



## TRADITIONAL FARMING SYSTEM IN DONG VAN KARST PLATEAU GLOBAL GEOPARK



Ha  
Giang

**GIAHS**

**TRADITIONAL FARMING SYSTEM  
IN THE DONG VAN KARST PLATEAU GLOBAL GEOPARK (DVKPGG) IN VIET  
NAM**

**A PROPOSAL FOR DECLARATION AS A  
GLOBALLY IMPORTANT AGRICULTURAL HERITAGE SYSTEM (GIAHS)**

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## Abbreviations

ABD	Agricultural biological diversity
DARD	Department of Agriculture and Rural Development
DCST	Department of Culture, Sport and Tourism
DVKPGG	Dong Van Karst Plateau Global GeoPark
FAO-UN	Food and Agriculture Organization of the United Nations
FDG	Focus Discussion Group
GEF	Global Environment Facility
GIAHS	Globally Important Agricultural Heritage System
IFAD	International Fund for Agricultural Development
MARD	Ministry of Agriculture and Rural Development
MoCST	Ministry of Culture, Sports and Tourism
MONRE	Ministry of Natural Resources and Environment
PRA	Participatory Rural Appraisal
PRC	Plant Resources Centre
RBFS	Rock Based Farming System
TFSs	Traditional Farming Systems
UNESCO	United Nations Educational Scientific and Cultural Organization
VAAS	Viet Nam Academy of Agricultural Sciences

## **I. SUMMARY INFORMATION**

### **1. Name of the agricultural heritage system**

Traditional Farming System (the system) in Dong Van Karst Plateau Global GeoPark (DVKPGG).

### **2. Key features of the system**

Pockets of agrobiodiversity-rich, small-scale upland agriculture and forest gardens embedded in the rocky topography of Dong Van Karst Plateau. This type of agriculture has been maintained for hundreds of years by at least 17 ethnic groups in the area. Of ethnic minority people produces special agricultural products such as mint honey, corn wine and buck wheat, whose market value can be further enhanced.

### **3. Extent of practice**

The system is an integral part of the DVKPGG, which spans more than 2,356 square kilometres. It has four districts, comprising including Dong Van, Meo Vac, Quan Ba and Yen Minh and 68 communes in one province (Ha Giang), with a total population of approximately 293,000.

### **4. Name of key ethnic groups practicing the system**

Seventeen ethnic groups, with Giay, Mong, Nung and Tay the key groups with large populations. Minor groups include Bo Y, Co Lao, Dao, Lo Lo and Pu Peo.

### **5. Communes and village(s) to represent this system under the GIAHS study**

Lung Cu commune in Dong Van district, Lung Tao commune in Dong Van district and Lung Pu commune in Meo Vac district.

### **6. Distance from the capital Ha Noi**

Some 450km by taking highway routes such as the Ha Noi-Lao Cai highway, National Routes No.2 and 4C.

## **7. Summary information**

The agricultural system involves 17 ethnic groups in the DVKPGG growing corn and other crops, raising animals and caring for forests for several hundred years in the harsh physical Karst terrain in Dong Van Karst Plateau, located in Ha Giang province in northeast Viet Nam. The DVKPGG is a globally recognized geopark and part of UNESCO's Global Geopark Network.

The agricultural system involves ingenious practices of conserving and managing limited land in the interstices of a rocky terrain, for purposes of food production and livelihoods. Soil conservation is accompanied by adaptive land preparation, while an age-old multiple cropping system minimizes the loss of fertility, maintains resilience and diversifies income sources. In addition, soil fertility is improved by abandoning the soil during winter.

The system supports the maintenance of biodiversity (in forests and agricultural land). It has high agrobiodiversity and is supported by local knowledge passed on through generations as well as customs and traditions. Overall, the system is manifested by a remarkable landscape characterized by diverse geomorphic forms of Karst as well as pockets of agriculture and forest in a predominantly rocky landscape.

The system is part of the DVKPGG's global classification as part of the Global Geopark Network. Thus, it adheres to certain global protocols for land use and heritage management. Moreover, it is nationally recognized by Viet Nam's Ministry of Culture, Sports and Tourism (MoCST) as part of the country's intangible culture.

## **II. DESCRIPTION OF AGRICULTURAL HERITAGE SYSTEM**

### **A. SUMMARY OF KEY FEATURES OF THE PROPOSED GIAHS**

The agricultural system involves ingenious practices of conserving and managing limited land in the interstices of the rocky terrain, for food production and livelihoods. Soil conservation is accompanied by adaptive land preparation, while an age-old multiple cropping system minimizes the loss of fertility, maintains resilience and diversifies income sources. In addition, soil fertility is improved by abandoning the soil during winter. The system meets five key GIAHS criteria:

- **Food security and livelihoods**

The system supports the food and livelihood requirements of various ethnic groups for at least nine months. Upland agriculture can also support agricultural value-added products from farms. Recently, community-based and eco-agricultural tourism was piloted as an additional livelihood source for local communities.

