

## THE MANAGEMENT, USE AND PROTECTION OF ENVIRONMENT AND NATURAL RESOURCES OF ETHNIC MINORITIES IN VIETNAM

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Every year in Vietnam large quantities of natural produce including food, coal, oil, iron, tin, gold, timber and other forest and marine products are exploited. Due to a small farming economy with a low level of production capacity, backward technologies and the consequences of wars, natural resources have been rapidly degraded in both quality and quantity, thus exerting negative impacts on the ecological environment.

Environmental degradation and pollution are urgent issues in Vietnam and are shown in the following areas:

- More than 13 million ha of land have been turned into wasteland and bare hills, 1.2 million ha of which have been seriously eroded and cannot be farmed.
- The area under forests has reduced nearly 6 million ha and forests continue to be destroyed, resulting in the reduction of many animal and plant species, many of them on the brink of extinction.
- Surface water resources have been contaminated and in many areas, they cannot be used resulting in many water creatures being unable to live.
- Underground water resources have started to be encroached by humans, rapidly becoming exhausted or reducing in quality.
- Sea pollution has reduced the sources of sea products, particularly along the seacoast, which is regularly and directly affected by human activities.
- Air pollution is increasing. In some areas dust, toxic chemicals and hazardous gasses are beyond the standard limits by 5 times or even 1000 times.
- The environment in industrial zones and urban areas has been degraded and polluted due to rapid urbanization and free migration from rural to urban areas.
- The rural environment has been degraded and polluted due to the imbalance between population and land requirements (rapid population growth).
- The working environment (at micro level) is affected by hazardous gasses and noise causing chronic respiratory and cardio vascular diseases and mental disorders for workers.
- Many environmental problems and accidents, particularly flooding in recent years have caused great loss of lives and property to the local people.

So the two issues— *natural resources* and *environment*, continue to pose *great challenges* in Vietnam, demanding the government make major readjustments in policies and review the approach from *control of nature* to “*nature friendly*”. The old way of thinking which involves the theory of control of nature often assumes the earth can provide endless natural resources and humans should subjugate nature. On the contrary, the new way of thinking (or the Gaia Theory) is based on the premise that the natural resources on

earth are limited, and humans should cooperate with the nature.

According to an official Government report in 1979, there are 54 ethnic groups in Vietnam including 53 ethnic minority groups. Three ethnic minority groups – the Hoa, Kho-me and Cham live in the plains and 50 other minority groups live in mountainous areas and highlands. On qualitative criteria based on the level of socio-economic development, scientists categorize the ethnic minority groups into the following two groups:

\* *Ethnic minority groups having higher development pace* include the Hoa, Muong, Kho-me and those belonging to the Tay-Thai linguistic family.

\* *Less developed ethnic groups* include those which are poor and backward, face difficult farming conditions and have very low material and spiritual living standards. They live along the Truong Son mountain range, high mountains in the Northwestern region or along the Vietnam-China border areas.

The management of natural resources and environment should be done at two different levels: State management at macro level and traditional management by communities at micro level.

The Government views on natural resources and environment have been institutionalized in its Constitution and laws. Article 17 of the Constitution of the Socialist Republic of Vietnam stipulates that *land, forests, mountains, rivers, lakes, water resources, underground resources and marine resources belong to the State and under the ownership of the entire people.*

As the representative of the people in the ownership of natural resources and environment, the State has established an organizational system from central to grassroots levels to enforce its ownership rights. In addition, under the “bottom-up” approach, there has existed a traditional or unofficial entitlement to the environment and natural resources among the ethnic groups through different historical stages. In each stage, due to socio-economic development levels, the approaches toward the environment and natural resources have varied. In the initial stage, primitive man mainly “*enjoyed nature*” and “*exploited nature*” to meet their daily needs. The development of production tools made of stone, bronze and particularly iron contributed to increasing productivity on the one hand and to widening the “*gap between humans and nature*” on the other. Thanks to the improvement of production tools and population growth, humans rapidly and strongly intervened in nature.

The protection of natural resources and the environment among the ethnic groups started when the production economy developed and population pressure increased.

More than anyone else, farmers have drawn on experiences around what should be done for sustainability over thousands of years, and handed them down through generations. Community experiences on the protection of natural resources and the environment are shown in the following:

- Understanding of the value of natural resources and the wise use of those resources.

- Gradual formation of effective farming techniques on wet land.

- Development of animal breeds and plants highly resistant to the environment.

In Vietnam, the research and assessment of the environmental state is new. Since 1994, Vietnam has had an annual environmental report submitted to the National Assembly and the State (the 1994, 1995, 1996, 1997, 1998 Environmental Report). Environmental components selected to include in the annual report are 1) land; 2) forests; 3) water resources; 4) biodiversity; 5) marine and coastal environment; 6) natural calamities; 7) industrial and urban environment; 8) wastes; 9) basic causes; 10) responsive policies and orientations toward land, forests, biodiversity, water resources, atmosphere and climate change, marine and lake environment, energy, toxic chemicals and wastes, commerce and environment, environment information, environment economics and economic tools.

