

The Dynamics of Livelihood Assets on Moving Duck Farmers

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Abstract— Moving duck farming is a livelihood system that does not occupy a settled location but moves. Therefore, the relationship between livelihood assets, livelihood strategies, and livelihood outcome is influenced by the characteristics of the moving. This study aims to explain the dynamics of livestock capital of duck farmers moving at various distances in their moving cycle. Data collection techniques were participatory observation, in-depth interviews, and documentation. Comparative analysis was applied to see the dynamics of livelihood assets composition based on sequences and moving distances. The result showed that there was a dynamic utilization of livelihood assets based on the moving cycle between the travel process and the settling process at the grazing location. It was concluded that there were differences in the composition of the use of human capital, financial capital, physical capital, natural capital, and social capital between short-distance, medium-distance, and long-distance movements. This study found that the livelihood assets usage on moving duck farming was attributed to the moving traveled distance. At nearby movements, livelihood assets tend to be forgone for moving duck farming since they are also used for paddy fields. Livelihood assets, such as human, natural, and physical capital, are more dominant than the financial and social capital. The capital carries out to retrieve the fields after harvesting as a grazing site while sustaining that access. It can be concluded that the livelihood assets utilization in moving duck-based livelihood systems are dynamics based on the cycle and the distance of moving covered.

Keywords—livelihood system; livelihood assets; moving duck farmers; distance.

I. INTRODUCTION

The sustainability of a household's livelihood system is determined by the ability of these households to access livelihood assets and carry out livelihood strategies in dealing with the context of vulnerability [1]–[4]. In a variety of rural ecosystems in Indonesia, it has been found that the format of the strategy of the livelihoods taken is influenced by the income assets that can be accessed and the types of contexts of vulnerability faced. It has also been found that the context of vulnerability in various rural ecosystems has its characteristics. In oil palm ecosystems, the vulnerability context occurs in the form of changes in the hydrological cycle and pollution of pesticides [5], vegetation monoculturalization [6], and reduced food sources from annual crops [6]. In the ecosystem of cattle farms, reduced field of grassland, conversion of paddy fields and changes in seasons, is a context of vulnerability for the livelihood system [6].

From various previous studies, it was seen that the relationship between livelihood strategies, livelihood assets, and the context of vulnerability was elaborated. The context

of vulnerability has also been studied in various ecosystems. This study focuses on essential aspects of the livelihood system but has not been a particular concern in the previous study, namely the dynamics of livelihood assets. Livelihood assets are formed from interactions between human capital, financial capital, natural capital, physical capital, and social capital [4], [7], [8]. The dynamics of livelihood assets are traced to moving duck farmer ecosystems, where the composition of livelihood assets continues to change according to the movements of duck farmers. With that focus, this study wants to show that livelihood capital in a livelihood system is not static, but experiences dynamics.

The presence of paddy fields supports the sustainability of the moving duck farmer's livelihood system. Duck population in South Sulawesi in 2017 was 5,699,519 ducks, duck egg production reached 36,556,715 eggs, and meat production reached 2,821,262 kg [9]. Integration of rice plants with duck livestock has advantages because of the potential for weed reduction, pest and disease control, maintenance of fertility and biodiversity [10]–[12] and the continuation of the food chain in the rice ecosystem [13] and [14]. This means that the integration of livelihood patterns of paddy fields with duck livestock creates sustainability in

both. The purpose of this study is to explain the dynamics of livelihood assets of duck farmers moving at various distances in their move cycle.

II. MATERIALS AND METHOD

This study was conducted in Pinrang regency, South Sulawesi, Indonesia. This area is the first location for moving duck farms to take place since this area is adaptable for duck breeders [15]. The local government of Pinrang regency also supports duck farming development [16]. Data were collected on three types of duck breeders moving based on the distance traveled. The first type is duck farmers moving close distances, namely duck breeders who move within the Pinrang regency area, with a move distance of fewer than 30 km. The second type is duck farmers moving medium distances, with a moving distance of 30-70 km. The third type is duck farmers moving long distances, with a moving distance of 80-300 km. For each kind of selected cases of moving duck farmers as the focus of study.

Data collection techniques used are (a) participatory observation [17], namely observing and participating in moving grazing activities; (b) in-depth interview [18], which are semi-structured interviews that are repeated to duck farmers moving in paddy fields and houses during the transfer; (c) documentation [19], which is collecting records made by duck farmers moving during the movement process. The focus of the data collected is the dynamics of livestock livelihood assets during the movement cycle.

