

Integration of the ecological vegetables and community cattle breeding in Long Lan village, Luang Prabang province, Laos

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Introduction

For the Hmong people in Long Lan village, cows are not raised simply for the significant revenue or assets they provide families; they are also of cultural and religious value. On death, the soul of the deceased can return to his/her ancestors only when and if the soul of the sacrificed cow accompanies it. In the religious festivals of the Hmong people held annually, such as 'Tong Xenh' and 'Thu Ti', it is compulsory to have at least one cow to sacrifice to the gods of nature. The meaning of the ritual is to pray for the protection of the gods of nature to bless the peace and prosperity of the whole community. For that reason, from the early time when migrating to live in the Phou Sung Mountain, in addition to focusing on cultivation and raising pigs and poultry, Hmong households have also accumulated economic sources to invest in cattle, especially cows and horses.

Before the American war period, the Hmong in the Phou Sung Mountain had many cows, mainly raised in the forest near the upland fields of families for easy care and protection. However, during the fiercest fighting time, due to the American bombs dropped in the Phou Sung mountain area, most of the cattle of the families died, and only some pigs and chickens were left.

At the end of the war in 1975, families continued to breed and expand their herds of cattle. Given the capital that was accumulated from the cultivation and sale of opium, after liberation, in 1975-1977, about 30 households in Long Lan village were able to buy cows, with an average number of 3-4 cows per family. At that time, these families mostly bought cows by exchanging one pair of silvers, about 8 million kip in current value, for one cow. As a valuable livestock, during this time households mainly kept and released cows near their houses and around the residential village. Each household had to make fences around their house to keep animals away from the living areas to avoid problems of hygiene. This solution was implemented by households for some time, but it did not thoroughly solve the issue of environmental sanitation. After that, the whole community together made a fence around the village to keep out the animals. This solution was implemented and the problem of hygiene was solved. However, in 1980 the government opened a road crossing the village.

This allowed cows to enter into the living area again and cause environmental and hygiene problems.

Given the above issues, some elderly and village leaders organized village meetings to agree on making two community grazing areas, far from the residential zone. Although having community-grazing areas, families still have to manage their own cattle. In addition, the community also planned a separate grazing area for pigs of the families in the village. This area is located near the residential zone, to be convenient for families to take care of their pigs.

Due to the abundant sources of grass and water as well as fresh environment, during the period from 1983 to 1989, the cattle of households increased significantly. However, the difficulty was the increase in conflicts among families related to cows. As the cows of families were released in the same place, when a young cow was born, villagers were confused as to which family the young cow should belong to. This led to the situation of different families recognizing the young cow as their own.

Around 2006-2009, after the program of community based land and forest allocation including local knowledge based land use planning, CHESH Lao/SPERI continued supporting families in Long Lan via saving-credit revolving funds to invest in animal husbandry. As a result, the number of the cows of the families significantly increased. Then, Long Lan zoned different community grazing areas, mainly located on the top of Phou Sung Mountain, adjacent to the cultivation areas. Here, the cows of the families are grazed according to the community regulations. The regulations were aimed at caring for, protecting and isolating the spread of the disease, and avoiding conflicts between families as well as damage to crops.

The case study found out that agricultural production of Long Lan is supporting three core factors which ensure sustainable livelihoods of families. The first of these is that households are still maintaining their basic rotational farming system. This is helping families to be self-sufficient in terms of food, income and the accumulation of long-term assets. The second factor is that Long Lan's agricultural activity has shown strong indicators of effectiveness and sustainability relating to livelihoods, environment and social ecology. At the same time, this type of production is creating significant employment opportunities for villagers, especially women, young people and the elderly. The third factor is that in addition to the cultivation of ecological vegetables and upland fields, community grazing in Long Lan village is of significant importance. Besides its cultural value, the activity of raising cattle in Long Lan is considered a significant source of capital and asset accumulation for the majority of households.

Community based rotational raising cattle

One of the initiatives of the Long Lan to ensure the economic, social and environmental value of livestock is the planning of rotational community grazing. Accordingly, Long Lan has four different areas of community cattle raising. Here the cattle of families in the village are rotationally grazed according to the grass growing cycle, as well as managed on the basis of community rules.

The total area of the four community grazing locations is about 1,565.75 ha. However, in recent years, cows of families in Long Lan village are mainly breeding in two areas, Phou Sung and Ca Xia. Each area is used for breeding for about 3 years, then they turn to the second area. These areas were selected based on criteria drawn from experiences of elderly and good cow raising families as well as those who understand the ecological and landscape features of Phou Sung Mountain. The criteria were:

First, it must be an uninhabited are, far away from the residential zone to avoid environmental sanitation problems affecting the health of human, as well as convenient for the control of disease. At the same time, this community grazing area should not belong to the locations designated as farming areas.

Second, there must be a variety of different types of grass to feed the cattle. In addition, there should be a variety of plants, especially bananas, to be used to supplement water in the dry season, when the water in the ponds is exhausted.

Thirdly, materials such as bamboo, rattan and wood should be available to make the fences surrounding the grazing area. These areas should also be convenient and easy to track and protect in order to prevent cows from eating and destroying crops in the upland fields.