In the draft report GEO II VNEP, another three components have been added: 11) content of socio-economic driving force; 12) land and food; 13) construction land area, initiatives on existing policies.

In this report, from the perspective of ethnology, we only focus our discussion on the most basic aspects of the management, use and protection of the environment concerning the components of land, forests, water resources, natural problems and accidents, causes and responsive policies and orientations (item 1,2,3,6,9 and 10). Moreover, as mentioned above, the ethnic minority groups in

Vietnam are only concentrated in mountainous, hilly and highland areas. Therefore we discuss the issue in relation to two main regions – the northern mountainous region and the Central Highlands.

## 1. THE NORTHERN MOUNTAINOUS AREAS

The northern mountainous areas were sparsely populated until recently and endowed with a favourable tropical climate. Besides some local ethnic groups, most of the inhabitants are migrants. The flows of migrants have upset the population distribution in the region and created the current distribution of ethnic groups.

According to the March 1, 1960 statistics, the northern mountainous areas comprising the Thai-Meo autonomous region and the provinces of Lao Cai, Yen Bai, Cao Bang, Bac Kan, Lang Son, Tuyen Quang, Ha Giang and Thai Nguyen have a population of 2,098,376 belonging to 36 ethnic groups. In 1979, the total population in the region rose to 5,403,338 and in 1989 the figure was 6,768,436.

In 10 years therefore, from 1979 to 1989, the population of the ethnic groups in the Northern Mountainous Areas increased 1,365,053 persons (or 125%). However, the population growth rate was not even across ethnic groups. The population of some groups, such as the Hoa, Phu La, La Ha and Mang reduced. There were different causes for this such as natural and *mechanical* changes, the *ethnicity process* and other factors. For example, the reduction of the Hoa population was due to the fact that a large number of Hoa people returned to China

during the late 1970s; and the rapid population growth of the Kinh was partly due to natural growth but largely due to the *mechanical* increase. Worthy of note is the abnormal change of the population of the Phu La, La Hu and Mang. This was possibly due to the *ethnicity process* or a mistake in the process of registration of these groups, census or processing of data. It might also be because of a mistake in their names *or the differences between science and experiences, which often cause a change*.

In terms of the number of ethnic groups, according to the 1979 list of ethnic composition in Vietnam, of the 54 ethnic groups in the country, 31 are present in the northern mountainous areas, accounting for 57.4 percent of the total number of ethnic groups in the country. Of those 31 ethnic groups, 27 have the population of more than 50 percent of their total population in the country and 20 ethnic groups have 90 percent of their total population.

The forest resources in the northern mountainous areas are rich.

According to the 1983 statistics of the forestry service, forests covered 1,509,300 ha in the northern mountainous areas, accounting for 17 percent of the total area. However, forest exploitation activities and other impacts have rapidly reduced forest resources in the region.

If in the past, "*golden forests*" in the northern mountainous areas could provide regular forest products for the local people in their daily lives, today, due to slash-and-burn farming and wanton forest destruction, the area under forests has reduced and we can only talk about the potential of forest land, not forests.

In the northern mountainous areas, local inhabitants while exploiting forest products, still had a long bond to the environment and in their customs and traditions typical to each ethnic group, an early awareness of the need to protect forest resources. For example, in the area inhabited by the Dao, the Dao people have had a tradition of growing cinnamon trees in celebration of the birthday of small children to be their dowry in the future.

In Sa Pa, some Hmong villages have a regulation stipulating that families can only cut down *tre* (bamboo), *nua* (neohouzeaua) and *vau* (a species of small and strong reed) trees under their ownership. Whoever by mistake cuts them from other families, will be fined. In Si Ma Cai, Bac Ha district, Lao Cai province, there were also regulations not allowing the clearance of bamboo forests for farming purpose. Worthy of note is that to ensure the enforcement of those regulations and rules, each *Joal* (village) appoints one or two "*Xong than*" (chiefs) to supervise the village activities and to try violations.

Local practitioners (from the Si La ethnic minority group in Seo Hai village in Can Ho commune, Muong Te district, Lai Chau province have had a custom of "*purchasing medicinal herbs*". When going to the forests to gather medicinal herbs, people must bring with them two silver coins (tantamount to VND 10,000) to "*buy*" the plants. For instance, when they see medicinal herbs 1, 2, 3, they must place a coin on the first plant and pray to gods and deities. They must not pick that plant but can then take others home as remedies for medical treatment. It is also not allowed to uproot the plants and so

the custom is good in preventing the destruction of forest plants.