The data analysis technique used is comparative analysis [20]. Comparative analysis was applied in two stages. The first stage is the comparison of the composition of livelihood assets based on the moving cycle, namely when traveling and when settling at the grazing location. The second stage is the comparison of livelihood assets is based on moving distances, namely short distances, medium distances, and long distances. A comparison of livelihood assets is analyzed based on the dynamic composition of human capital, financial capital, social capital, natural capital, and physical capital.

III. RESULTS AND DISCUSSION

A. Movement Cycle of Moving Duck Farmers

Moving duck farms are used to utilize rice fields that have been harvested as food sources. The moving cycle is based on harvest time. Based on interviews with the informant in this study:

"People harvest in Sidrap regency at the end of February-March, so duck farmers from Pinrang regency move to Sidrap, and some also move to Polman regency. April to the end of May moved back to Pinrang regency, but from May to June, some farmers also moved to Luwu and Gowa regency (duck farmers/community leaders H.Bsr)".

Based on this cycle, the pattern of moving duck farms can be divided into three. The first is the close distance moving pattern, the second is the medium distance moving pattern, and the third is the long-distance moving pattern.

1) *The first is the close distance moving pattern:* Based on an interview with an informant who carried out a close distance moving pattern in this study:

"I keep ducks from the age of DOD until the age of 3 months. The duck farms were kept in the house for about three weeks and then transferred to the location of the rice fields that had been harvested, namely in Ulu Tedong, Watang Sawitto District, Pinrang regency, about 20 km from here for one month. After the harvest is finished in Soroe district, Pinrang regency, the duck livestock grazed in Ulu Tedong, Pinrang regency is moved back to the paddy fields in Soroe district, where I currently live (Bhrd. duck farmer)".

Regarding the close moving pattern, farmers only move in Pinrang regency, occupying a rice field location of about two months. They move between villages, between villages and between sub-districts pasturing ducks. Maintenance of ducks is done starting from DOD (day old duck) age ducks until the age of three months with a minimum scale of 1,000 fish; the moving distance is 2-20 km using a car with a rent of around IDR. 200,000/car. They graze ducks on harvested fields until they reach a selling size.

2) *The medium distance moving pattern:* Based on an interview with the informant who carried out the medium distance moving pattern in this study:

"I am grazing ducks in the paddy fields that have been harvested in Padanglampe district, Pinrang regency, then move to Cenranae Lanrisang district of Pinrang regency then move to Tonrongngnge district of Sidrap regency then move to Aressie district of Pinrang regency and back to Padanglampe district of Pinrang regency. The cost of transporting ducks to Tonrongngnge district of Sidrap regency is about IDR. 400,000, but when moving within Pinrang regency, the maximum transportation costs are about IDR. 200,000 / car (Arf. duck farmers)".

In the medium distance moving pattern, farmers are from Pinrang regency move to neighboring districts, namely Sidrap and Polewali Mamasa regency, for three months and occupied two-three locations. Some of them go to Polewali Mamasa regency for two months and move again to Sidrap regency for pastoral care for a month. This second pattern moving distance is closest to 30 km and at most 70 km. Transportation costs IDR. 400,000-IDR. 600,000 / car. The duck that is raised is around 700 ducks, and the products produced are ducks and eggs.

3) *The long-distance moving pattern:* Based on an interview with the informant who carried out the long-distance moving pattern in this study:

"Recently my duck livestock from North Luwu Regency (Masamba) for 50 days and spent the cost of transporting ducks of IDR. 1,500,000/car, then moved to Wajo regency for about 30 days. From Wajo regency, I moved to Akakae district of Sidrap regency, about 20 days later, moved to the Toe district of Pinrang regency for two months in my residence, and finally moved to the next village location in Boki district of Pinrang regency about 20 days (Hw duck farmer)".

The farmer moves from Pinrang regency to Luwu, East Luwu, or North Luwu regency and lasts two months there, then stops at Wajo, Soppeng, or Bone regency for a month then moves to Sidrap regency in the next one month and returns to Pinrang regency. Moving also occurred from Pinrang regency to Gowa regency for two months, then stopped at Maros regency for about a month, then moved to Polewali Mandar regency for about a month, and returned to Pinrang regency. Some from Pinrang moved to Wajo for two months, then moved to Sidrap regency a month and returned to Pinrang regency. The closest moving distance on this pattern is about 80 km, and the furthest is around 400 km. The cost of transporting ducks is IDR 750,000 - IDR 1,500,000/car. Duck herds are at least 900-1,200. The products are duck and egg.

