Journal of Economics, Finance and Management Studies

ISSN(print): 2644-0490, ISSN(online): 2644-0504

Volume 4 Issue 06 June 2021

Article DOI: 10.47191/jefms/v4-i6-05 , Impact Factor: 6.228

Page No.- 709-715

Shifting Cultivation and Strategies to Cope with Food Scarcity of Ethnic Minorities in Nghean province, Vietnam

Tran Xuan Minh[1], Nguyen Thi Tieng[2]

[1,2]Institute of Agriculture and Natural Resources, Vinh University, 182 Le Duan, Vinh City 43108, Nghean, Vietnam

ABSTRACT: Shifting cultivation is still an important form of agricultural production and is suitable for mountainous areas. To ensure food security and improve the lives of mountainous residents, it is necessary to have active swidden management measures based on local experience and technical advances to exploit land resources effectively and sustainably. This paper concludes that an effective shifting cultivation control strategy would require (1) Changes in awareness, farming practices and customs of local people; (2) Changes in policy institutions such as granting land ownership rights to shifting cultivators, linking shifting cultivation areas with local and regional market centres through infrastructure development, and provision of necessary support services such as extension, credit and marketing.

KEYWORDS: Coping strategies, Food scarcity, Shifting cultivation, Swidden agriculture, Nghean (Vietnam)

I. INTRODUCTION

Shifting cultivation can be considered as a form of "Shifting Agriculture" (Ney & Greenland, 1960; Robison & McKean, 1993; Aweto, 2013), "Slash and Burn Agriculture" (Peters & Neuenschwander, 1990; Palm et al., 2005) of the ancestors of the Vietnamese and other ethnic groups living in the mountains, in which the cultivation period is usually shorter than the fallow period (Mertz, 2002).

Shifting cultivation occurs under different conditions and in different forms (Mahapatra, 1983; Mertz et al., 2012). However, the general characteristics of this farming system include the following stages: 1. Site selection; 2. Cutting; 3. Burning; 4. Cropping; 5. Following (Spencer, 1966; Do, 1996), in which fallow time depends on population density, land demand, soil fertility and farming practices. This form of agriculture includes primary tools and techniques, low input, and self-sufficient of production and consumption (Geertz, 1963; Ruthenberg, 1980). Therefore, shifting cultivation is considered as an environmentally suitable form of land use when the fallow period is long enough to regenerate soil nutrients and vegetation cover (Ramakrishnan, 1984; Warner, 1991). Until the 1970s, shifting cultivators used to keep land fallow for 15-20 years. However, the growing population combined with expanding government control over common resources, including forests, has forced shifting cultivators to shorten the fallow periods, leading to deforestation, soil erosion, depletion of soil nutrients and loss of biodiversity (Palm et al., 1996; Gafur et al., 2000).

Although the government has made many efforts to gradually reduce the area of shifting cultivation and convert to intensive fixed farming, up to now this form of farming has continued to exist in the highlands. The reason for this existence is due to Food security is still a difficult problem to solve in the highlands, even though we already have rice for export; Shifting cultivation is a traditional farming method, with a long-standing relationship with the ethnic minority community both in terms of culture and spiritual life; Shifting cultivation is an important place for food production and local food supply for places where there is no condition to develop wet rice. Thereby, it can be seen that at present, shifting cultivation is still an important form of agricultural production and is suitable for mountainous areas. To ensure food security and improve the lives of mountainous residents, it is necessary to have active swidden management measures based on local experience and technical advances to exploit land resources effectively and sustainably.

II. METHODOLOGY

2.1. Study area

The study area is 3 mountainous districts of Nghean province, where the ethnic minorities - whose life is closely associated with forests and mountains-live. With high mountainous terrain, complicated division, difficult traffic, harsh climate. People's education level is low, farming practices are outdated, life is still very difficult. The swidden area in Nghean is 46478.2 ha, distributed at altitudes of 300 m or more and mainly in 6 mountainous districts; in which Ky Son, Tuong Duong and Con Cuong are the 3 districts with the largest swidden area.

Nghean is directly affected by the tropical monsoon climate. The average temperature varies from 23-25^{o}C; the highest temperature in July: 39-41^{o}C; the lowest temperature in January: 8^{o}C. The average rainfall is 1450 mm but unevenly distributed in space and time, the rainy season accounting for 80% of total annual rainfall.

2.2. Data Collection

The methodology consisted of the collection of secondary data through consultation of existing documents, interview of key informants, and the collection of primary data through surveys conducted in the research area. The participatory approach was used in the field for exploratory survey in the whole site. Cases studies were used for a more detailed characterisation of farmer's priority-setting and strategies for shifting cultivation management.