- **Agro-biodiversity, biodiversity and ecosystems values**

The initiative is supported by the beneficial effects of terrestrial biodiversity in the area. At the same time, farmer practices enable on-farm conservation of important genetic agro-biodiversity for farming systems including corn, rice, key cash crops and animals. They also contribute to watershed conservation of at least two major river systems, the Nhiem and Nho Que rivers.

- **Knowledge systems and adapted technologies**

Traditional knowledge is passed to younger generations to maintain ethnic group farming practices. Farming knowledge is complemented by local knowledge on food processing, production of architecture and traditional clothing others.

- **Cultural value systems and social organizations**

The cultural traditions of 17 ethnic groups reflect on community members as well as interactions with nature and the spiritual world in relation to agriculture. This involves various expressions through song, dance, literature, and architecture. Traditions and indigenous governance systems provide customary rules to ensure cooperation and sustainability.

- **Remarkable landscapes, land and water resources management features**

The karst terrain is a remarkable landscape itself. In addition, the age-old agricultural practices and remarkable diligence of the people in Dong Van are transforming the predominantly stone and rock landscape into an aesthetically remarkable mosaic of rock outcrops, stone structures, trees, crops and wild vegetation. Numerous farm activities produce varying landscape colours throughout the year.

## **B. DESCRIPTION OF THE AGRICULTURAL HERITAGE SYSTEM IN THE DVKPGG PROPOSED AS A GIAHS**

The rock-based farming was declared part of Viet Nam's intangible heritage by the MoCST through Decision No.2684/QD-BVHTTDL dated 25/8/2014. The area was declared the Dong Van Karst Plateau Geo Park by World Geopark Networks from 2010. The five GIAHS criteria met by:

### **1. Food security and livelihoods**

Agricultural production in the DVKPGG accounts for 90% of total annual income of the area and provides jobs for approximately 80% of the local labour pool. The main agricultural products are corn, legumes and livestock. Some agricultural commodities have a high value such as mint honey, traditional yellow cows, local black pigs, buckwheat, corn wine cooked by herbal yeast, herbs collected from forests and gardens. Food and livelihood security is attained through practices that sustain the nutrient cycle of the soil, such as practicing multiple cropping of cereals and legumes (sequential cropping of four to six crop species), soil management (use of manure and chemical fertilizers, maintaining an annual fallow period) and labour sharing for land preparation in harsh terrain. The maintenance of karst limestone forest vegetation on steep slopes helps minimize water run-off and soil erosion as well as contributes to maintenance of the system that supports food security and livelihoods. Traditional farming systems can provide cereal (corn) for food and energy needs of the majority of farmers in the DVKPGG area for at least nine months. At the same time, legumes and vegetables planted between the main crop of corn provide added protein, vitamins and mineral sources for households.

Corn is the most important crop in the DVKPGG, planted in about 30-50% of the agricultural area of Dong Van, Meo Vac, Quan Ba and Yen Minh districts (UBND Meo Vac, 2014; UBND Dong Van, 2014; UBND Quan Ba, 2014; UBND Yen Minh, 2014). Approximately 96.6% of households in Yen Minh district cultivated corn (UBND Yen Minh, 2011). Corn is an important source of energy and an important daily meal for many local groups, where it is known as "*Men-Men*" which is cooked by steaming corn powder. Most farmers in the DVKPGG cultivate native and hybrid corn, but the ratio varies in different areas. According to Ha Giang People's Committee, the area planted with native corn is small, about 12.8% of the arable area (UBND Ha Giang, 2014). However, results of the PRA survey conducted by PRC in 2015 (Attachment 5) at some representative sites showed that areas that grew native corn cultivars were larger than those with modern corn varieties, especially in zones where rock fields were dominant, such as Lung Pu and Lung Tao communes (growing 70% native corn). The key reason is that native corns have some resilience against drought and cold, are

well-adapted to local weather and the limited land conditions of Dong Van plateau. Even several poor farmers in rocky mountain areas sold new seeds subsidized by local government and they used native corn to grow in upland fields with surface rocks due to effective adaption to the hard DVKPGG conditions. In addition, the price of hybrid varieties is high, while subsidies for poor farmers have significantly declined since 2015 (PRC, 2015). Finally, these varieties have good quality, good taste and can be stored for a long time (Nong Thi Yen, 2013). Corn is utilized as animal feed, corn wine or food. Native corn is often used by people, while hybrid corn is used for animals or wine cooking.

