
Poverty alleviation among Vietnamese ethnic minorities: a behavioural economics perspective

Nguyen Van Hiep

Thu Dau Mot University,
Thu Dau Mot City, Binh Duong Province,
820000, Vietnam
Email: hiepnv@tdmu.edu.vn

Tran Hanh Minh Phuong

Thu Dau Mot University,
Thu Dau Mot City,
Binh Duong Province, 820000, Vietnam
Email: phuongthm@tdmu.edu.vn

Maher N. Itani*

Department of Management,
College of Business Administration,
Ajman University,
P.O. Box: 346, Ajman, United Arab Emirates
Email: m.itani@ajman.ac.ae
*Corresponding author

Abstract: This study examines the dynamics of the economic transformation in rural Vietnam and reviews how socio-economic development projects have transformed the economic behaviour of ethnic minorities across Vietnam's Central Highlands. It investigates the impact of state-sponsored poverty alleviation initiatives aimed at improving the economic condition of the X'dang, Bahnar, Jarai, Ede, Mnong, Koho, and Maethnic minorities. These initiatives are financed by Vietnamese state agencies focused on infrastructural and community development to facilitate agricultural transformation and halt the massive migration of farmers from the countryside to urban centres. These initiatives include the selection of high-yielding and profitable crops for plantation, application of appropriate agricultural technology, sound land and crop management processes, and deployment of robust irrigation management techniques. This study finds that the economic conditions of ethnic minority farmers have improved substantially as a result of the execution of sound, robust and resilient poverty alleviation initiatives by the Vietnamese government.

Keywords: economical behaviour; ethnic minorities; agricultural development; Vietnam's central highlands; Vietnam.

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Biographical notes: Nguyen Van Hiep is an Associate Professor and the Head of Thu Dau University's Science and Training Council. He has extensive expertise in a variety of Binh Duong-related fields, including the development of revolutionary education in the province from 1945 to 1955, the livelihood and poverty alleviation of underprivileged people in the province, administrative reform in the province during the reformation process from 1986 to 2012, and scientifically-based sustainable economic and social development in the province. He also has extensive management experience in higher education. He frequently gives presentations on topics like Quality assurance in Vietnam's Higher Education.

Tran Hanh Minh Phuong is currently a Lecturer in Ethnology at Thu Dau Mot University. She has a lot of experience in areas related to ethnic minorities, such as the culture and religion of the Chinese diaspora in Ho Chi Minh City, and the informal institutes of Khmer, Jrai people. She is interested in using a transdisciplinary approach in her research, and recently finished a project titled "The Model for Development of Tourism Based on Cultural Heritage in Binh Duong Island from a Transdisciplinary Approach – The Case Study Thanh Hoi and Bach Dang Islands".

Maher N. Itani is currently an Assistant Professor of Operations Management in the College of Business at Ajman University, UAE. He has comprehensive experience in areas of supply chain management and possesses a solid knowledge in project development and documented skills in the formulation of project proposals as well as risk-cost benefit analysis reports. He regularly presents papers on a wide variety of supply chain topics such as emergency management systems and risk analysis for the global supply chain. His current research area is on identifying the managerial challenges faced by today's sports sector during the COVID-19 outbreak.

1 Introduction

Vietnam is a Southeast Asian country with a rich heritage and populated by diverse ethnic groups. The majority of its population comprises ethnic Vietnamese known as Kinh (around 86% of the total population) and 53 ethnic minority groups that are mainly concentrated in the highlands and mountainous areas. These minorities account for about 13.4 million people, around 14.6% of the national population and over 50% of whom are persistently poor (Bui et al., 2017, General Statistical Office, 2009). The Central Highlands region, which is the focus here, has a population of more than five million people, mostly living in rural areas. Of these, two million are ethnic minorities who continue their traditional cultural heritage and produce the unique cultural characteristics of the region in terms of societal regulations, customs and practices (Tran, 2016). Despite high economic growth in Vietnam over the last two decades and unlike the case for the ethnic Kinh, the poverty level remains very high among ethnic minorities in the

Central Highlands (Bui et al., 2017). Although ethnic minorities often have more land than Kinh, the latter has perennial cropland. The poor quality of the land of ethnic minorities has a significant impact on the income they receive and on the opportunities they have to practise shifting agriculture and participate in cash crops such as coffee, cacao, rubber and cashews.

The Central Highlands has a high potential for economic development in agroforestry product processing. The participation of ethnic minorities in agricultural development provides them with a crucial opportunity for income growth. The government of Vietnam has adopted and implemented multiple initiatives targeted mainly at the Central Highlands, such as programmes P-135, P-30a, P-132, and P-134 (to increase access to land and improve housing conditions); these are intended to alleviate poverty and improve the living conditions of ethnic minorities (Asian Development Bank, 2001). Initiatives have also been undertaken by the World Bank and numerous non-governmental organisations in the Central Highlands. Such programmes impact many facets of households, such as infrastructure investment, capacity building, and ensuring access to basic social services. For example, the United Nations Development Programme supports Vietnam's government in socio-economic activities to promote equitable, inclusive, and sustainable growth in two ethnic minority provinces, Bac Kan and DakNog (UNDP, 2019). The International Fund for Agricultural Development implemented a sustainable poverty alleviation programme in one poverty-stricken area in Gia Lai province. The Success Alliance project is funded by United States Agency for International Development (2008). Its purpose is to improve rural livelihoods by providing training to ethnic minority farmers on cacao in a multi-cropping system. The German Technical Cooperation Agency carried out a rural development and poverty reduction initiative in Dak Lak. The Kuwait Fund enhanced community-level irrigation in three provinces (USAID, 2008).

State policies and foreign organisations' community development initiatives have a profound effect on the standard of living of ethnic minority groups in the Central Highlands, specifically their economic behaviour. Numerous studies have explored the economic behaviour of farmers in, for example, Africa, China, Mexico, and Cambodia. There is less research available on the economic behaviour of ethnic minority households in Vietnam, especially in the context of state and non-governmental programmes, projects, and initiatives. This illustrates the necessity of doing a deep investigation into this topic.

Previous studies examine the difference in poverty dynamics between ethnic minority groups and Kinh. The former groups are classified as underdeveloped due to inefficient production and area prominent target of subsidy programmes and support policies. They are identified as individuals who are utterly apathetic to the Central Highlands' rapid changes. They lack understanding and do not know how to do business properly. For instance, according to Nguyen (2020), ethnic minorities in the North Central Highlands are usually impoverished, and the majority reside in remote regions (accounting for 77.87%). They are below the poverty level and cut trees to use for cultivation. Nguyen (2020) mentions that the bulk of ethnic minority families continue to be severely impacted by subsistence production activities and smallholder production concepts (Tran, 2016). They do not readily adjust to the competitive market economy because they lack a high degree of specialisation, big investment capital, managerial skill, and knowledge to identify output markets for their agricultural products (Wolff et al., 2002). According to a

report prepared by the United States Agency for International Development (USAID, 2008), the inhabitants in these areas achieve among the lowest scores on social indicators in the Central Highlands. They have a high rate of poverty and low educational attainment, notably in the upper grades. They own more land than Kinh households but on poorer, less productive soils (USAID, 2008). Minorities comprise only 14% of the population; however, as of 2004, they accounted for 29% of Vietnam's impoverished population (Swinkels and Turk, 2003).