Table 1. Summary of some information about surveyed households

	Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)	150	150	150	450
Information about the head of the household				
- The average age (year)	44.97	35.55	45.39	42.84
- Head of household in working age (%)	64	88	60	71
- Average income/year/household (1000 VND)	15.536	5.366	18.694	
- Average income/year/person (1000 VND)	2.877	868	3.368	
- Main source of income from shifting cultivation (%)	70	62	40	57
- Average food (kg/person/year)	351	138	324	
Information about ethnicity (%)				
- Kinh ethnic group	18	6	16	13
- Khmu ethnic group	22	12	6	13
- H'mong ethnic group	20	40	20	27
- Tay ethnic group	10	4	6	7
- Thai ethnic group	26	28	46	33
- Other ethnic group	4	10	6	7

III. RESULTS AND DISCUSSION

3.1. Crops on swidden land

Rice is usually grown for 1-2 years and then fallow for 2-3 years. However, in our opinion, with such a short fallow period, the soil is still degraded by nutrients, most people believe that the soil has deteriorated because rice yield tends to decrease in recent years. Rice is usually sown in May when the rainy season begins. The most common method is to poke a hole in the ground with a stick, then drop in seeds. No fertilizer is needed; the burning is enough. The hole is about 2-3 cm deep, sow 5-7 seeds/hole, the distance between the holes is 30 cm × 40 cm. The average yield is 3-3.5 tons/ha, with such rice production, most of the interviewed households believe that there is enough rice to eat.

Maize is the main crop on swidden land. 58% of interviewed households consider that maize is the most suitable crop. Maize is also sown in May when the rainy season begins and harvested at the end of August every year. Maize is sown for 1-2 years and fallow for 2-3 years, mostly local varieties, with low yield (1-2.5 tons/ha). Most of the harvested product is used for food, partly for livestock.

Cassava is grown in April-May, using mainly local varieties, without fertilizing, with a density of 15,000 roots/ha. After planting 2-3 years to harvest, the average yield is 6-7kg/root. Cassava is mainly for making wine and for livestock.

Table 2. Suitable crops and fallow time on swidden land

	Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)	150	150	150	450
Total surveyed area (ha)	80.55	228.75	129.75	439.05
Percentage of suitable crops (%)				
Rice	20	14	24	19
Maize	50	65	58	58
Cassava	20	6	8	11
Other	10	15	10	12
Percentage of fallow time (%)				
Continuous production	95	85	90	90
Fallowing < 3 years	5	10	7	7
Fallowing > 3 years	0	5	3	3

3.2. Economic efficiency in the use of swidden land

As for the cost of using swidden land, Table 3 shows that the average total production cost per hectare of swidden land in the surveyed units ranges from 2.7 to 3.5 million VND. The economic efficiency obtained per hectare of maize or cassava is higher than that of rice. The reason is that the average production cost for growing one hectare of rice (seeds and materials) is higher than that of maize or cassava. Moreover, the demand for maize and cassava for livestock is increasing, so they have a higher and more stable price than rice.

Shifting cultivation mainly meets the self-sufficient needs of households, to evaluate economic efficiency, we evaluate the efficiency of using labour resources from production on swidden land. The results in Table 4 show that labour efficiency from production on swidden land has also increased in recent years. 65% of interviewed households believe that the average income/working day from production on upland fields has increased compared to before.

Table 3. Cost of production on swidden land

	Ky Son	Tuong Duong	Con Cuong	Average
Total cost (million VND/ha/year)	3.531	3.1	2.79	3.14
Rice (%)	15	15	15	15
Maize (%)	28	24	22	25
Cassava (%)	13	16	18	16
Vegetable (%)	6	10	9	8
Other (%)	38	34	36	36

3.3. Social efficiency in the use of swidden land

Social efficiency in the use of swidden land is mainly considered in terms of the ability to meet the demand for agricultural labour, the level of income per working day of households for the area of swidden land. 68% of interviewed households consider that the current swidden land area is enough to meet their labour needs. 7% of interviewed households consider that they must hire more workers to serve production needs on upland fields. 77% of interviewed households want the government to allocate more swidden land for production.

Thus, the existing swidden land area of the interviewed households can only meet over 68% of the households' labour needs. And over 70% of interviewed households want to be allocated more swidden land for production although swidden production still faces many difficulties and production efficiency is not high compared to other occupations.