The Kho-mu people in Co Chai village in Mai Son district, Son La province have established a regulation on the protection of two types of forests. The prohibited forests are those on the upstream watershed. Whoever violates this regulation must pay a fine of VND 1000/tree, VND 5,000-8,000/m<sup>3</sup> of wood and if at a higher level; their gains will be confiscated for the communal fund. Those who discover acts of violations will receive 3 – 5 percent of the fine. The second type of forest is the ghost forest, which is only used as burial place for the dead. Whoever violates it will be fined in kind: two roosters, two jars of *can* wine and a liter of white liquor. These things will be handed to the “*Chau ma sa*” (the master of ceremony) to offer to the Ghost and then divided between all the villagers. Imposing fines such as these on the violators are very useful for the protection of these two types of protected forests.

The main sources of livelihood for the ethnic groups on the highlands come from forests and slash-and-burn farming. According to Do Dinh Sam (1994), of the total 9 million ethnic minority people, 2,879,685 persons from 482,512 household families live on upland farming. Among them, the Tay accounts for 7 percent, the Nung 16 percent, the Thai 45 percent and other ethnic minority groups in remote areas 100 percent. In upland farming, from long-standing experience, the people of these ethnic groups practice the open-cycle farming regime. The duration for leaving the land fallow depends on each ethnic group and region but may be from 5 to 20 years. During the period the land

is left fallow, the thin plant coverage on the land is a remarkable source of nutrition for re-cultivation.

In some limestone topography such as in the provinces of Ha Giang, Lao Cai and Cao Bang, the Hmong, Dao, Lo Lo and Ha Nhi have established farmland in stone holes. This includes large and small-size stone holes containing soil, and each hole can grow several maize plants. In the stone holes having no soil, the locals have to carry soil from across the valley to fill them for cultivation. In some places, they even arrange stone slabs based on their experience to keep the soil from being washed away. It is noteworthy that such “*soil bags*” in the “*mid-air areas*” provide a sizeable farmland area and high yield of rice and maize. For example, in Lung Tao commune in Dong Van district, Ha Giang province, during the 1968-1982 period, the Hmong and Lo Lo built nearly 100 ha of upland fields edged by stones with an annual yield of 0.9 – 1.1 tonnes of maize per hectare and even 2.5 tonnes of maize per hectare in some high yield maize fields (the average maize yield in 1985 was 1.24 tonnes/ha).

To adapt to the adverse weather and climate, the ethnic minority people in the northern mountainous areas have drawn a rather precise cultivation schedule with a scientific grounding and with highly localized and ethnic characteristics.

Through a wealth of traditional knowledge, practice and awareness of the importance of weather and climate in their life in general and in agricultural production in particular, some ethnic groups in the northern mountainous areas have become experienced in weather forecasting. For example, the Thai in the

Northwest can forecast the weather through an insects cry. When the red grasshoppers cry, the weather will change from sunny to rainy. In some areas, the locals manufacture rings from prehistoric hatchets and wear them on their fingers. Based on their colour they can predict the weather.

The water resources in the highlands have been managed and exploited by people for their daily life and production. They make use of the energy from running water at different levels to irrigate their crop fields.

Fish rearing in wet fields by the Thai, Muong and Tay has also been developed. They have built fish rearing fields through creating two deep canals on two sides of the field and a cross-shaped small pond in the middle of the field. The field covers a large area where the fish are fed with nutritious food while the canals shelter them from hot and cold weather and protect them from the enemy. The fish can freely move from the canal to the field to seek food and return to the deep-water canal to rest. Here fish and rice plants support each other in their development. Fish eat insects, water plants and mosses which harm rice plants, and scour mud to help rice plants grow. They also provide manure for the rice. When farmers manure the rice fields, a by product will be feeding the fish.

According to statistics released by the Fisheries Department of the Ministry of Fisheries, the total area of ponds and small lakes in the northern mountainous areas is about 19,700 ha, with the average yield of 1 tonne per ha. In the rainy season, the Muong, Thai and Tay can harvest 3 tonnes per ha. In the Dien Bien

hollow, Lai Chau province, the Thai raised hundreds of tonnes of fresh fish and many households harvested 3 tonnes of fish per ha, with a value five times better than rice growing.

Fresh water fish are very nutritious food, providing mineral salt and iodine. Wherever people eat more fresh water fish therefore, goiter is reduced. From the aspect of environmental protection, fish also contribute to eliminating malaria as they eat mosquito lava on the water surface.

There is a popular custom in the northern mountainous areas of collecting drinking water during the rainy season from house roofs in jars, tanks or large stone holes for use during the dry season. Due to limited water containers, people have to fetch water 3 – 10 km away during the dry season. Moreover, the water quality is not good and can be unhygienic with the coliform bacteria much higher than Vietnamese standards for drinking water.

Recently, with support from the Government and international organizations, people who live on mountains in the highland areas make use of rainwater, water from rivers and streams and have started to use underground water by digging water wells for their daily life.

On stone mountains in the highlands, in addition to using rainwater, people make use of water sources from water springs and mountain creeks, through pipelines to their brick tanks, stone holes or stone tanks.