Fourth, it should be in terrain that is not too complicated and sloping to avoid the risks of endangering the cattle as well as people during the time of taking care of their cattle. At the same time, it should not need much effort to make protective fences if the grazing areas are in favorable terrain conditions.

Fifth, there should be water available for cows to drink, especially in the dry season. If the area does not have ponds or water reservoirs, especially in the dry season, then there should be forest trees, such as bananas, which contain water, available for cows to eat.

Sixth, it should be an area where cattle have never been infected before. According to the experience of villagers, if the areas were selected in which a disease had occurred before, the germ could be very easy spread to their current herds.

Seventh, they should be places where the previous cattle had grown fast. Especially, where mother cows had given birth to many healthy calves.

In addition to their cultural and religious values, the herd of cows is contributing significantly to the income of households in Long Lan village. On average, the economic value of the herds amounted to 13.58% of their total income. By comparison, if vegetable production provides a stable source of income, and distributes income evenly between the months in the year, cattle raising provides a "cumulative" source of assets / capital for the households in Long Lan. If there is no need for the greater expenditure, such as for buying land, a car, or building new houses, then families will not have to sell cattle. Therefore, the asset (cattle) in that year will continue to accumulate for the next year. On the other hand, when any household has a big event, such as a funeral or ritual ceremony, the family has its cows ready, so it is not necessary for them to buy a cow. Recognizing this, currently many households in Long Lan village, besides other types of farming, tend to focus on livestock in order to accumulate capital for expanding their production.

Integration between livestock and ecological vegetables

Unlike many places where natural resources are exhausted due to intensive cultivation for high productivity and income, so far, families in Long Lan very much care about improving the soil so that the soil in return will nourish the crops. One example of this is the combination of livestock and cultivation, notably vegetables with cows and horses. Livestock are grazed in the community planned forest areas. These locations are situated at a higher elevation than the swidden fields. At the lower locations, normally in valleys, villagers often grow vegetables in combination with different types of agricultural crops. According to 2017 statistics, there are currently 55 households raising cattle, including 380 cows and 75 horses.

Livestock in the community forest areas far from the residential zone do not create environmental pollution, but provide a significant source of nutrients in the form of cow and horse dung for the natural ecosystem, particularly vegetables and upland rice. It is estimated that, on average, each animal produces about 6 kg of manure per day. As a result, the amount of manure collected from the entire village cattle herd is about 2,730 kg per day. If it is calculated for the whole year, the amount would be 982,800 kg.

Animal manure is seen as a significant source of nutrients for the growth and development of forest trees in the areas where cattle are raised. In return, this natural vegetation is a source of food for livestock. This is a special nutritional cycle used by the people in Long Lan village.

As the grazing areas are located at the highest elevation, this allows the livestock manure to flow down into the cultivation areas to supplement nutrients and humus in the soil. Therefore, these farming areas are continuously maintaining their fertility throughout the production cycles. In addition to the land and climate characteristics, maintaining the nutrients supplied from the grazing area is one of the key factors that contribute to sustaining the harmonious farming system of Long Lan.

Moreover, the rotating community grazing method could ensure that the vegetation, especially grasses and plants for cows' feed, properly regenerate in each livestock area. Continuous livestock production in one area would result in a scarcity of feed for cow and that would affect the growth and development of the herd. In addition, having livestock continuously in one area would compact the soil in the area. Therefore, organisms such as worms would not have a suitable environment for development, and forest seeds would not have favorable conditions for regeneration. Hence, the regeneration of forest vegetation, including grasses, would be slowed, or prevented altogether.

As analyzed in the ecological vegetable cultivation section, the zoning of production areas is closely linked to the forest and livestock areas. These cropping areas are always selected and planned in valleys surrounded by natural forests and community grazing forests. Every year, 455 cows and horses of 55 families release about 982,800 kg of manure into the natural ecosystems (including forest and farms). This source of organic nutrients is very important for meeting the nutritional needs of plants, especially in areas of continuous vegetable cultivation (not fallow).

In addition to these above two factors, the rotation of cattle around different livestock areas helps to reduce the risks of disease infection, as continuous grazing of livestock in one area provides a suitable environment for the germination of diseases.

Conclusion

The people in Long Lan village have accumulated a lot of experience related to techniques and solutions in agricultural production in general, and local eco-vegetable cultivation and cattle grazing in particular. These experiences involve the appropriate and harmonious combination of local ethnic knowledge in upland cultivation and newly adapted techniques to ensure the sustainability of a production system that does not harm the natural forest ecosystem, landscape characteristics and other natural conditions.

Nature-based farming, particularly the integration between ecological cultivation and livestock, in Long Lan village has shown strong indicators of effectiveness and sustainability in relation to livelihoods, the environmental and social ecology created by the three core

activities that make up a solid 'tripod' of values supporting the sustainable livelihoods of its families: Households still maintain their rotational farming; ecological vegetable cultivation, despite its small size, providing additional nutrition and a major source of income for the vast majority of households; and besides, ecological vegetable production and upland rice cultivation, community-based cattle grazing in Long Lan providing a vital source of accumulated assets for the majority of households in the village. Therefore, the experience and techniques of animal husbandry in Long Lan should be introduced to other communities in the province, as well as integrated into the livestock development plan of the local government.