In contrast to the above studies, others show that it is inappropriate to classify all ethnic minority farming households in the Central Highlands as underdeveloped because a large number of farmers have already transformed to adapt to modern agriculture. They are no longer nomads practising shifting agriculture. They become stationary farmers, growing crops not only to fulfil their food requirements but also to earn a living. They actively make use of the facilities provided by the state's economic development policies to improve the household economy. This paper reinforces this rationale and assumes that the dynamic economic behaviour of these family heads has played a crucial role in the growth of their household economies and contributed to the development of the regional economy. Nevertheless, state-sponsored poverty alleviation initiatives aimed at improving the economic condition of ethnic minorities in Central Highlands would neither be efficient nor effective without focusing on the ethnicity of farmers themselves (Bui et al., 2017).

Therefore, the purpose of this paper is to explore the dynamic economic behaviours of ethnic minorities associated with selecting high-yielding and profitable crops for plantation, application of appropriate agricultural technology, and prudent allocation of resources. Understanding better the economic behaviour of ethnic minority farmers can assist Vietnamese local authorities in formulating suitable policies for agricultural development initiatives, such as arranging farmer training in new agricultural techniques, providing new seedlings, managing water resources, and consuming agricultural goods.

The remainder of this paper is structured in four sections. In Section 2, a brief literature review is provided on the role of provincial agricultural planning on ethnic minority farming households' economic behaviours. The employed methodological approach in this study is presented in Section 3. Section 4 reports the empirical results of the survey on households in the Central Highlands, and Section 5 concludes with recommendations for formulating a long-term assistance strategy for the Central Highlands.

2 Literature review

2.1 Central highlands of Vietnam

The Central Highlands is a volcanic land on the western flank of the Annamite Mountains, forming a high plateau bordering Cambodia and Laos. It has two major rivers: DakBla and DakPoko (Thao, 2004). It is considered the largest basalt land in the country, accounting for 60% of the country's basalt soil. Basalt soil is especially suitable for some industrial crops, such as coffee and rubber. In terms of climate, the Central Highlands has two distinct seasons, the dry season from November to mid-May and the rainy season from late May to October. Basalt is soil that does not hold water; rainwater

slides off the surface. Therefore, in the dry season, the Central Highlands often experience water shortages to irrigate plants. Around 92% of working-age people are peasants and dependent on agriculture as their primary source of income (Tran, 2013).

The Central Highlands consists of five provinces: Kon Tum, Gia Lai, Dak Lak, DakNong, and Lam Dong (recently transferred to the Southeast region). It has long been home to 12 indigenous ethnic minorities: Jarai, Bahnar, Koho, X'dang, Mnong, Ede, Ma, Gie-Trieng, Chu Ru, Hre, Ro Mam, and Brau. Originally, these minority communities were relatively isolated communities, mostly unformed or formed according to primitive structures. They have their own languages, lifestyles, and cultural heritage. They have limited access to infrastructure, healthcare, and education (World Bank, 2009). Moreover, they have very little connection with state-owned societies in the Northwest mountainous or Lowland areas.

After reunification in 1975, the Central Highlands transformed from an autonomous traditional community to a community that is under the authority of the state. The population structure of the Central Highlands has changed as a result of the expropriation of agricultural land and the implementation of the state's ethnic policy. Vietnam's government established state farms in the Central Highlands and launched a series of resettlement programmes to transplant ethnic Kinh and encourage them to work the state farms. This led to a cultural exchange among indigenous people, with the majority Kinh and other ethnic minorities migrating from the north. The ethnic groups indigenous to the Central Highlands have now become a minority population in their homeland, as shown in Table 1 (General Statistical Office, 2009).

Table 1 Ethnic populations of the main provinces in the Central Highlands

<i>Province</i>	<i>Total population</i>	<i>Kinh population</i>	<i>Ethnic minority population</i>	<i>% of population that is ethnic minority</i>
Kon Tum	313,285	145,681	167,604	54%
Gia Lai	966,934	545,048	421,886	44%
Dak Lak	1,780,644	1,250,494	530,150	30%
Lam Dong	997,740	769,398	228,342	23%

2.2 *Poverty situation in Central Highlands*

The Central Highlands have long been populated by ethnic groups that are distinct from the Vietnamese. There is a pressing need to understand their socio-economic situation and to analyse what impact current developments in these areas may have on the economic behaviours of ethnic minority farm households. Around 90% of poor households are ethnic minority farmers, have small landholdings or are landless, and are living in the highlands and rural areas. Kinh farmers are almost 60% more likely to have perennial cropland than their minority counterparts. This has a significant impact on the income minority farmers receive. The poverty rate among ethnic minority families is regarded as significantly higher than that among Kinh families in the five Central Highland provinces. One underlying reason for ethnic minorities' poverty and sub-optimal crop choice is their low level of education (Pimhidzai, 2018). Moreover, the training provided by the Department of Agriculture and Rural Development on farm management and skills often is not customised for the less educated ethnic minority.

Many minority farmers have remained in old villages with very limited access to modern infrastructure and government and international aid. They rely on agriculture in the hope of restoring the shifting cultivation system. Their chance of getting out of poverty is even worse than in the past as Vietnam continues to modernise the economy, and they will be left even further behind (Quyen, 2019). Forestry or farm fields have developed next to old villages, and a new form of economic village has emerged. The road to the city is easier to travel than before, but the daily life of farmers has not changed much (Chi and Nguyen, 1996).

In December 1986, the government mandated the *Doi Moi* (open door) reform, shifting from an inefficient central-planning economic system to a dynamic market economy efficiently using scarce resources. The government considered the agricultural sector an important part of the economy as it provides livelihoods for about 72% of the workforce and is vital for national food security. The government engaged in land reform, allocating farming land for use by households for 15 years, or 50 years in the case of perennial crops. Consequently, farmers had the right to make decisions on how much to invest in their own land and produce more agricultural products for their families as well as for society.

Households have diversified into cash crops, and food production has increased from 19.5 million metric tonnes in 1988 to 39.5 metric tonnes in 2005 (Oxfam International, 2008). Vietnam has thus transitioned from a food deficit nation to becoming the second largest exporter of rice. This was only possible because of the support farmers obtained from the government through irrigation schemes and seeds and technology improvement programmes. The government has also opened the economy to trade and joined trade agreements to export surplus food. Subsequently, households have moved to trade, business, and paid jobs rather than plantation work.

The Vietnamese government has made progress toward meeting a set of development goals as part of its Comprehensive Poverty Reduction and Growth Strategy. According to the VietNam Living Standard Survey, the poverty rate for all of Vietnam dropped from 58.1% in 1993 to only 19.5% in 2004, partly due to government investment in basic social services (General Statistical Office, 2005). This is comparable to the UN's Millennium Development Goal of halving poverty in 25 years. However, the reduction in poverty and vulnerability varied among different ethnic groups; there was a 25% reduction among ethnic minorities and a 40% reduction among Kinh. It seems that ethnic minorities have benefited less from the *Doi Moi* reform.