Small hydro-electric power potential in the northern mountainous areas can be

tapped to produce 600,000 kW electricity. The potential is distributed evenly and in remote areas, and therefore is easy for local people to tap into the potential. In past years, only about 50,000 kW of electricity were produced, accounting for 8 percent of the total output. For the ethnic groups in the remote areas, micro-hydro electric power at the household level is a solution that deserves great attention. A micro hydro-electric power program to support households in 11 northern mountainous provinces has assisted the building of 5000 micro hydro-electric stations in the northern mountainous areas with a total funding of VND 10 billion. Micro hydro-electric power stations on the one hand exploit new energy and on the other contribute to rural development in mountainous areas. They also help bring lighting to remote rural villages, provide the local people with access to radio and TV programs, water supplies to irrigate crop fields and contribute to building a sustainable living environment in the mountainous and border areas.

The final consequences of environmental degradation are a propulsive force for migration flows (both planned and free migration). In fact, in the past years, major migration exodus have been seen, moving from the northern mountainous areas to the Central Highlands.

## 2. THE CENTRAL HIGHLANDS

The Central Highlands comprises four provinces of Gia Lai, Kon Tum, Dak Lak and Lam Dong with a total area of 55,000 sq. km, or 16.8 percent of the country's total area.

The Central Highlands has served an important position in the history of revolutionary struggle in our country and is becoming more important in the cause of socio-economic development.

The Central Highlands has long been considered a region with great diverse natural resources. Ninety percent of its area is covered by basaltic soil and 33 percent by natural forests. The Central Highlands accounts for 46.7 percent of the country's timber reserves. These natural resources have on the one hand created a strong forestry economy with long-term industrial crops and large livestock breeding; and on the other attracted more population, thus forming organized and free migration flows to the region.

For this reason, the population growth in the Central Highlands increased rapidly, particularly in recent years due to the *mechanical* growth. In 1976, the population in the Central Highlands was 1,206,700 and by 1994, the figure rose to 2,998,700; that is within 18 years the population increased by 2.48 times or an average 5 percent increase a year. Rapid population growth rate has had negative impacts on the environment not only in the Central Highlands but also in the surrounding areas. It can be said that the pace of degradation of the natural environment is directly proportional to the population growth rate.

The most typical characteristic of the Central Highlands is its vast basaltic soil area, which accounts for almost all the basaltic area of the country. The 1.4 million hectares of basaltic soil is distributed in five high plateaus: Kon Ha Nung - 98,000 ha; Peiku - 344,000 ha; Buon Ma Thuot (also called Ban Me

Thuat) - 334,000 ha; Dak Nong – 430,000 ha and Di Linh-Bao Loc high plateau 195,000 ha. The Central Highlands basaltic soil is highly fertile and very suitable for many long-term industrial crops of high value such as coffee, rubber, pepper and tea.

The alluvial area is estimated to be 180,000 – 190,000 ha concentrating in districts such as Da Hoai – Cat Tien, Lak – Krong Pak, Ia yun Pa, Kon Tum. This type of soil can be used for intensive wet rice farming with one or two crops a year and high yield.

According to statistics released by Program 48 C, compared to the whole country, the Central Highlands accounts for 16.7 percent of the country's natural area but its forest area accounts for 33.4 percent and the timber reserves 46.2 percent. The region has 2.84 million ha forests providing 237 million cubic meters of timber, 756 million bamboo trees and its forest coverage is 47 percent.

The water resources of the Central Highlands include rainwater, surface water and ground water. Surface water comes from surface water flows, natural lakes and man-made lakes. The Central Highlands is in the catchment of several river systems such as the Ba River (running through to Phu Yen and Khanh Hoa provinces); the Dong Nai River (running to the Southeastern region); and the Se San, Serepok Rivers flow to the central part of the Mekong River.

The underground water sources play an important role in the Central Highlands. The underground water reserves are estimated to be 1,422,035 m<sup>3</sup>/day in the Pleiku Plateau; 2,028,997 m<sup>3</sup>/day in Buon Ma Thuot Plateau;

475,031 m<sup>3</sup>/day in Duc Trong Plateau; and 331,105 m<sup>3</sup>/day in Di Linh-Bao Loc Plateau.

The Mon - Kho-me ethnic minority groups were present very early in northern and southern Central Highlands and then came the E-de and Gia-rai ethnic minority groups from the coastal region to occupy Dak Lak Plateau and part of Kon Tum and Pleiku Plateaus.

The Kinh (Viet) only accounted for 5 percent of the population in the area during French domination. After the wars of resistance against the French colonialists and US imperialists, the Kinh population increased to 50 percent, and today they account for two thirds of the total population in the Central Highlands.

The Kinh in the Central Highlands are distributed mostly in the district towns and provincial towns and along major transport roads. After the liberation in 1975, more and more Kinh people resettled in the Central Highlands and became the main force exploiting natural resources in the region. The contacts and exchanges between the local ethnic groups and the Kinh people have greatly affected the locals. New farming techniques have been brought by the Kinh re-settlers and transferred to the local ethnic groups. Scientific, technological and cultural impacts have been transferred from district towns and provincial towns to rural areas in the Central Highlands. This has contributed to a big leap in shifting from an autarchic economy to a commodity economy in the region.