Table 4. Social efficiency in the use of swidden land

	Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)	150	150	150	450
Job (%)				

- Satisfying labor needs	80	52	72	68
- Hire more workers	4	16	0	7
- Get more farming land	74	80	46	77
Labor efficiency (%)				
- Income per working day increase	64	36	94	65
- Income per working day decreases	34	46	4	28
- No ideas	2	20	18	13
- Average income/working day < 30,000 VND	0	24	0	8
- Average income/working day (30,000 - 50,000 VND)	84	60	42	62
- Average income/working day > 50,000 VND	16	0	56	24

3.4. Impact of shifting cultivation on the environment

The effects of shifting cultivation on soil erosion, soil pollution and fertility as well as a water supply for shifting cultivation are shown in Table 5. The results show that:

Soil erosion: 84% of interviewed households consider that the use of swidden land increases soil erosion. 21% of households consider that the use of swidden land reduces soil erosion.

Soil pollution: 44% of interviewed households consider that the use of swidden land causes increased soil pollution. 24% of households consider that the use of swidden land reduces soil pollution.

Soil fertility: 13% of interviewed households consider that the use of swidden land increases soil fertility. 77% of households consider that the use of swidden land reduces soil fertility.

Water supply for farming: 84% of interviewed households consider that the use of swidden land reduces the water supply for shifting cultivation, and only 14% consider that the use of swidden land increases water resources.

Table 5. Impact of shifting cultivation on the environment

		Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)		150	150	150	450
Soil erosion (%)	Increase	48	80	92	84
	Reduction	20	18	6	21
Soil pollution (%)	Increase	88	2	42	44
	Reduction	10	6	56	24
Soil fertility (%)	Increase	24	16	0	13
	Reduction	58	74	98	77
Water supply for farming (%)	Increase	22	16	4	14
	Reduction	74	84	94	84

3.5. Strategies to cope with food scarcity of ethnic minorities

As analyzed above, food is mainly produced from shifting cultivation, and when production is not enough for consumption, it leads to food shortage, and people need to change the way they exploit natural resources to cope with food scarcity (Tran Danh Thin).

The degradation of swidden land, which is mainly due to an excessive increase in the population, leads to increased pressure on swidden cultivation, shortening fallow time, reducing soil nutrients and crop yield. Such activities affect soil physical (Alegre & Cassel, 1996) and chemical properties (Juo & Manu, 1996; Holscher et al., 1997), reduce nutrient stocks and accelerate soil erosion (Baker, 1984; Gafur et al., 2000) and sedimentation (Watters, 1971; Gafur et al., 2003). Deforestation and land degradation in turn badly affect the livelihood of shifting cultivators. In recent years, a formidable challenge has been faced by the shifting cultivators to maintain their livelihood in the face of increased constraints such as declining soil fertility and increased weed pressure, soil erosion and flooding emerging from land degradation and deforestation (Watson, 1989; Sanchez et al., 2005; Crains, 2015).

Habits and customs of local people. The habits and customs in farming and life have a great influence on the food shortage of ethnic minorities. The process of change of all forms of shifting cultivation is a complex and dynamic mechanism. It involves changes in cropping pattern, cultivation techniques, input use and management practices (Rasul & Thapa, 2003). For example,

with the same shifting cultivation, the H'mong have production habits that focus on food crops such as upland rice, maize and cassava. They have little interest in other crops. Therefore, food scarcity occurs more often, especially in dry years. Meanwhile, the Thai people know how to combine food crops such as rice, maize, and cassava with commodity crops such as vegetables, bananas, and fruit trees to create a diversity of income sources and less food scarcity happening. New crops are planted as settlers become aware of their advantages and interest in selling the produces increases (Vongvisouk et al., 2014). In addition, the technical measures in shifting cultivation are also more concerned by people to improve crop productivity to cope with food scarcity. The results in Table 6 show that 86% of interviewed households report that using fertilizers is a technical measure to protect swidden land, then the measures to plant cover crops (50%); using terraced fields (36%); making contour lines (10%).

Table 6. Technical measures used in swidden land

	Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)	150	150	150	450
Using terraced fields (%)	58	32	18	36
Making contour lines (%)	8	12	10	10
Planting cover crops (%)	54	20	76	50
Using fertilizers (%)	88	80	90	86
Other (%)	10	18	20	16

Changing awareness and policy institutions. Shifting cultivation offers little opportunity for improving people's quality of life, as the return per unit of land and labour is very low (Atal & Bennagen, 1983; Waston, 1989) because of the low level of technology and inputs use. Shifting cultivation is self-sufficient, a characteristic of ethnic minority communities. They produce to eat, not to sell. Therefore, the concept of a commodity tree has not yet formed in their thinking. Therefore, it is necessary to change this perception, shifting cultivation is not only self-sufficient but also creates a commodity-style production method. Only then can the food scarcity be better solved, and poverty and hunger can be completely overcome.