One main reason for the unevenness of the effects of reform is that the Kinh benefited from the right to own agricultural land, which, in turn, led to the improvement of their livelihoods. Ethnic minorities lack such endowment despite their livelihoods relying heavily on this natural capital (Le, 2006). Moreover, for ethnic minorities to cultivate perennial and cash crops from their lands requires investment, but they have limited access to credit and often need expensive intermediate resources such as labour for hire. This led ethnic minorities to plant crops that required little investment, such as rice and maize. Furthermore, ethnic minority households are estimated to own less than one hectare of land on average. Because the land in the Central Highlands is un-irrigated swidden-cultivated land, one hectare can be considered inadequate to meet the food production needs of a minority household (Tinh, 2003).

The current trend shows growing social inequality between ethnic minorities and the Kinh majority (Oxfam International, 2008), reflected in social unrest in the Central Highlands. It is likely that Vietnam is travelling the same uneven development path as

that taken by China (Fritzen and Brassard, 2005). Addressing these disparities will be essential to meet the Millenium Development Goals and generate improvements in living standards. Closing the social gap between these groups requires a more focused or targeted poverty reduction programme; however, it is challenging due to the many barriers that exist, such as language, culture, and norms (Wolff et al., 2002). The government of Vietnam has attempted to address the disparity through various national programmes focused on basic social service provisions. These include the participation of villagers in the supervising development programmes to promote the transparency of government operations. The government needs to address inequality more aggressively and accelerate the allocation of forest and forestland to ethnic minorities. This would allow these groups to achieve a boost similar to that experienced by Kinh after the liberalisation of agricultural land at the end of the 1980s. The investment in human capabilities such as education and healthcare for ethnic minorities is also critical for achieving sustainable development and for curbing the increasing gaps between ethnic minorities and the Kinh majority.

The Comprehensive Poverty Reduction and Growth Strategy is an action plan that translates the government's 10-year socio-economic development strategy and five-year socio-economic development plan into concrete measures with well-defined roadmaps for implementation. It presents a set of prioritised Sustainable Development Goals to reduce poverty and promote social equity. Altogether 12 Sustainable Development Goals have been formulated, mostly related to the earlier Millenium Development Goals identified by the UN. Vietnam's government considers ethnic minorities as prioritised groups in the country's efforts to fight poverty and improve socio-economic development. For example, Sustainable Development Goals 1 and 10 were set to eradicate poverty and preserve the cultural diversity of ethnic minorities by focusing on poorer provinces. These efforts are intended to achieve economic growth by generating off-farm employment, increasing rural incomes, and providing land-use rights in ethnic-minority areas (Swinkels and Turk, 2003). The UN Ethnic Minority Working Group worked on an initiative to develop an ethnic minority database with the intention of monitoring the 'leave no one behind' policy for the Sustainable Development Goals (United Nations, 2017; UNDP, 2019). Social protection offered to ethnic minorities is very limited, with the supporting allowance being barely enough to survive. Around half of poor households are not covered by the social safety net. The government needs to implement proper social protection by offering micro-finance and vocational training for the shift from cereal to perennial crops (Quyen, 2019).

2.3 The role of informal institutions in economic behaviour

A new social structure within the village community dominated by traditional informal institutions affects the behavioural economics of village residents of the Central Highlands in general. The economic survival space of a traditional village in the Central Highlands is established through the following: (1) jointly building a common production plan for the whole community in shifting cultivation and raising cattle and poultry, handicrafts, and exploiting the natural resources of the mountains and forests; (2) conducting livelihood activities in compliance with customs and laws; (3) distributing products obtained in the spirit of mutual affection and equality; (4) ensuring common

ownership and management of the village's land, mountains and forests, the main means of production of the community.

It can be argued that informal institutions create dependence on the past, but, at the same time, they are a mechanism capable of filling the gaps that formal institutions cannot in an underdeveloped society. Informal institutions can be seen as secondary when state institutions do not operate smoothly or as hindering the process of social development because they tend to erode the coherence required to establish important new institutions (Meagher, 2007). Some authors argue that informal governance relies on rules of conduct and logic foreign to the public spaces of modern society. Some authors argue that these trends arise from the very logic of native cultures. For others, the reason for these trends is the difficult economic situation of native communities. This view holds that efforts to attract and involve informal institutions in formal governance not only fail to create synergies but also contribute to the fragmentation and polarisation of ethnic minority communities (Meagher, 2007).

The informal institution is considered a mechanism capable of improving the effectiveness of formal institutions. The impact of informal institutions on the development of formal institutions is described as 'synergy' or 'co-production'. The synergistic view is that the proliferation of informal associations not only makes people more adaptable to social life but also contributes to the creation of a framework for a new institution to deliver services and for citizen participation in democratic processes. The United Nations Economic Commission for Africa's report also took this synergistic view, arguing that indigenous governance institutions could play a more important evolving role in modern governance systems because they have capacity to contribute to the apparatus administrative local, on the job move people, service delivery, as well as into the field of solving problems conflict (Meagher, 2007).

Hu (2007) finds that tradition and informal institutions play a much more important role than formal institutions in the modernisation process in rural villages. Yami et al. (2009) find that informal institutions have played a positive role by creating a favourable environment for cooperation in the decision-making process. These authors argue that the government's policies and development programmes promote and strengthen informal institutions to achieve a sustainable resource management approach (Yami et al., 2009). Witcher (2014) concludes that informal social institutions play a clear positive role in the sustainable development of society. Similarly, Leković (2011) analyses the data of several countries and observes that the best economic development results can only be obtained if ideal conditions are created for synchronisation and complementarity between formal and informal institutions.

There is one more aspect to emphasise, which is that the trend, nature, and speed of socio-economic development processes – in terms of social institutions – are, after all, the result of integrated effects from the behavioural strategies of each individual. These individual behaviours and actions are not outside the control and influence of social institutions, although individual actions themselves still have specific properties and dynamics that need to be emphasised. The dialectical relationship between people and social institutions, as well as the active role of people and the influential role of social institutions, are the things that need to be clarified when studying any development process (Tran, 2013). That is why the focus of this work is on the role of informal institutions. However, it is still necessary to include individuals with all of their

conceptions, behaviours, and choices; in other words, it is necessary to put social institutions together with people's social actions. Social institutions are ultimately the product of human institutions as a social construct (Berger and Luckmann, 2015).

2.4 Ethnic minority farm households' economic behaviours

Farm households in developing countries have been the subject of research in various areas of the social sciences. A diverse range of research contributions offers insights into the anthropological, sociological, and economic peculiarities of peasant modes of production in the larger social system (Amare et al., 2012; Kassie et al., 2011; Mendola, 2008). Furthermore, a sizeable section of the economics literature is devoted to the analysis of farmers' production decisions in developing nations.

The agricultural household models, which have become popular for explaining the behaviour of farm households (as consumption and production units) in both perfect and incomplete market contexts, are classic models that incorporate household consumption goals into microeconomic models of peasant household decision-making (Taylor and Adelman, 2003). Bartlett (1980) addresses how farmers decide what and how to grow. Meanwhile, Wang and Li (2007) apply an econometric analysis method to find that farmers allocate labour resources in their families based on relative advantages; non-farm job possibilities are an important route to combat unemployment and use their labour resources. Asmah (2011) surveyed farmers in Africa and concludes that family welfare and non-farm livelihood diversification decisions of households are largely influenced by the size of their capital, such as good health, education, and age composition of family members within livelihood diversification can have a positive impact on the welfare of farmers.