However, the *mechanical population* growth in the past years has caused a strong pressure on the environment. For example, the Dak Lak People's Committee

reported on Nov. 28, 1998 that after 20 years from 1976 to 1998, the population in the province rose from 330,000 to 1.6 million. The *mechanical population* increase was 25,000 – 30,000 persons annually or an increase of 5,000 – 6,000 households. From 8 administrative units with 96 communes and wards, the province now has 18 districts and provincial towns and 203 communes and wards. The migration flows are accompanied by wanton forest destruction and the use of land for housing and upland farming.

Prior to 1975, the society of the local ethnic groups in the Central Highlands had been in the process of changing from the primitive society to a class society, but this was distorted due to the effects of the feudal regime, French colonialists and US imperialists.

The traditional society of the local ethnic groups was built on the basis of the shifting cultivation economy with low yield and autarchy. The production distribution was based on egalitarianism, there was no market thus the exchange of goods did not develop.

For example, in the traditional agriculture of the E-de, milpa (hma or upland fields) plays an essential role. Wet fields account for a small proportion and can only be found along rivers and lakes.

After selecting suitable land, from January to April people are engaged in slash and burn farming (clearing and burning forests, hoeing land). Rice is the main crop in the milpa. Next to rice is millet. The main form of cultivation is making holes and sowing seeds in the holes. The ways of harvesting are very simple. For normal rice, people pluck rice

grains off ears and put them into a basket hung around their front hip. For sticky rice, they use sickles to cut rice stems and tie them in bundles (*cum*) and carry home.

Rotation of farmland plots is the main mode of cultivation. Each household family usually has a plot which is under cultivation and one or several others, which are left fallow.

In addition to milpa, people also have wet fields, particularly those around Lak lake and along Kno and Ana Rivers. In villages along the river and around lakes, during the rainy season (April, May – September) when the water level rises, people prepare soil for cultivation using buffaloes to crush the soil. This is the simplest method of soil preparation in the history of wet rice cultivation.

In spite of simple ways of cultivation and rudimentary tools, the yield of rice and other subsidiary crops is quite good (2 tonnes/ha/year) thanks to fertile soil and good application of the farming calendar.

Different to the E-de, the Gia-rai ethnic minority people farm using two cows to pull a plough or a harrow. (Although people still raise buffaloes, they are not used for draught).

In addition to cultivation which is the main means for their livelihood, the E-de and Gia-rai are also engaged in livestock breeding, handicraft and hunting.

Household livestock breeding developed very early among the Gia-rai ethnic minority group. Domestic animals include buffaloes, cows, horses, chicken and dogs. Buffaloes are used for religious ceremonies and bartering for valuable things (a Lao gong is bartered for 14 – 20

buffaloes; a small jar for 30 buffaloes and one slave for 15 buffaloes).

Cows are raised as draught animals; horses are used as an important means of transport, for hunting bulls and bartering with business people coming from Laos.

Elephants are raised as a means of transport for the locals and pulling lumber. The Gia-rai and the E-de do not have elephant taming techniques for wild elephants therefore they have to share with and send people to Boloven Plateau in Laos to exchange for tamed elephants. In traditional society the elephant was an important symbol of the wealth (in addition to the buffalo and jar). In the E-de ethnic group, people who owned elephants were considered to have good fortune.

The E-de and the Gia-rai also pay attention to developing poultry breeding such as chicken, ducks, geese and pigs and goats. Most of the households have flock of poultry and dozens of pigs and goats.

In addition, people are also involved in gathering, hunting and fishing. They gather forest vegetables, honey, fruit, bamboo and lumber to build their houses and make household furniture. They go hunting and fishing for food. Many household families have meat from birds, animals and fish in their meals all year round. Some even have surplus to be bartered for salt, cloths and jars. The Gia-rai are famous for hunting bulls. Men ride horses to chase wild animals, using javelins to throw at them or round them up in abyss or deep places to kill them. Bull hunting is an opportunity for Gia-rai men to prove their courage, try their talents and to select the most courageous

men to lead the village, particularly in the past in disputes between tribes.

The most popular residential area for people is the village called *play*. Each traditional *play* in the past was a complete autonomous administrative unit with its own customary laws and institutions to enforce the laws. Heading the institution was the village leader (village owner or village chief). The village chief was often an old person who is wealthy, sound in mind and body, very active, righteous and very knowledgeable about the villages customary laws and the relationships between the villagers. Thanks to their prestige, the village chiefs handle all affairs in the life of the villagers including military, civil, internal and external affairs, and economic, social and spiritual activities aiming to preserve the unity, stability and harmony among the villagers.

Worthy of note here is that the village chief does not stand above or separate from the village community. On the contrary, he represents the villagers and is a farmer and a village elder. The relations in the village, therefore, bare notable democratic characteristics without any domination or imposition. The autonomous institutional structure of the village is: a village chief (knangboh) → prestigious village elders → elders in general → villagers (Chan son). Other factors affecting the village autonomous institution include the effect of rich people, religious activists, and valiant men in the village, and landlords.