The interview shows a household livelihood system whose sustainability depends on the moves. Livelihoods assets are managed for duck livestock as a source of livelihood; food for ducks can only be obtained from harvested paddy fields. Therefore, ducks are grazed following the harvest cycle of paddy fields in various locations. In the transfer between locations, the farmer earns a living, and the composition of managed livelihood assets experiences dynamics during the moving process.

B. Duck Farmers' Movement Process

After describing the cycle of duck farmers transfer. This study presents the process of movement. The process is divided into three parts: they are duck farmers' departure, duck farmers' arrival, duck farmers are in the location target, and duck farmers' back to their villages.

1) *Duck farmers departure the location target:* All duck farmers can access cars to transport duck livestock to the location of the moving, although generally the status of the lease and a small portion of private property. The car used to move duck is a minibus pickup with a capacity of 500-700 ducks and a truck with a capacity of 900-1200 ducks. For minibus pick up, it is generally used for close distance moving and medium distance moving. In contrast, for truck cars, it is usually used for long-distance moving, on the grounds of efficient transportation costs.



Fig. 1 Duck farmers departure to the movement location

Moving duck farmers feel the loss when moving small quantities of duck livestock to remote locations so that they take an alternative to use the truck with a large duck's capacity. The duck farmers bring some production equipment in the movement period. They bring nets and ropes to make shelter cages and limit the location in paddy fields. The duck farmers also bring basins for drinking water places and shelter boxes for eggs. The duck farmers bring some other stuff are tarps as protectors of ducks, machetes, flashlights, and non-production equipment, such as cooking utensils, eat and drink, clothes, mats, mosquito nets, and food supplies (figure 1). In general, duck farmers move to bring their motorcycles to the location of the moving. Ducks that are transported in cars should not be more than the capacity of the cars, and the moving of ducks is done in the afternoon to avoid the risk of dying due to overheating in the car.

2) *Duck farmers arrive at the location target:* When duck farmers arrive at the target location, it was seen that duck farmers work together to lift production and non-production equipment from cars. They make duck storage cages in paddy fields with an area of 100-200 m depending on the number of ducks. The process of making cages is very fast because it is done together. After the cage has finished, then the ducks are lowered from the car with the help of a net. Some duck farmers help drive ducks out of the car and partially drive them to the shelter (figure 2).



Fig. 2 Duck farmers arrive at the move location

3) *Duck farmers are in the location target:* The location of the paddy fields occupied paddy fields houses to spend the night and keep their ducks from disturbing humans and animals when grazed. Near the paddy field house, a cage is made overnight from a net that is about 1 meter high and located higher than rice fields. When a farm road is available, duck farmers make the cage overnight there. Inside the cage, several basins are stored as drinking water for ducks. Duck farmer activities every morning pick up eggs in the cage then store them in a bucket. After all the eggs are collected, they are then put in an egg storage box made of wood, which is about 1 m³ in size. If a farm road is available, the egg shelter is stored in a paddy field house and locked with a padlock. If there is no farm road, the duck farmer takes the egg using

two buckets with the help of a wooden block tied to a rope and linked to the bucket. The egg shelter is stored in the house of the location or the member of the duck farmer who lives in that location. Usually, duck farmers keep their duck eggs 3 to 5 days to be taken by egg traders. Duck farmers count their ducks before they are released from the cage. Every day around 6:00 a.m. to 5:30 p.m., duck farmers graze ducks in the fields to get paddy seeds scattered and biota that exists in the paddy fields as a source of food in the form of snails and red worms, and new growing paddy shoots. The designated paddy fields for grazing ducks, the soil must be runny. Such conditions of paddy fields result in ducks being able to lay eggs and increase duck body weight (Fig. 3).