According to Diederer et al. (2003), structural variables (farm size, market position, solvency, and age of the farmer) explain the difference in adoption behaviour between innovators and early adopters on the one hand and laggards on the other. To assist Cambodian farmers in moving from rice to vegetables, Santoyo (2012) recommends an array of activities, including instruction on financial management for the family, managing personal savings and credit, as well as marketing and access to pricing information.

Fajardo et al. (2016) assume that small-scale subsistence farming in the Highlands of Central Mexico by the Mazahua indigenous group is responsible for the adoption of around 17 different land management techniques. Land degradation is being reduced or controlled in part due to the activities. Many farming practices are employed by the farmers to preserve the ecology of their property. Individual and combined practices are utilised in various ways to provide a range of advantages; these activities depend on the availability of assets and what interests of the family. Farmers' financial assets are impacted by every action regarding land management. Furthermore, the assumption is made that farm categorisation is based on land management.

Studies on the economic behaviour of ethnic minorities in the Central Highlands, such as that by the United States Agency for International Development (2008), find that minority farmers in distant locations have failed to take advantage of government-sponsored agricultural development initiatives. The initiatives by the Department of Agriculture and Rural Development that promoted a fast rise in cash crop output over the previous 10 to 15 years are unlikely to target this demographic. Minorities are generally

found on marginal land, in locations where they are difficult to access and are ill-equipped to know the intricacies of cultivation techniques and consideration they would have to learn to profitably grow cash crops. This project was based on the assumption that the disproportionate number of impoverished ethnic minorities practice primitive cultivation habits and have outdated thinking. Focusing on large-scale or high-value activities, such as wet-rice, coffee and rubber farming, while ignoring small-scale or low-value activities such as ethnic minority farmers, practising upland agriculture is not a part of government-sponsored agricultural research and training. Ethnic minorities are also unable to employ short-course training even when the topics they are learning are relevant (USAID, 2008).

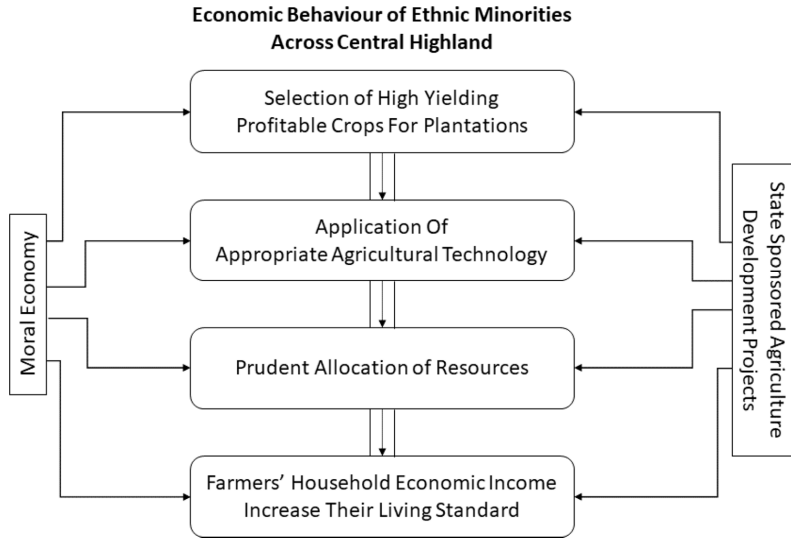
The study done by Cầm et al. (2017) suggests that there have been significant consequences due to development programmes and policies, particularly the State's initiatives of providing seeds, offering fertilisers and pesticides, and training cultivation techniques, as K'ho and Ma ethnic groups (Ban, Lak, and Dak Lak villages) have experienced significant changes in crop selection. On the other hand, M'ngong ethnic group (Biet village, Lam Ha district, Lam Dong province) experienced a tremendous change in crop selection. When the government implemented a policy prohibiting swidden agriculture, farmers shifted from swidden farming to coffee plantations (UNHCR, 2006). Thus, the change has diminished the use of traditional livelihood approaches and other practices in traditional agricultural production, and this has caused people to fall into poverty. People in both communities found it difficult to profit financially, even though they had planted thousands of hectares of coffee and hundreds of hectares of maize. The increasing number of unpaid loans has become a severe problem for the majority of ethnic minority households in the Central Highlands, with deleterious effects on their socio-economic and cultural well-being. Based on Krajan (2017), the poverty minorities face in Vietnam is the result of differing cultural values, various social factors of ethnic discrimination, and ethnocentric poverty alleviation programs.

A study of 1250 households was conducted by Hung et al. (2016) in January 2015 on the role of some informal social institutions in the sustainable development of the Central Highlands. This revealed that the villages of the Montagnards are no longer homogeneous in terms of inhabitants and are no longer isolated in terms of residence and living environment. The economic activities have changed from shifting cultivation, raising livestock, and poultry. It gradually changed to dry-field, wet-field, industrial crops (coffee, rubber, pepper, cashew), raising cows instead of buffalo, and working in agricultural and forestry farms (after 1975). The barter method is replaced by cash payment for goods.

2.5 Conceptual framework of economic behaviour for ethnic minorities

Ethnic minority farming households' economic behaviours have been affected by both state-sponsored agroforestry development initiatives and a resulting understanding of the moral economy, which prioritises safety above risk creation. As a result, it is important to include both their traditional economic beliefs and the effect of state-sponsored farm development programmes when identifying and analysing their economic behaviours. The conceptual framework proposed by this study is depicted in Figure 1.

Figure 1 Conceptual framework of this study



3 Methods

3.1 Selection of ethnic minorities sample

The study focused on all five provinces of Central Highlands, further split into a total of five districts, which are themselves divided into 10 communes. Each commune contains a commune centre and several villages. The survey sample is based on population-ethnic and livelihood criteria. The main criteria used to select the 10 survey communes are as follows: (1) the area is densely populated with ethnic minorities and where households have changed their economic behaviour; (2) if any indigenous ethnic community is selected in the two locals (the Gia Rai ethnic group), one will retain its traditional earnings, and the other one will be selected according to livelihood changes. As a result, seven out of 12 ethnic minorities from 10 communes were selected for the survey: X'dang ethnic group (Ngok Wang commune, Dak Ha district, Kon Tum province); Bahnare ethnic group (Dak La commune, Dak Ha district, Kon Tum province); Jarai ethnic group (Dun and Ia Glaicommunes, Chu Se district, Gia Lai province); Ede ethnic group (Cu M'gar and Ea Tulcommunes, Cu M'gar district, Dak Lak province); Mnong ethnic group (Quang Truc and Dak R'Tihcommunes, Tuy Duc district, Dak Nong province); Koho ethnic group (Loc An commune, Bao Lam district, Lam Dong province); and Ma ethnic group (Loc Tan commune, Bao Lam district, Lam Dong province).

A sample of 125 people in each community was identified, and individuals were interviewed and identified according to their indigenous ethnic groups. The stratified sampling method was used to sample households in each community. A few hamlets were chosen randomly in each community, and a further 125 households from the hamlet were chosen to eventually participate in the survey.