The operation of the village in the past mainly relied on customary laws. The customary laws contain regulations and social rules and sanctions. The

advantages of the customary laws are that they are specific and detailed and are expressed in proverbs; sayings with rhyming, coherence and image. Therefore they are easy to understand, apply and remember to many people.

It can be said that human effects have rapidly degraded the environment and natural resources in the Central Highlands, particularly in recent past due to strong population pressure.

Human activities include:

- *Expansion of agricultural land area:*

For cultivation, livestock breeding and agricultural services. People in the Central Highlands grow maize crops on large areas. Every year in May or June, people clear and burn forests to grow maize, tend the crop and harvest it in September or October.

Sweet potatoes and cassava crops are less developed in the Central Highlands than the northern mountainous areas. On the contrary, long-term industrial crops such as coffee, cashew nuts, pepper and rubber are popular. For example, coffee has been introduced into Vietnam since 1857. Prior to liberation in 1975, Dak Lak province had 7000 ha of coffee. Then, only a few E-de and Gia-rai household families who lived close to the coffee plantations knew how to grow coffee. Since the move to sedentary farming and development of a garden economy, the growing of coffee was promoted among the local people and today many households harvest tonnes of coffee a year.

- *Nomadic life of the locals*

According to statistics, 148,700 households with nearly 800,000 persons from the local ethnic groups in the Central

Highlands are still leading a nomadic life. It is calculated that each person needs 500 kg of rice to support their life. If the upland rice yield in the Central Highlands is 0.1 ton/ha on average, the cultivable land for a person per year should be 0.5 ha. Suppose after 20 years, forests can recover in a natural way, about 10 ha of land is needed for a shifting cultivation cycle for a person per year. Under this calculation, the Central Highlands with nearly 800,000 nomadic people must have 400,000 ha of cultivable land per year and 8 million ha for the whole shifting cultivation cycle, although the region only has a natural land area of 5.6 million ha.

So, when the population density is low, the process of shifting cultivation has less affect on the environment. When the population growth reaches a certain level, the land-population relationship is broken down and the environment and natural resources will be degraded. According to this logic, the present population density in the Central Highlands of 54persons/sq. km surpasses the limit that allows shifting cultivation. Therefore we must mobilize nomadic people to settle down to sedentary farming.

Settlement and sedentary farming change the mode of exploiting nature. They cover the following aspects:

- \* *Expansion of wet rice cultivation area*

In the first years after liberation, the issue of settlement and sedentary farming was considered a strategic issue and was carried out on a large scale in the Central Highlands. In the 1976-1980 period, large-scale land reclamation in combination with irrigation work and the construction of transport roads were implemented in the areas capable of wet rice farming.

Thanks to this effort, the area under wet rice in the Central Highlands increased remarkably.

*\* Garden economic development*

For the majority Kinh people, garden cultivation has been very familiar to them for a long time. But for the local ethnic minority groups in the Central Highlands, this type of cultivation is new to them. Prior to liberation, just a few ethnic minority households who lived close to the coffee plantations in Buon Ma Thuot and Buon Ho learned from the plantations to grow coffee around their house. By 1980s, coffee growing in gardens was encouraged among the ethnic minority groups in the region. Thanks to the gardening economy, there have been changes in the quality of life in the Central Highlands. Most of the households received planned land areas to build their gardens. Up to now, these gardens yield tonnes of coffee every year. The system of gardens has created a firm economic ground for local people in their sedentary life. However, during the process of mobilization for settlement and sedentary farming, remarkable achievements have been recorded in socio-economic fields. However, in cultural fields, many problems have been posed around the relationship between tradition and modernity.

For example, the guideline *“to help people in the mountainous areas catch up with those in the plains”* does not mean to take the cultural lifestyle of the king as a model for the ethnic minority people. Must the traditional long house, which has existed for many generations and the matriarchal family-style households with the traditions, customs, psychology, emotion and beliefs of the local ethnic

people in the Central Highlands be eliminated? Is the elimination of the long house and extended matriarchal families a sign of cultural progress? This is not to mention the cultural activities of the traditional villages in the Central Highlands, which are still linked to primitive beliefs and the worship of Yang (meaning Soul). These are very valuable in the protection of the living environment. For example, the ceremony to worship the river watering place has an aim to pray to God for supplying enough water for the cultivation and daily life of the village around the year. This is a common worshipping ceremony of the whole village and often lasts for three days. During the ceremony, the villagers have to repair the access road to the watering place, area for washing and bathing and water pipelines, to thank the Gods for providing enough water for them during the year. Normally, on the first day, the village repairs the watering place; and on the second day, all families in the village hold the worshipping ceremony. The shaman comes to each family to help carry out the ceremony. And on the third day, the whole village joins the ceremony. The ceremony leads to a festival. Therefore, during the ceremony, gongs and drum beats are heard, making it a boisterous atmosphere, inviting the deities and urging the villagers to respond to their call.