Fig. 3 Duck farmers are in the target location

4) Duck farmers are moving back to their villages:

There are some conditions for duck farmers to move back to their communities:

- The food source in the paddy fields where the moving has diminished. In this condition, egg production will decrease so that moving duck farmers to move the ducks to their area and look for alternative moving locations if they have not harvested in their fixed locations. If you do not get an alternative moving location, the moving duck farmers to his house and buys made man foods while waiting for the location of his paddy fields to open. This is done by duck farmers moving so that their duck can survive.
- The farmers will process the paddy fields. In this condition, the duck farmers must leave the location of the paddy field, although there are still many food sources available. This is a rule that must be adhered to by moving duck farmers.
- Paddy farmers harvest in their villages. In this condition, farmers move their ducks back in their villages (figure 4).



Fig. 4 Duck farmers are moving back to their villages

When going to leave the location, duck farmers ask permission to location determinants, duck farmers, farmer

groups, and communities around the grazing location. Duck farmers move to do this so that trust and networking remain sustainable. All production and non-production equipment is put back into the sack. Duck farmers who do not access farm roads, their ducks must be herded on the side of the road and stored in temporary shelter cages. The duck must be checked in the mouth and counted the amount when it will be raised in the car. Duck's condition must be strong and healthy. If it is exposed to rainwater before it is raised in a car, then duck feathers must be dried first. This is done to avoid the risk of ducks dying during the trip.

C. Dynamics of Livelihood Asset

Livelihoods are composed of the interaction of human capital, financial capital, social capital, natural capital, and physical capital. The capital composition experienced dynamics during the transfer of duck farmers. On short distance, medium distance, and long-distance movements, some assets are utilized during travel and living in the intended location.

The composition of livelihood assets is based on interviews with informants who carried out close distance moving pattern in this study:

"I occupied the paddy fields location when the moving to Ulu Tedong, Pinrang Regency with an area of about 7 ha. My family gave me the location of the paddy fields. Family involvement can be petrified because I did not leave the area. The paddy fields, I occupied by the pastor, provided food and water from irrigation sources. I spend a maximum of IDR 200,000 per car for duck transportation. The number of ducks when I moved to Ulu Tedong, around 1,300 were two months old. This duck will be sold at the age of 2.5 - 3 months; the price is IDR 30,000 - IDR 35,000 (duck farmer Bhrd.)"

From the results of interviews and observations in the study locations, in the pattern of close moving, utilization of livelihood assets is longer carried out when settling at the grazing location than during the trip. This is due to the short travel time at close moving. The departure and return trips predominantly involve small amounts of human capital and are sourced from the family. Physical capital is in the form of roads between villages and sub-districts in one district, as well as financial capital in small amounts for the cost of transporting ducks. At the location of the transfer destination, the dominant capital utilized is natural capital in the form of harvested paddy fields in the Pinrang regency area, with an area around 700 ducks and two months grazing. Access to utilizing the paddy fields is based on the willingness of rice field owners, some of whom are still related to duck farmers so that the social capital needed is still on a low scale. Moving grazing is carried out to raise ducks, income from the sale of ducks for two seasons a year. In households involved in ranching, they move at close range, some of which are allocated to paddy fields farming.

The dynamics of livelihood assets of duck farmers moving from close distance duck patterns are characterized as follows:

- The allocation of longer-term asset utilization for the grazing process to stay in the destination compared to the process of leaving and returning.

- The period of leaving the location of a residence for a living in the year is relatively short.
- The composition of dominant livelihood assets utilizes human capital, natural capital, and physical capital compared to financial capital and social capital (Fig. 5).
- The income of households is not entirely dependent on moving livestock farming; some of their revenue comes from paddy fields farming.

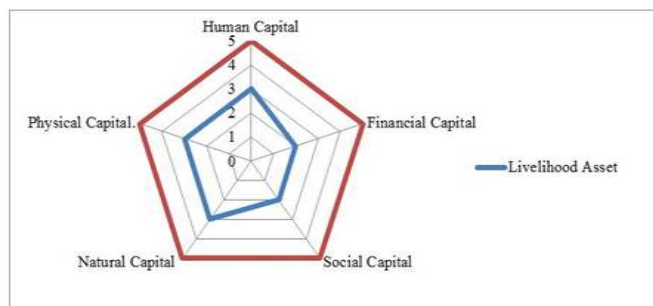


Fig. 5 Dynamics of livelihood asset composition on the close distance moving pattern

The composition of livelihood assets is based on interviews with an informant who carried out on the medium distance moving pattern in this study:

"I am now in Tonrongnge Village, Baranti District, Sidrap Regency. Every time I harvest rice, I will come here. I was invited by fellow duck farmers who lived here. So, if the rice harvest season is in Pinrang regency, then I invite him also to Pinrang regency. I have 500 laying ducks and occupying around 10 ha of paddy fields. Egg production now starts to rise by 340 grains because the fields occupied are available for food and water (Arf. duck Farmers) "

From the results of interviews and observations in the study locations, in the medium distance moving pattern, the utilization of assets on the journey to depart and return take a considerable portion. This is due to the moving distance reaching 70 km and moving twice a year before returning to his home in Pinrang regency. Human capital requires four to six people to raise and lower duck groups from truck cars when leaving or returning. This human capital must have enough knowledge and skills to create a net that encloses a group of ducks so that they do not scatter when they arrive at their destination. At the destination, skills are also needed to herd the cattle from the cage to the paddy fields and vice versa, the skills to protect duck groups from dog attacks, monitor lizards and theft, and picking up duck eggs.

Financial capital is needed in large quantities to rent trucks in transit and living costs at grazing locations. Social capital plays an important role in the form of networks, mutual trust, and reciprocity relations with residents who manage grazing locations, fellow farmers who can replace livestock guarding, traders for egg marketing, and community leaders to protect from disturbances of residents. Natural capital is needed in large quantities and long usage at the destination. This natural capital is in the form of irrigation canals and paddy fields, which are harvested as a source of water and nutrients that allow ducks to grow and lay eggs productively. Physical capital used is inter-district

roads, inter-village roads, and farm roads as a means of moving and grazing. Physical capital also includes production equipment in the form of net cages, shelter boxes for eggs, ropes, machetes, hoes, buckets, basins, knives, and non-production equipment including cooking, eating, drinking, clothing, mats, mosquito nets and gas cylinders, as well as food ingredients in the form of rice, instant noodles, and dried fish. Households involved in this pattern entirely rely on livelihoods on moving to a farm and leave homes for an extended period.

From this description, it can be concluded that the dynamics of livelihood assets of duck farmers moving from medium distance patterns have characteristics as follows:

- The allocation of time for the utilization of assets on the journey to leave and take a large portion.
- The period of leaving the residence location for a process of earning a living for a year is quite long.
- The composition of dominant livelihood assets utilizes social capital to access paddy fields after harvest from the owner at the destination (Fig. 6).
- Household income depends entirely on moving duck farming.

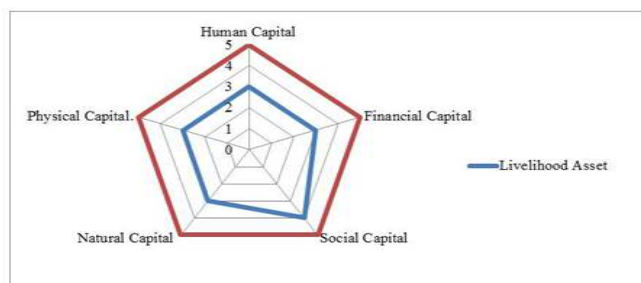


Fig. 6 Dynamics of livelihood asset composition on the medium distance moving pattern

The composition of livelihood assets is based on interviews with the informant who carried out on the long-distance moving pattern in this study:

"When my ducks were in Masamba, North Luwu Regency, the production of duck eggs was good, because there were many food sources and water in paddy fields. Then moved to Wajo regency, here there was food but there was no water flowing through the fields, the water source from the ground used a water pump, resulting in lost egg production. We just surrender, so that ducklings do not lay eggs but can survive. So, the cost of living during the transfer uses the savings from Luwu, but if the savings have also been used up because it is used for other needs, then we borrow from the egg traders, then lay new duck eggs are paid. When I moved to Akakae Sidrap Regency for about 20 days, I only got 20 egg racks (Hw. duck farmers) "

From the results of interviews and observations in the study locations, in the long-distance moving pattern, process trips depart and return to take portions of relatively equal income assets than when mental at the destination location. This is due to the moving distance (80-400 km), and the number of grazing locations visited (3-4 districts) with a relatively short duration for each location (one-two months). Human capital in long-distance moving patterns is used in high numbers and intensity [21], [22]. Human capital is

involved with the knowledge and skills to raise and a lower group of ducks from the truck, keeping the ducks in the truck during the trip, dispels duck at the destination location that does not have the farmer, making the cage nets for gathering the group of ducks, herding and guarding a group of ducks on paddy field plots, and protect the ducks' group of animal and human disturbance.