**Table 1. Native and hybrid seeds of corn cultivated at representative sites in 2015**

No	Lung Cu commune		Lung Tao commune		Lung Pu commune	
	Hybrid seeds (%)	Native seeds (%)	Hybrid seeds (%)	Native seeds (%)	Hybrid seeds (%)	Native seeds (%)
1	83	17	26.7	73.3	23.1	76.9
2	60	40	25.0	75.0	16.7	83.3
3	77	23	75.0	25.0	80.6	19.4
4	28.5	71.5	12.5	87.5	6.3	93.8
5	75	25	18.2	81.8	20.0	80.0
6	62.5	37.5	14.3	85.7	28.6	71.4
7	78	22	28.6	71.4	27.3	72.3
8	100	0	-	-	21.1	78.9
9	75	25	-	-	21.4	78.6
<b>Average</b>	<b>78.3</b>	<b>21.7</b>	<b>28.6</b>	<b>71.4</b>	<b>27.2</b>	<b>72.8</b>

*(Source: PRA survey report of PRC in 2015)*

Traditional cultivation, such as intercropping and rotation between legumes and vegetables with the main crop (corn) are popular in DVKPGG. It allows farmers to obtain more products, income and area. In addition, these practices can create a covering layer to reduce soil degradation and erosion. Moreover, these can provide a significant amount of nitrogen to soil from legumes (Ha Giang Museum, 2013).

Brocade weaving is a unique cultural feature of many ethnic groups living at the DVKPGG, especially the Mong ethnic people. Growing flax for weaving traditional clothes is still common in many places. However, this traditional craft has gradually been lost in recent times. The PRA survey showed that weaving clothes was mostly done by old women as girls were not interested in this task. The reason is that it took a significant amounts of time and

labour to complete a traditional dress, while it was easy to buy a similar machine-made dress. PRA results also found this craft had disappeared at Lung Tao commune, but was still popular at Lung Pu.

The livestock sector also plays an important part in food security and livelihoods for local people in DVKPGG. It provides a significant amount of income, manure and animal draught for a agricultural traditional system unable to adopt machines and chemical fertilizers due to challenging geomorphology and topography conditions (rocky surface, steep slope and fragmentation). The PRA results indicated that livestock sector income accounted for 30% of Lung Tao commune's total income, while for Lung Cu and Lung Pu communes it was 50 and 70%, respectively. Main stocks are yellow cows, black pigs, local goats, chickens, ducks and musk ducks. In terms of the livestock sector, major products come from cattle (cows), called "raising cows on back", which sees cows kept in stables and fed with grass cut by farmers daily. The grass is brought home on farmers' backs, hence it is called "raising cows on back". This is a traditional practice adopted due to the tough conditions in DVKPGG (low temperatures, dense fog, steep slopes and rocky surface). In addition, raising cows in stables accumulates more manure for crops.

Community-based tourism that promotes an understanding and appreciation of nature and culture has recently been piloted in several communities. This represents a potential major source of livelihood in the next several years. Nature-based tourism is growing at approximately 30% annually, and 12% of tourists are international visitors. Besides viewing the majestic karst topography, tourists are also interested in witnessing seasonal production of following high value commodities such as mint honey, buckwheat and yellow cows. Other tourism-related services, such as homestay accommodation, tour guide services, restaurants and souvenir shops also provide additional income to pilot communities (Ha Giang people's committee, 2012).

## **2. Biodiversity and ecosystem functions**

Three types of biodiversity in DVKPGG are ecosystem, species and genetic biodiversity. In addition, there are other aspects of biodiversity.

### ***2.1. Geological and paleontological records of diversity***

The present terrain and landscapes are supposed to have been formed about 542 million years ago (DVPK Newsletter 5, 2012). Various terrains are described as "custas," "stone desert," "stone forest," "stone tower," "pyramid," "cone stone," "karst sink holder," and "soft rounded karst topography." There are many spectacular deep canyons, one of which is the deepest in Viet Nam is more than 30 kilometres long, 700-800 metres deep with a 80-90 degree slope.