3.2 *Research design and data collection*

A pilot survey in five provinces, five districts, and 10 communities was initially conducted; specifically, this survey explored whether changes in the standardised questionnaire developed by the World Bank were warranted. An ethnographic survey of 10 villages was undertaken using participant observation and structured interviews to examine the socio-economic situations of ethnic minorities. Fifteen fieldwork assistants were hired and trained to undertake in-depth, face-to-face interviews with household heads, household members, and key community officials. Based on the unstructured interviews, a modified questionnaire and structured interview questions were developed. The second official fieldwork in 10 communities was launched and included the distribution of a 35-question quantitative questionnaire to 1250 household heads in 10 communes and in-depth interviews using a template of 20 open-ended questions. These interviews targeted (1) trustworthy people with knowledge of households' livelihoods; (2) leaders such as heads of the commune with knowledge of its history; (3) heads of the farmers' association who have to accompany farmers in agricultural cultivation; and (4) village heads. In addition, there were focus group discussions with groups formed based on age and gender, such as groups of both young men and women, middle-aged men and women, and elderly people.

4 Results

Descriptive analysis of questionnaire responses about the selection of high-yielding and lucrative crops for planting, the deployment of appropriate agricultural technology, and farmers' wise resource allocation was undertaken along with the interpretation of qualitative data gathered during in-depth interviews and fieldwork; that to include participant observations.

4.1 *Selection of high-yielding and profitable crops for plantation*

The process of changing the crop structure of indigenous minority farmers in the Central Highlands has been ongoing for a long period, from growing one crop per year to growing wet rice 2–3 crops per year and specialising in cash crops as a result of government and non-governmental organisation agricultural development policies. Ancient farmers cultivated crops such as upland rice, maize, potatoes, and cucurbits to provide daily meals for their families. Because they relied on rainwater for upland rice farming, they only planted one crop each year. Beginning with field burning in March (Lunar year) and seed sowing in April-May, harvesting takes place in October-November.

Fieldwork notes of surveyor Phan Thi Kim Lien stated:

Before 1980, when Kon Chon hamlet was still atop Ngoc Den hill, the X'dang people farmed mainly highland rice, maize, sweet potatoes, and a few vegetables. Additionally, they foraged for vegetables and hunted animals in the forest to supplement their diets. In addition, farmers also grazed a few poultry and livestock (buffalo, cow, chicken, pig, goat). Similarly, farmers in the village of Greo Pet cultivated just one crop each year, with minimal production. The yield of upland rice was 0.6-0.8 metric tonnes/500m², or roughly 1/4 of the production of wet rice, which meant that people frequently starve.

Since 1975, the government has urged farmers to produce wet rice in two crops every year: the winter–spring crop, which is seeded in December and harvested in May, and the summer–autumn crop, which is seeded in July and harvested in November. Interview notes of surveyor Siu H’kip stated: “Wet rice yields significantly more than upland rice, at 1.1 metric tonnes/500m²”. Because growing food crops (rice, tapioca, and corn) is highly dependent on weather, it has low productivity, and farm households face economic hardship. When the state invested in projects to grow cash crops, the majority of ethnic minority farmers shifted to planting high-yielding and profitable crops.

In Ngol village/IaGlai commune, the Jarai have been growing rubber trees since 1984. A farmer in Greo Pet informed that his family has been cultivating coffee and pepper since 1995 and 1998, respectively. Families with a large amount of land frequently separate that into several plots, with a portion planted with wet rice and maize for daily sustenance and the remainder planted with coffee and pepper to sell and build capital, allowing their economy to expand in recent years. Interview notes of surveyor Nguyen Dang Phuong Thao state: “In Mang Ly village/Loc Tan commune, the Ma people transitioned from upland rice cultivation to wet rice, intercropping with crops like as gourds, squash, and maize; then totally shifted to the garden economy, producing tea and coffee beginning in 1984, but yields were low. Since 1984, new coffee cultivars have delivered substantial earnings to households, owing to the State’s new cultivar supply programme. Since then, the local population has devoted themselves entirely to gardening”.

According to the results of this study, ethnic minority farmers currently choose a crop strategy that not only ensures food sources for their families but also produces goods to sell to the market for economic accumulation so the economy can be saved. Their agriculture has two kinds of crops: (1) food crops include: upland rice/wet rice, seasonal cassava/high-yielding cassava, seasonal maize/high yield maize – grown for family sustenance and sale; and (2) cash crops include: rubber, coffee, pepper, tea, cashew. Below are the statistics of the crop area of the ethnic minorities distinguished by food and cash crops and presented in Tables 2 and 3.

Of the total area of 509.6 ha of food crops farmed by 875 families in the sample, 34.5% (175.6 ha) is for rice, 65.0% (331.1 ha) is used for other food crops (mostly cassava and maize), and only 0.5% (2.8 ha) for legumes or other vegetable crops. The X’dang ethnic community in Kon Tum, for instance, cultivates the least rice relative to the other ethnic groupings in the sample (17.9 ha, accounting for only 11.9% of the total area planted with food crops). Rice agriculture, whether highland rice or seasonal rice, accounts for 32.2% (56.6 ha) of the total area, while 67.8% (119 ha) is dedicated to the planting of novel rice cultivars with winter–spring, summer–autumn, and autumn–winter harvests. The majority of highland or seasonal rice land is owned by two Mngong villages in DakNong (41.9 ha) and Gia Rai (13.0 ha), but other groups also own a small portion.

Ethnic minority families cultivate a greater proportion of cash crops than food crops (except for the X’dang group in Kon Tum, which grows a greater proportion of food crops), totalling 1199.1 ha (accounting for 70.1% of the total land area of households). The dominant cash crops are coffee (665.8 ha) and rubber (310.4 ha), then cashews (101.3 ha), tea (50.6 ha), and pepper (48.1 ha).

Table 2 Area planted with food crops by households of ethnic groups (2014)

Ethnicity (surveyed households HHs)	The area under cultivation of food crops		Area planted with food crops		Upland rice	The winter-spring rice crop	Summer-Autumn rice crop	Autumn-Winter rice crop	Sweet potato, maize	Other food crops
	Area (ha)	HH number	Area (ha)	HH number						
X' dang (125)	150.07	125	166.60	125	0.10	16.73	13.10	4.54	132.13	-
Average area	1.20	1.33	1.33	1.33	0.10	0.16	0.17	0.16	1.08	-
Bahmar (125)	45.25	119	64.33	119	0.23	18.60	17.05	5.49	22.46	1.00
Average area	0.38	0.54	0.54	0.54	0.12	0.18	0.18	0.26	0.55	0.50
Mnong (250)	232.02	227	249.61	227	41.95	25.09	4.55	3.33	169.23	1.00
Average area	1.02	1.10	1.10	1.10	0.42	0.21	0.23	0.18	1.08	1.00
Jarai (250)	58.84	228	94.14	228	12.96	41.92	23.69	8.25	7.33	-
Average area	0.26	0.41	0.41	0.41	0.25	0.21	0.22	0.25	0.20	-
Ede (250)	23.40	176	43.93	179	1.37	21.90	20.35	0.32	-	0.80
Average area	0.13	0.25	0.25	0.25	0.15	0.13	0.13	0.08	-	0.80
Koho* (125)	-	-	-	-	-	-	-	-	-	-
Average area	-	-	-	-	-	-	-	-	-	-
Ma* (125)	-	-	-	-	-	-	-	-	-	-
Average area	-	-	-	-	-	-	-	-	-	-
Total (1250)	509.58	875	618.61	878	56.61	124.24	78.74	21.92	331.15	2.80
Average area	0.58	0.70	0.70	0.70	0.35	0.18	0.17	0.21	0.93	0.70

*The Koho and Ma ethnic groups in the survey sample have not planted food crops.