There are also other festivals and ceremonies such as: Seeking farmland; Upland farming; Rice planting; New rice; Praying for rain; Rice soul procession etc.

- Resettlement has helped to expand the cultivable land in the Central Highlands. In 1976, the area under

cultivation of the whole region increased 215 percent (while that of the whole country 110 percent). Meanwhile the area under food crops increased 137 percent (that of the whole country 110 percent), short-term industrial crops 416 percent and long-term industrial crops, mostly coffee increased 797 percent within 18 years. In addition to the achievements, there have also been some "losses", most typically in natural resources and the environment. Wanton forest destruction has turned large forests into food production areas and then waste land and bare hills.

- In the recent past, the most outstanding problem was free migration, particularly the exodus of the ethnic minority people from the northern mountainous areas to the Central Highlands.

In the province of Dak Lak alone, by 1993, 65,000 Tay, Nung, Dao and Thai ethnic minority people from Cao Bang, Lang Son, Quang Ninh and Thanh Hoa province had moved to the Central Highlands.

*\* Exploitation of firewood and forest products*

According to statistics, every year the Central Highlands exploits 690,000m<sup>3</sup> of lumber, 80 percent by State-owned companies and 3 million *stes* of firewood and 40 million bamboo trees.

The violations of the law on protection of forests in the Central Highlands in the past years have been very frequent. For example, in 1990, the Dak Lak provincial Department of Culture and Forestry granted 25 permits for logging 41,000m<sup>3</sup> of lumbers but in fact 72,5000 m<sup>3</sup> have been

exploited. Also in Dak Lak province in only the first four months of 1995, 1,132 violations of law on protection of forests, an increase of 415 cases over the same period in the previous year.

*\* Poverty and backwardness:*

According to the survey statistics released in 1993 by the General Statistic Office, 30.11 percent of the households in the Central Highlands were poor and 6.78 percent were very poor. The respective figures in the whole country were 19.99 percent and 4.36 percent, and in the northern mountainous areas they were 24.94 percent and 4.63 percent. Poor households often resorted to any means such as selling their farmland to free migrants and travelling to deep jungles to destroy forests.

Finally are the activities of other players such as forest fires, wars and construction projects, which also contribute to degrading the environment.

Human exploitation and population pressure as discussed earlier are the two main players that have rapidly degraded the natural environment in the Central Highlands in recent years.

*Forest coverage* plays the most decisive role in regulating the climate, and the surface water and the underground water flows. Sudden climatic changes such as storms, whirlwinds, hurricanes, floods and droughts are closely linked to the plant coverage of the earth. When the plant coverage is too thin, rainwater converges very quickly, forming water flows and causing floods down stream during the rainy season. On the contrary, during the dry season, the lack of the plant coverage causes rapid evaporation,

thus lowering the underground water level.

*Soil erosion* in the Central Highlands is closely related to plant coverage. In the coffee growing areas where coffee trees have full shade with the coverage of 85-96 percent, only 2 percent of rainfalls can form the surface flow with the remaining 98 percent change into underground flow.

Exploitation of natural resources in the Central Highlands, where people forget constraints and the interaction between different components of the environment, has led to many mistakes.

Of the total area of exhausted land due to human activities, the most regrettable is more than one million ha of basaltic soil, of which 21 percent rapidly degenerated.

Hydro-meteorological research projects show that in the past, the Central Highlands rarely witnessed major floods. But recently, many major floods have claimed the lives of dozens of people such as the flood in Ajunpa in 1990. Serious floods in the central region in 1999 were due to environmental destruction in the Central Highlands and along the Truong Son mountain range.

During the dry season, due to no plant coverage, sunshine and dryness, the wind blows a large amount of dust into the air, thus eroding the soil. According to statistics of the Central Highlands Epidemiological Institute, the density of dust in Buon Ma Thuot city reached 5,578 g/m<sup>3</sup>/24 hours during the dry season and 0,763g/m<sup>3</sup>/24 hours during the rainy season (the allowed limit is 0,116 – 0,113g /m<sup>3</sup>/24 hours).

The degradation of natural resources has also lead to a change in the meteorological data: the rainfall in 1993 recorded by the Pleiku, Buon Ma Thuot, Da Lat and Bao Loc Meteorological Stations was lower than that in 1978. The range of temperature, rainfall and relative humidity tends to have widened. For example, in 1978, the temperature at Pleiku Meteorological Station was 4.8<sup>o</sup>C, the figure in 1993 was 6.9<sup>o</sup>C. The respective figures at Buon Ma Thuot Meteorological Station were 4.9 and 6<sup>o</sup>C; at Da Lat Meteorological Station were 3.6 and 4.4<sup>o</sup>C; and at Bao Loc Meteorological Station were 3.6 and 4.2<sup>o</sup>C.