The government's policies in the mountainous economic development strategy have a particularly important meaning. The results in Table 7 show that:

38% of interviewed households have recommendations on land policy. They report that the government needs to have more specific policies on management, use and protection of swidden land. In which, there should be specific regulations on how to determine swidden land, classify and statistic the swidden area for management.

49% of interviewed households have recommendations on production support (capital, technical). They expect to receive from the government, including support for capital, support for seeds and materials for production, support for the market for agricultural products, and support for technology transfer.

26% of interviewed households have recommendations on increasing investment support to build infrastructure for daily life and production. They want to be built by the government including rural transport system; agriculture-irrigation, canal and furrow irrigation works; other public welfare works such as schools, health stations, water and electricity supply stations, markets and agricultural and forestry extension stations.

Table 7. Recommendations of interviewed households in the use of swidden land

	Ky Son	Tuong Duong	Con Cuong	Average
Sample size (household)	150	150	150	450
Land policy (%)	30	70	14	38
Production support (capital, technical) (%)	34	60	54	49
Support to build infrastructure (%)	14	26	44	26
No idea (%)	22	26	40	29

This result was consistent with the results of previous studies, the authors suggest that knowledge, institutions and technological development are the main sources of agricultural change that enable the production of more with the same resources (Schultz, 1964; Hayami & Ruttan, 1971). Institutions not only govern the processes by which scientific and technical knowledge is created but also facilitate the introduction and use of new technology in agricultural production. Population

density, land availability, technology, market forces, and economic and political structures play important roles in stimulating change (Turner & Brush, 1987).

Lele and Stone (1989) particularly emphasize the role of public policy in facilitating agricultural change by influencing the availability and adoption of technology and prices of inputs and outputs. Brady (1996), however, argues that the availability of resources (natural, human, technological, capital), constraints (biophysical, socio-economic) and the policy environment (including land rights, land tenure, subsidies, taxes, commodity prices, transportation and marketing opportunities) influence land-use change. In view of the socio-economic condition, particularly of small farmers in developing countries, Vosti and Witcover (1996) argue that the food and livelihood security of farm households ultimately guides land-use decisions. Farmers must decide how to use available resources, above all to put enough food on the table. These authors have also recognized the influence of external factors such as policies, technologies, institutional arrangements and community assets in multisectoral production and investment activities in shaping the pace and direction of land-use changes.

IV. CONCLUSION

Shifting cultivation plays a significant role in the livelihoods of people in the study area and shifting cultivation has partly provided food for the people. Therefore, it is necessary to have synchronous solutions to remove difficulties and limit obstacles to further improve the efficiency of swidden land use. Learning lessons from past experiences, we conclude that the population growth and expansion of state control over common resources cannot help to control shifting cultivation as long as its structural causes are not addressed. An effective shifting cultivation control strategy would require (1) Changes in awareness, farming practices and customs of local people; (2) Changes in policy institutions such as granting land ownership rights to shifting cultivators, linking shifting cultivation areas with local and regional market centres through infrastructure development, and provision of necessary support services such as extension, credit and marketing.