Table 3 Area planted with cash crops by households of ethnic groups

<i>Ethnicity (surveyed households HHs)</i>		<i>The area under cultivation of cash crops</i>	<i>Cash crop</i>					<i>Others</i>
			<i>Coffee</i>	<i>Tea</i>	<i>Pepper</i>	<i>Cashew</i>	<i>Rubber</i>	
X'dang	Area (ha)	105.41	33.41	–	–	–	33.20	38.80
(125)	HH number	87	55				28	51
	Average area	1.21	0.61				1.19	0.76
Bahnar	Area (ha)	110.76	24.47	–	–	–	76.55	9.74
(125)	HH number	92	59				70	19
	Average area	1.20	0.41				1.09	0.51
Mnong	Area (ha)	450.22	206.30	0.06	13.25	96.40	140.91	21.27
(250)	HH number	218	196	1	33	92	68	25
	Average area	2.07	1.05	0.06	0.40	1.05	2.07	0.85
Koho	Area (ha)	106.65	92.19	14.46	–	–	–	–
(125)	HH number	125	124	79				
	Average area	0.85	0.74	0.18				
Ma	Area (ha)	105.48	69.37	36.11	–	–	–	–
(125)	HH number	120	116	97				
	Average area	0.88	0.60	0.37				
Jarai	Area (ha)	93.09	71.00	–	16.48	3.95	1.50	–
(250)	HH number	189	177		100	7	1	
	Average area	0.49	0.40		0.16	0.56	1.50	
Ede	Area (ha)	227.53	169.07	–	18.37	1.00	58.21	2.32
(250)	HH number	229	229		28	4	41	4
	Average area	0.99	0.74		0.66	0.25	1.42	0.58
Total	Area (ha)	1,199.14	665.81	50.63	48.10	101.35	310.37	72.13
(1,250)	HH number	1,060	956	177	161	103	208	99
	Average area	1.13	0.70	0.29	0.30	0.98	1.49	0.73

Additionally, according to Tiệp et al.'s (2011) study in Dak Lak province, ethnic minorities cultivate commodity crops like coffee, cocoa, pepper, cashew, hybrid maize, broccoli, and high-yield cassava in specialised gardens. Between 1990 and 1999, the total cultivated area rose by 142.62% (38,567 ha in 1990 to 55,009 ha in 1999), with wet rice increasing by 9,429 ha to 10,583 ha and cash crops increasing by 14,427 ha to 29,933 ha (Tiệp et al., 2011). In another instance, before 1985, Y ButkKso's home community, the Ede people of Dran village, EaSol commune, EaH'Leo district, Dak Lak, cultivated rice once a year without utilising agricultural technology and relying on nature's gods, resulting in year-round food scarcity. Since 1993, the family has cultivated high-value commodities such as coffee and high-yielding maize on highland fields under the direction of the Farmer's Association. For the garden, Y ButkKso restored the mixed garden under the direction of the District Agricultural Extension Centre's technical team, removing the guava and bitter gourd trees and replacing them with 700 pepper pillars.

After three years of attentive care, the pepper garden still makes 50 million VND (Vietnamese dong) after subtracting all production expenditures, while 2.5 ha of coffee earns 100 million VND each year. Additionally, other households in Ma Sanh and Ma Ri in Huynh village earn between 50 million and 80 million VND annually (Tiệp et al., 2011). Thus, the agricultural structure of ethnic minority farmers in the Central Highlands has shifted away from food crops and toward cash crops. The seasonal calendar of a Bahnar household, Village 4, Dak Tieng Ko Tu village, Dak La commune, Dak Ha district, Kon Tum province shows that the previous months of leisure have been filled with new crops (Table 4).

Table 4 Crop timeline – Wôi’s household, Bahnar group, Dak Tieng Ko Tu village (2014)

<i>Month</i>	<i>Crop cultivation phase</i>
January	Tapping latex
February	Tapping latex
March	Tapping latex
April	Spring – Winter rice harvesting; Tapping latex
May	Tapping latex
June	Tapping latex
July	Sowing Seasonal Rice; Tapping latex
August	Tapping latex
September	Tapping latex
October	Coffee harvest – crops (100 days rice); Latex
November	Harvest the crop (fragrant rice 110 days); Latex
December	Harvest sugarcane; Winter-spring rice sowing; Latex

Source: Surveyor Thieu Thi Tra Mi’s fieldwork note, dated 6 August, 2014

An interview conducted with a Jarai distinctive peasant named Rahlan S. is presented next. He was born in 1953 and lives in Ngol village, Ia Glai commune, Chu Se district, Gia Lai province. Rahlan S. is an example of a person overcoming difficulties to become rich. He is progressive and dynamic, ready to select high-yielding and profitable crops for plantation, and willing to apply new techniques for plantation to improve the family economy. A story of his success below is visible proof of the dynamic economic behaviour of ethnic minority farmers:

Rahlan’s father died when he was 6 months old and his mother passed away when he was 4 years old; so his childhood was so hard. His relatives were too poor to bring up him. He said that the difficult situation intermined him to have put in a great deal of effort to become rich. Thanks to an important and bold decision, he began to have land to cultivate. Initially, he planted two crops of rice and his family had a stable life because he has enough food but he has not yet accumulated capital. From the late 1980s, the Central Highlands began to appear coffee and pepper fields of Kinh people attracting his attention. He aspired to attain techniques for planting but has not had the conditions to learn. He said, ‘when I saw coffee plantation in Ia Pang village (Chu Se), I thought so much of this issue that I couldn’t sleep that night. I thought how I should start to grow coffee’. In 1993, when he learned that a relative in Dak Lak had successfully planted coffee, he came to learn coffee growing techniques from him. Then, he planted 20 coffee trees as a trial but it failed. Being not

discouraged, he found some Kinh households in the area to learn from their experiences. Since 1994, he has successfully planted coffee trees but productivity was not high. He continued to learn coffee growing techniques from Radio. For the kava crop, he also had a similar experience, learning from the Kinh people and started planting kava in 1996. He has gained the technique of planting industrial trees, which is not traditional agriculture for ethnic minorities. In recent years, whenever the commune has organized training courses on techniques of planting, fertilizing, and harvesting, he has participated to improve his planting techniques. He modestly said, 'I have not cultivated as well as the Kinh, so my pepper and coffee productivity are not as good as theirs. I have to learn more'.