The picture of the land use structure in the Central Highlands has seen many changes over the past years. Analysis of the change of the land use in the 1985-1993 period shows that every year the agricultural land area increased 21.780 ha (4,110ha of annual crops, 17,220 ha of long-term crops; 430 ha of meadow for cattle raising and fish rearing). During this period, the area under forests decreased 12,780 ha/year on an average. So in general, the agricultural land area has been expanding, particularly for gardening and farm economies with long-term industrial crops, while the forest area has narrowed. This is a sign of natural environmental degradation in the Central Highlands.

Worth noting is that enterprises of the State economic sector occupy 75 percent of the land area in the Central Highlands. The largest corporation is the Vietnam Coffee Corporation, the Central Rubber Company and Army Corps 12 and 15, with dozens of affiliated State farms. In the past years, the State economic sector has

changed the economic face of the region. Many urban residential areas and economic sub-regions have been formed, contributing to regional socio-economic development. However, it is regrettable that their activities of exploiting natural resources during the period of State subsidies, State-owned enterprises did not pay attention to environmental protection for sustainable development. Therefore they have contributed a good deal to degrading the environment in the Central Highlands.

The degradation of the environment and natural resources in the areas inhabited by ethnic minorities in Vietnam, as discussed earlier, have become an urgent issue. To implement the principle of exploitation while improving, protecting and rehabilitating natural resources and the environment, we propose the following step-by-step recommendations:

1. There is a dialectical relationship between population, population growth and the environment. In the past several decades, the living environment of the ethnic groups in Vietnam has been seriously degraded, in particular, forests have been destroyed and soil has been degenerated and cannot be self rehabilitated. One of the reasons for environmental degradation is the pressure of rapid population growth. It is necessary to invest in studying the relationship between population and the environment to find out a reasonable correlation between the population density and natural resources and the environment, thus contributing to the process of sustainable development in mountainous areas.

2. In implementing the Party's nationalities policy, to protect the remaining area of forests, in 1968, the Government issued Resolution 38/CP launching a movement on settlement and sedentary farming in combination with the agricultural collectivization. After 22 years of implementation (1968-1990), the Government mobilized 482,000 households comprising 1,800,000 persons belonging to 52 ethnic minority groups in the country's mountainous areas to settle down to sedentary farming. However, those achievements have been fading. There are many reasons for this. Many infrastructure projects have been downgraded; some production establishments for ethnic minorities who settled down to sedentary farming became out-moded and can no longer be effective. The piece work system in agriculture also forced a section of ethnic minorities who moved down to the lowlands from the mountainous areas to lose their farmland. Settled households whose members became workers no longer received subsidies from the State. Here we'd like to stress the fact that the population in the settlement area tends to increase. So to make the achievements of the settlement and sedentary farming movement sustainable, population and family planning work should be implemented one step ahead. The view that after resettlement, with economic development, the policy on population and family planning will automatically be implemented cannot be supported. The question is to integrate population and family planning in settlement projects to make it more effective.

3. Vietnam is a multi-ethnic country and the population growth is not even

among the ethnic groups. In this respect, we can categorize 53 ethnic minority groups in Vietnam in three groups:

- The ethnic groups having an average population of more than 10,000. According to the 1989 population census, this group has 33 ethnic minority groups – the Tay, Muong, Hoa, Kho-me, Nung, Hmong, Dao, Gia-rai, E-de, Ba-na, San Chay, Cham, Xo-dang, San Diu, Hre, Co-ho, Ra-glai, Mnong, Tho, Xtieng, Kho-mu, Bru-Van Kieu, Giay, Co-tu, Gie-Trieng, Ta-oi, Ma, Co, Cho-ro, Ha Nhi, Xinh-mun and Chu-ru.

- The small population ethnic minority groups (with a population of 1,000-10,000) include the Lao, La Chi, La Hu, Khang, Lu, Pa Then, Lo Lo, Co Lao, Bo Y and Cong.

- The ethnic groups having very small population (less than 1000) include the Si La, Pu Peo, Brau and Ro-mam.

To ensure a sustainable development of a multi-national country, the Government should develop a population strategy suitable to each of these groups.

4. Each group in the great family of ethnic groups in Vietnam has two components forming its culture. The first component has already mixed with other ethnic groups to form the Vietnam's "national culture"; and the remaining component is the traditional culture and the culture of that specific ethnic group.

In the culture of ethnic groups, each group has its own customs, festivals and traditional knowledge more or less relating to environment policy. Besides customs that cause some constraints, there are customs and traditions that integrate with environmental protection.

Each ethnic group in Vietnam has its own history of formation and development. This has created behaviours favourable to the surrounding environment. They include the development of regulations on the management and use of natural resources to ensure their long-term life. This is an important resource for the country, and can help the process of sustainable development. Thus, study of the cultural identities of ethnic groups including the collection and analysis of local knowledge drawn from many generations will contribute to scientific background for developing environmental policies in the mountainous and ethnic minority areas. It is necessary to strengthen the relationship between ethnology and the research and study of the environment and natural resources in the ethnic minority areas in Vietnam.

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