The second dominant capital that plays a role in moving duck farming long-range patterns is social capital [23]. This social capital is in the form of networking and mutual trust with pastoralists, fellow duck farmers, egg traders, duck traders, irrigation officers, community leaders, local government, and surrounding communities. The existence of networks for mastering grazing locations in some remote areas must be maintained because it is challenging to build new networks. Social capital in the form of reciprocity relationships is also used in the form of cooperation with traders, where traders provide capital assistance to duck farmers and duck farmers must sell their eggs to traders.

Physical capital [24] is utilized with higher intensity in the form of road infrastructure between districts during the process of moving, village roads, farm roads, and irrigation networks at the destination, as well as production and non-production equipment while at the destination. Specific production equipment in this pattern is a water pump because, in long-distance moving, there are locations that lack water, so farmers must use pumps to meet the needs of ducks. Other equipment is relatively the same as that used in the medium distance moving patterns, including non-production equipment.

Financial capital [25] is also used in large quantities in the form of livestock transportation costs during the process of moving, living costs for farmer groups while at the grazing location, and costs of equipment and materials for grazing. The cost of a car to transport ducks reaches IDR 2, 000,000 for one movement, and in one district, there can be three shifts. For example, in the Luwu regency region, which at any time there is a paddy planting location, there is a location where the processing of paddy fields is faster so that the time to grazing ducks is limited. In this condition, the farmer immediately moves to another location and requires alternative feed costs while waiting for the opening of a new location. When they moved again from Luwu regency to other locations such as regency of Wajo, Soppeng, or Bone regency and settled there for a month, and then proceeded to Sidrap regency and stayed a month before returning to Pinrang regency, the transportation costs increased.

There are also certain areas that require rental fees for paddy fields for grazing, thus increasing the cost of the land [26]—owned natural capital in the form of paddy fields covering an area of 10-20 ha to accommodate around 1,000 ducks, dominant layer ducks and some four-month-old ducks. The moving location is adjusted to the age of ducks being grazed. Water is accessed from irrigation channels, but in some grazing areas rely on rainwater and water pumps. This causes that during the dry season, ducks do not lay eggs and are only maintained to survive. The dynamics of livelihood assets of duck farmers in long-distance moving patterns have characteristics as follows:

- The allocation of time for the utilization of assets relative to the needs during the process of travel with needs during grazing at the destination.
- The process of leaving a house to live for a long period of time.
- The composition of the earning assets is dominantly utilizing social capital, but other capital is also used in high intensity (Fig. 7).
- Households depend entirely on income from moving duck farming.

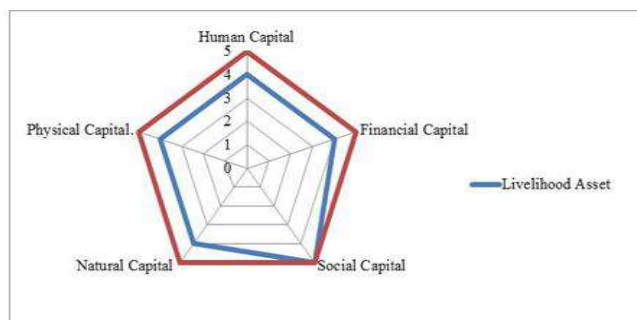


Fig. 7 Dynamics of livelihood assets on the long-distance moving pattern

IV. CONCLUSION

This study found that the utilization of livelihood assets on moving duck farming was associated with the distance of moving traveled. At close range movements, livelihood assets tend not to be utilized maximally for moving duck farming, because livelihood assets are also used for paddy field. In this pattern, livelihood assets in the form of human capital, natural capital, and physical capital are more dominantly utilized than financial capital and social capital. In medium-distance movements, livelihood assets are fully used for moving duck farms, where the utilization of income assets for the process of departing and returning home takes a large portion. In this pattern, social capital is more dominantly utilized than other capital; the social capital serves to access paddy fields after harvesting as a grazing location. In the pattern of moving over long distances, livelihood assets are also fully utilized for moving duck farming, where the utilization of the travel process is almost the same as a grazing process at the destination location. In this pattern, all livelihood assets are used in high intensity, but social capital is more dominant than other capital. The capital serves to access the fields after harvest as a grazing location while maintaining that access. It was concluded that the utilization of livelihood assets in moving duck-based livelihood systems had dynamics according to the cycle and the distance of moving traveled.

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