4.2 Application of appropriate agricultural technology

Ethnic minority farmers' use of technological advancements to improve revenue includes the use of machinery to replace manual labour, science and hi-tech farming, and the conversion of cultivars to commodity production. Before 1997, ethnic minority farmers relied entirely on human labour. Tilling the soil required considerable time, resulting in inconsistent seeding and failure to keep up with the crop, resulting in low output. Additionally, harvesting takes a long time, lowering the quality of agricultural products. One of the State's poverty reduction projects in the Central Highlands is to organise, advise, and assist farmers in obtaining bank loans to purchase agricultural machinery and equipment to reduce field-preparation time, save labour, and ensure timely planting. The soil is ploughed thoroughly and meticulously to ensure that crops thrive. The extent to which machines are used varies according to the aspect and kind of crop. People rely entirely on equipment for tilling the soil and drilling holes to plant new coffee, pepper, and rubber trees. Watering, spraying pesticides, transporting agricultural goods after harvest, and processing raw coffee to a greater or lesser extent all employ the use of motor vehicles. Rice is mechanised at a slower pace than cash crops because it is produced in a smaller area on terraced fields where commercial crops cannot be planted: tilling (87%), tending (over 77%), fertilising, watering (53%), harvesting (over 50%), and processing/preservation (over 50%) (Hung, 2015).

In the interview notes of surveyor Siu K'Kip, a Jarai lady in Greo Pet village stated that: "After 1997, farming has gotten simpler than ever before, owing to the use of machineries such as tillers and rice threshers. Farmers used to perform only light labour by hand, such as sowing rice, fertilising, weeding, and spraying herbicides". Due to the impossibility of using combine harvesters on terraced fields, as is the case in the Mekong Delta, people rely on semi-manual thresher machines. The devices are positioned on undeveloped terrain (the farmer will set aside flat land in each field to place the machine). Rice is chopped by lawn mowers and put aside, and the individuals gather, bring, and place it on threshing machines. "For a few days", Ms Kip says, "the fields are reaped by thresher equipment". The fields are irrigated and harvested using the same source of water. Fields adjacent to one another are frequently sowed on the same day to simplify irrigation. The farmers of the Central Highlands have lost their reputation for poking holes for seed planting; big terraced fields with tillers and thresher machines have been established.

Fieldwork notes of surveyor Tran Hanh Minh Phuong state:

Family of Rahlan P. owns approximately five sào (1 sào equals 1000 m²) of rice and five sào of coffee. Historically, it needed a great deal of effort to

prepare the ground for cultivation or to harvest it on time. The family chose to purchase a land tiller for production in 2015 after receiving promotion and mobilisation from the local authorities. On average, the machine can plough 2–3 sào of land in a half-day, which is five times faster than pulling buffalo or cows.

Every family that grows coffee, rubber, or pepper invests in ploughs, water pumps, weed machines, automated sprinklers, pesticide sprayers, and coffee processing equipment, among other things. Land preparation, irrigation, fertiliser transportation, and coffee product transportation are all automated to assist cut production time and costs. As a result, farmers have more time to expand their operations and revenue. In 2014, a farmer planted one hectare of coffee, pepper, and four sào of rice fields, earning over 300 million VND as a result of automation, reducing investment costs and eliminating the need for seasonal labour (Hung, 2015).

Agricultural extension initiatives conducted broadly by the state in ethnic minority communities have had a profound effect on farmers' attitudes about agriculture. They use technology to fertilise, water and cure diseased plants, as well as a water-saving irrigation scheme. Coffee has been a major crop in the Central Highlands since 1994, and the District Agricultural Centres are interested in training people in new ways. Local governments trained ethnic minorities in 2013 on the technical procedure of replanting coffee plants in non-rotation circumstances while also managing parasitic nematodes and root-damaging fungus. As a result, the majority of coffee trees thrive after two years. Since 1988, Mr Rahlan's family has cultivated more than 1.8 ha of coffee. The production is quite poor, averaging about 2 metric tonnes of green coffee per hectare each year. When the District Agriculture Centre announced the replanting of coffee in conjunction with parasitic nematodes and root-damaging fungus management in 2016, he registered and received funding to invest in a 0.1ha model utilising the robust coffee cultivar TR4. He gained an understanding of technology, from tillage to planting, fertilising, and trimming branches to create a canopy and the use of plant protection chemicals to treat nematodes and root-damaging fungus. From this, he gained an appreciation for the focused supervision of agricultural extension workers. With the information gathered over several years, his family will progressively enhance the remaining sections to increase the garden's production and quality.

Between 2007 and 2010, the Dun Commune Farmers' Association and the German NGO, Project Board, trained farmers on cultivar selection, planting, care, processing, and preservation to increase the quality of Bobita coffee. According to the study data (refer to Table 5), 53.7% of families report learning production skills from their neighbours, 44% from official outlets for agricultural advising policies, including seminars and training conducted by the government, and 25.2% from agricultural extension staff.

Pham Thanh Thoi and Nguyen Van Sang's fieldwork note at B'Dor, Loc An ward, Bao Lam, Lam Dong province, states:

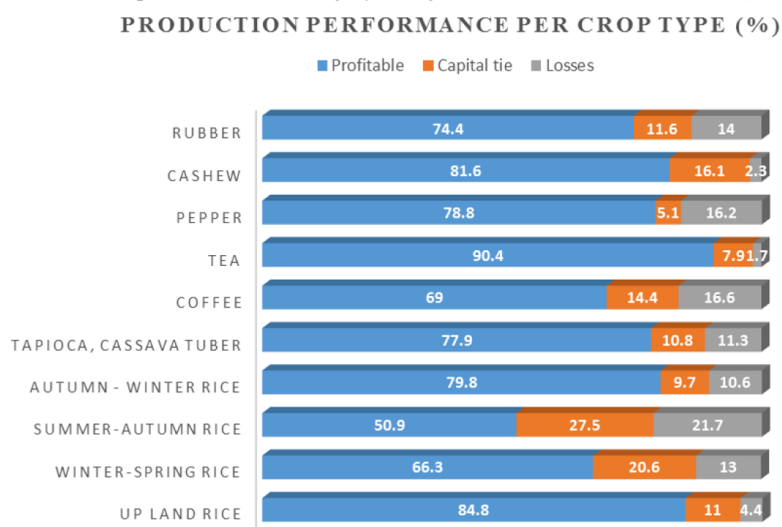
K'Bes was attending the launch of a district-organised course on coffee growing practices at the village hall. He is an enthusiastic learner and communicator. His methods and experience in coffee cultivation are also derived from this. He has been a member of the rural organisation since 2006 and attends such seminars on an as-needed basis. And via connections, information and farming practices will soon spread across the village. The Rural Association (established in 2000, according to K'Bes) has developed a social network for farmers to share agricultural practices.

Similarly, the Ma people of Mang Ly village understand how to use technology for wet-rice or coffee cultivation. Families with children who attend school or work in the city not only learn agricultural skills through state agricultural extension programmes but also how to use the internet to learn about sophisticated contemporary farming techniques that enhance crop output. Production performance has risen as a result of the deployment of technology, as shown in Figure 2.