REFERENCES

1) Alegre, J.C. and Cassel, D.K. 1996. Dynamics of soil physical properties under alternative systems to slash-and-burn. Agriculture, Ecosystem and Environment, 58: 39-48.
2) Atal, Y. and Bennagen, P.L. 1983. In swidden cultivation in Asia, Vol. 2, Country Profiles: India, Indonesia, Malaysia, Philippines, Thailand. UNESCO Regional Office for Education in Asia and the Pacific: Bangkok.
3) Aweto, A.O. 2013. Shifting cultivation and secondary succession in the tropics. Wallingford, UK: CABI, pp.196.
4) Baker, R. 1984. Protecting the environment against the poor. Ecologist, 14: 53-60.
5) Brady, N.C. 1996. Alternatives to slash-and-burn: a global imperative. Agriculture, Ecosystem and Environment, 58: 3-11.
6) Crains, M. 2015. Shifting cultivation and environmental change: indigenous people. Agriculture and Forest Conservation, London: Earthscan.
7) Do, D.S. 1996. Overview of migration agriculture in Vietnam. Vietnam Academy of Forestry, Forestry Science and Technology Information, 5(1): 34-39.
8) Gafur, A., Borggaard, O.K., Jensen J.R. and Peterson, L. 2000. Changes in soil nutrient content under shifting cultivation in the Chittagong Hill Tracts of Bangladesh. Danish Journal of Geography, 100: 37-46.
9) Gafur, A., Jensen, J.R., Borggaard, O.K. and Peterson, L. 2003. Run-off and losses of soil nutrients from small watershed and shifting cultivation (Jhum) in the Chittagong Hill Tracts of Bangladesh. Journal of Hydrology, 274: 30-46.
10) Geertz, C. 1963. Agricultural involution: the processes of ecological change in Indonesia. University of California Press: Berkeley, CA.
11) Hayami, Y. and Ruttan, V.W. 1971. Agricultural development: An international perspective. The Johns Hopkins University Press: Baltimore, MA.
12) Holscher, D., Ludwig, B., Moller, R.F. and Folster, H. 1997. Dynamics of soil chemical parameters in shifting agriculture in Eastern Amazon. Agriculture, Ecosystems and Environment, 66: 153-163.
13) Juo, A.S.R. and Manu, A. 1996. Chemical dynamics in slash-and-burn agriculture. Agriculture, Ecosystems and Environment, 58: 49-60.
14) Lele, U. and Stone, S. 1989. Population pressure, the environment and agricultural intensification: variations on the Boserup hypothesis. Managing Agricultural Development in Africa Discussion Paper No. 4, World Bank: Washington, DC.
15) Mahapatra, L.K. 1983. In swidden cultivation in Asia, Vol. 1, Country profiles: India, Indonesia, Malaysia, Philippines, Thailand, Atal Y, Bennagen PL (eds). UNESCO Regional Office for Education in Asia and the Pacific: Bangkok, 13–82.

16) Mertz, O. 2002. The relationship between length of fallow and crop yields in shifting cultivation: a rethinking. Agroforestry Systems,55: 149-159.
17) Mertz, O., Birch-Thomsen, T., Elberling, B., Rothausen, S., Bruun, T.B., Reenberg, A., et al. 2012. Changes in shifting cultivation systems on small Pacific islands. Geographical Journal, 178: 175-187.
18) Ney, P.H. and Greenland, D.J. 1960. The soil under shifting cultivation. Agronomy Journal, 54(3): 1-279.
19) Palm, C.A., Vosti, S.A., Sanchez, P.A. and Ericksen, P.J. 2005. Slash and burn agriculture: The search for alternatives. New York, Columbia University Press, pp.24.
20) Peters, W.J. and Neuenschwander, L.F. 1990. Slash and burn: Farming in the third world forest. Geographical Review, 80(1): 1-85.
21) Ramakrishnan, P.S. 1984. The science behind rotational bush fallow agriculture system (jhum). Proceedings of the Indian Academy of Science: Plant Science, 93: 379-400.
22) Rasul, G. and Thapa, G.B. 2003. Shifting cultivation in the mountains of South and Southeast Asia: Regional patterns and factors influencing the change. Land Degradation and Development, 14(5): 495-508.
23) Robison, D.M. and McKean, S.J. 1993. Shifting cultivation and alternatives: An annotated bibliography, 1972-1989. Journal of Tropical Ecology, 9(2): 1-152.
24) Ruthenberg, H. 1980. Farming systems in the tropics - 3rd edition. Oxford: Oxford University Press.
25) Sanchez, P.A., Palm, C.A., Vosti, S.A., Tomich, T. and Kasyoki, J. 2005. Alternatives to slash and burn. Challenges and approaches of an international consortium. In: Palm CA, Vosti SA, Sanchez PA, Ericksen PJ, editors. Slash-and-Burn Agriculture the Search for Alternatives. Columbia University Press. New York, pp. 3-37.
26) Schultz, T.W. 1964. Transforming traditional agriculture. Yale University Press: New Haven, CN.
27) Spencer, J.E. 1966. Shifting Cultivation in Southeastern Asia. University of California Press: Berkeley, CA.
28) Turner, B.L. and Brush, S.B. 1987. Comparative farming systems. Guildford Press: New York, NY.
29) Vongvisouk, T., Mertz, O., Thongmanivong, S., Heinimann, A. and Phanvilay, K. 2014. Shifting cultivation stability and change: Contrasting pathways of land use and livelihood change in Laos. Applied Geography, 46: 1–10.
30) Vosti, S.A. and Witcover, J. 1996. Slash-and-burn agriculture-household perspectives. Agriculture, Ecosystem and Environment, 58: 23-38.
31) Watson, D.J. 1989. The evolution of appropriate resource management systems. In Common Property Resources: Ecology and Community-Based Sustainable Development, Beres FT (ed.). Belhaven: London: 55-69.
32) Watters, R.F. 1971. Shifting cultivation in Latin America. Food and Agricultural Organization: Rome.