. So duck breeders should not go around in one area without the location determination permission. The rules of the game determined by the location determiner must be adhered to by duck breeder. The existence of networks and trusts owned duck breeders can access paddy fields that have been harvested.

The results show that the vulnerability context faced by duck breeders is season vulnerability and location vulnerability. The existence of these vulnerabilities requires duck farmers to adopt strategies for the sustainability of duck farms. This is in the opinion of Ellis[4] the context of vulnerability consists of external and internal environment that affect the livelihood of every individual and family and society. The context of vulnerability includes certain natural or human-made shocks and pressures that affect the livelihood of individuals, households, and communities in accessing resources in the form of capital [5]. Vulnerability caused by the season, both the rainy season and the dry season make duck farmers have difficulty. In this case, concerning capital owned. The context of vulnerability in the livelihood pattern of the community includes trends such as economic or resource trends, e.g., shock, conflict, economic shocks, natural shocks, etc. and seasonal fluctuations such as price, production, health, employment[4–8]. These factors can have a direct impact on the community's assets and on the options available to them to seek lucrative livelihood strategies [4–6].

The impacts often experienced by climate change are erratic rainfall, declining yields, prolonged drought and shifting cropping season [9]. Various adaptive strategies that duck breeders do in dealing with this vulnerability make duck breeder can survive. Scoones [6] says that in the application of livelihood strategies, farm households utilize the resources they possess to survive. Thulstrup [5] describes how communities and households have responded to past social, economic and environmental changes, to assess how these responses will affect their ability to adapt to ongoing and future environmental changes.

Production strategies that duck farmers use to move in overcoming vulnerability can make duck breeders move on. Likewise, by combining some livelihood capitals such as utilizing social capital to obtain physical capital or use social capital to obtain financial capital. This is supported that livelihood strategies can also be viewed from the economic side of production through efforts to minimize costs and increase profits, requiring the existence of human and capital resources and social relations patterns also contribute to color in the strategy of livelihood [10].

4. Conclusion
The vulnerability faced by the shifting cultivator that is the change of seasons and changes in location. The strategies used to address these vulnerabilities are (a) establishing appropriate duck shifting locations. (b) Reduce the cost of production, (c) entrust ducks, (d) pawn and sell assets, (f) trader debt, (g) use savings and (h) combine livelihoods. By adopting adaptive strategies, duck breeders can face vulnerabilities so they can survive.

Acknowledgments
Thanks to the Ministry of Research, Technology and Higher Education, and LP2M of Hasanuddin University for bppdn scholarship and grant dissertation. Thanks to the Post-Graduate Program of Hasanuddin University for the opportunity to do this research.

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