Table 5 Information channels for production techniques

<i>Information channel</i>	<i>Responses</i>		<i>Cases</i>
	<i>No.</i>	<i>%</i>	<i>%</i>
Television	282	9.2	22.7
Radio	23	0.8	1.9
Newspaper	13	0.4	1.0
Books	16	0.5	1.3
Internet	11	0.4	0.9
Relative	612	20.1	49.3
Neighbour	667	21.9	53.7
Other farmers	60	2.0	4.8
Agricultural extension officer	313	10.3	25.2
Training of local government	546	17.9	44.0
Training of company selling pesticides	302	9.9	24.3
Others	207	6.8	16.7
Total	3052	100%	

Figure 2 Production performance at Mang Ly village (see online version for colours)



Not only have ethnic minorities employed agricultural technology in agricultural production, but they have also used agricultural products such as fertilisers and

insecticides. This demonstrates that ethnic minorities' farming operations are no longer entirely dependent on nature, as was the case with traditional farming.

4.3 Prudent allocation of resources

According to the survey findings, 64.6% of households (807 out of 1250) work exclusively in agriculture, 29.4% work in both farming and non-agricultural jobs, and 6% work solely in non-agricultural occupations. Agriculture-dependent households have recognised the dangers associated with reliance on a single type of commodity. Farmers have recognised the need to diversify their crops and animals: "If the harvest is excellent, the price is lost, and if the price is good, the crop is lost". For instance: R Mal L's household (in Greo Pet village, Dun commune, Chu Se district, Gia Lai) relies entirely on agriculture but diversifies its crops and livestock: five sào of land is devoted to wet-rice intercropping with maize or beans, one hectare to coffee, eight cows and three pigs are raised, and the land surrounding the house is devoted to bananas, noodles, and sweet vegetables.

The husband of Rahlan P. works as both a farmer and a local officer. His wife and daughter-in-law are rubber latex workers, and his son works in agriculture. However, each member of the family is responsible for cultivating two sào rice fields to get rice for daily use. Additionally, pepper is grown on the ground around the home. There is a little shop in front of the home that sells pastries and soft drinks to village residents. This is an average-income household in comparison to other families in the community. Rahlan P. owns six hectares of land, including three hectares of coffee, 1.5 hectares of rubber, 2100 pepper plants, and four sào of rice for one crop.

Diversifying crops, livestock, and family human resources to guarantee a secure livelihood and minimise hazards is a typical method of resource allocation among ethnic minorities in the Central Highlands. Although they are aware that producing goods under the guidance of agricultural extension officers can increase profits, Ro Mal L., Rahlan P., and Rahlan S. represent Jarai risk-averse behaviour by diversifying their livelihoods, which is no different from the behaviour of any Vietnamese farmers in general, as Scott (2015) identifies in his fieldwork on the moral economy of the peasant in Southeast Asia:

The primary issue confronting Vietnamese agricultural households, in general, is one of sustenance. Due to the precarious nature of farmers' incomes and the unpredictable nature of the weather, farmers are always looking for strategies to prevent risks and crop failure. It is the fear of food scarcity, or more broadly, the subsistence ethic... The farmer's primary objective is safety and survival, not profit maximization.

Numerous studies have, however, demonstrated that income diversification is a necessary strategy to increase revenue and reduce poverty (Ibrahim et al., 2009) and mitigate income volatility and risk (Abdulai and CroleRees, 2001). In addition, diversifying income sources helps to avoid food crises and contributes to household welfare (Sultana et al., 2015). Thus, households always have supplementary economic activity in addition to their primary source of income (e.g., producing hybrid maize and coffee, livestock, rice farming, gardening, trading, and processing fresh coffee into the coffee core). Additionally, households are constantly shifting their livelihoods and seeking alternative sources of income to avoid hazardous situations in their primary economic activity. For instance, when growing maize, they expand their tea production to enhance revenue. When the price of maize falls and the price of tea grows, they are prepared and with

sufficient experience to produce tea. Even when the price of tea is high, they plant maize in case the price of tea decreases. In another example, ethnic minorities in the Central Highlands have experimented with coffee cultivation. When coffee production is risky, farmers actively seek alternative livelihoods.

Appropriate and effective allocation of labour resources will make important economic and social significance for the stable and fast development of the income of peasant families in the long term. Due to a shortage of arable land in the Central Highlands and the low productivity in the agricultural sector, 6% of households rely exclusively on non-agricultural employment. Without cultivable land, families rely on agricultural labour, while youngsters work as rubber latex workers or in city-based businesses. Underemployed agricultural labour will have to work in off-farm activities or migrate to the cities and abroad. Some families borrow money to send their children overseas to work to better the family's economic situation. It is not unusual for Jarai and Ma young people to leave the village for jobs in Malaysia, Japan, and Korea. Therefore, having more diversified production and rural off-farm employment are the main pillars for combating poverty in the Central Highlands. The division of work among ethnic minority families remains gender- and age-based. Men perform physically demanding tasks such as tilling the soil, planting seeds, watering the crops, and delivering agricultural products. At home, the women perform light duties, sons assist their father with heavier labour, and daughters assist their mother.

5 Conclusion and recommendations

Economic development policies and agricultural technology training implemented by the State have a significant influence on the economic behaviour of a large number of farmers. It was appropriate, therefore, that Vietnam embarked on a targeted approach to transit from a self-sufficient to a commodity-based economy. Households will embrace new farming practices, shift their focus from short- to long-term crops, and reallocate family resources to improve both income and economic resources. The study has shown that ethnic minorities' behaviour altered from shifting cultivation to growing wet rice and cash crops like cocoa, rubber, coffee, and pepper. Such change is multidimensional and influenced by a variety of aspects such as physical and social distance, risk assessments, relationship quality, and status. The household's economy has become increasingly associated with the market economy and promoted the process of specialisation and monetisation. The local society has also begun to participate in the service sector, where products are gradually replaced by purchasing and selling. The majority of farmers polled raise a range of industrial plants for goods. They recognised the value of applying horticulture techniques to increase output. Nevertheless, they are enthusiastic about growing a variety of vegetables for self-consumption. They see the value of enriching the family diet, feeling better, saving money, and, in some circumstances, earning an additional income from surplus vegetables. Small-scale vegetable growers sell their surplus mostly at local markets, to friends and neighbours and, occasionally, in exchange for other goods and to neighbouring communities.

The survey concluded that the economic behaviour of ethnic minority farmers in the Central Highlands was not aimed at survival, and their agricultural activity was not a livelihood and way of life but a business practice for profit (Redfield, 1989). Such useful knowledge will motivate Vietnam's government to propose further reforms in the

agriculture sector and introduce a new style of poverty reduction and increased social protection in rural areas. Specifically, they can generate opportunities to develop sustainable agriculture by applying high technology, clean and organic agriculture for higher productivity and value. The government of Vietnam needs to improve labour productivity and continue investing in infrastructure to create jobs. It should also more intensively direct poor households toward using profitable crops, provide microfinance, improve the skills of the young generations and prepare them for off-farm opportunities that offer more stable income. The following specific recommendations are made for the government of Vietnam to consider in pursuing the eradication of poverty among ethnic minority groups: (1) Empower minority populations and their participation in the management and use of natural resources; (2) Launch agricultural development programmes in collaboration with international organisations and donors that will provide ethnic minorities with primary opportunities for income growth; (3) Improve access to vocational training opportunities for target households; (4) Facilitate the training of ethnic minority youths for entry into the job market.

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