Geologists have identified 13 sedimentary rock systems and set up six standard sections to compare strata in different areas of Viet Nam. Geological formations (large faults, folds, trike and dips in rocks) represent continuing geologic development. Geologists have identified 19 paleontological groups with 120 races and thousands of species including<sup>1</sup>:

- Brachipod
- Tabulate
- Rugose coral
- Stomatoporoidea
- Trilobite
- Prehistoric fish
- Foraminifera
- Conical Shell
- Conodont
- Pelecypod
- Gastropod
- Cephalopod
- Moss formed animals
- Ecrinite
- Hard shell
- Prehistoric crustacians
- Aquatic plants
- Prehistoric algae
- Chitinozoa

Some 26 new races (out of 120) and species have been found in DVKPGG. Another report indicates Stratum Paleo-biological heritage consisting of several groups, with more than 1,000 species discovered for the first time at the Geopark. Embedded in the unique geological landscape are important vegetation such as limestone forests and subforests, cave vegetation and brushlands.

## ***2.2. Systems within the agriculture landscape***

DVKPGG's biodiversity has been partially recorded, but mostly forest biodiversity. Within the agricultural landscape, the following agroecosystem diversity has been observed:

- *Cultivation on hill slopes*: This is the main agrosystem in DVKPGG, as many areas do not sufficient water to plant rice so local farmers often cultivate corn, food crops, livestock pasture. This system is rain-fed (Ha Giang Forest Protection Department).
- *Cultivation on upland fields established by arranging stone shore*: Farmers use blocks of rocks of various sizes and shapes as barriers to prevent soil erosion, especially during the rainy season. The practice of cultivating corn and other crops in soil between rocks was started by older generations of ethnic groups, who transformed scattered rocks into hedges and made small patches of land available for small-scale agriculture.

<sup>1</sup> (DVPL Newsletter 5, 2012)

- *Planting in rock barkets*: Because the DVKPGG’s topography is mainly limestone, there is little available land suitable for farming. Thus, local farmers learnt to place soil in rock holes and plant corn.
- *Home gardens*: There are two types of gardens in the karst plateau, home and forest gardens. In home gardens, ethnic people use narrow spaces near houses to grow medicinal herbs, fruits or vegetables such as local mustard greens, cabbage and tomatoes. In forest gardens, available land is used to plant medicinal herbs.
- *Rice cultivation in flat paddies*: Rice is grown in a relatively flat valley in some communes of Dong Van, Quan Ba and Yen Minh districts.
- *Cultivation on terraced fields*: This area focuses on the hills of Dong Van, Meo Vac and Yen Minh districts. Local farmers cultivate rice on terraced fields, which help prevent soil erosion.
- *Protective forest areas*: These were natural forests, however they have been over-exploited to the point of degradation. In recent years, the local government has had a policy for forest land allocation and food for farmers to protect forests.

The results of the PRA survey showed that all of these agrosystems were recorded in three research sites Lung Cu, Lung Tao and Lung Pu communes (Table 2). However, there were differences in the kinds of agrosystems. The hill slope cultivating area at Lung Cu commune is the largest followed by terraced fields, while the main cultivated systems in Lung Tao and Lung Pu communes are planted on rock barkets and hill slopes. These systems in the three communes have not significantly varied, except for cultivation on terraced fields and land between rocky shores which have remarkably changed since 2000, when the local government had a policy to encourage reclamation.

**Table 2: Agroecosystems ranked on areas in representative sites**

No	Agroecosystems	Lung Cu	Lung Tao	Lung Pu
1	Cultivation on hill slopes	1	2	2
2	Cultivation on rock barkets	3	1	1
3	Cultivation on land between rocky shores	6	3	3
4	Flat paddies	5	5	-
5	Terraced fields	2	4	-
6	Protective forest areas	4	6	4
7	Home gardens	7	-	5

*Note: Ranked in order of decreases in area*

### 2.3. Agrobiodiversity in DVKPGG

There are many traditional cultivars of plants and animals in DVKPGG. The results of the PRA survey on agrobiodiversity at three research sites are presented in Table 3.

**Table 3. Agrobiodiversity at three research sites now and 10 years ago**

Cultivars and stocks	Lung Cu		Lung Tao		Lung Pu	
	10 years ago	Present	10 years ago	Present	10 years ago	Present
<i>Native corn</i>						
+ White corn	✓	✓	✓	✓	✓	✓
+ Yellow corn	✓	✓	✓	✓	✓	✓
+ Red corn	✓	✓			✓	✓
+ White sticky corn	✓	✓	✓	✓	✓	✓
+ Yellow sticky corn	✓	✓	✓	✓	✓	✓
Traditional rice	✓					
Sticky rice	✓	✓				
Upland rice	✓		✓		✓	
Rice bean ( <i>Vigna umbellata</i> )						
+ Black seeds	✓	✓			✓	✓
+ Red seeds					✓	✓
+ Purple seeds					✓	✓
Common beans ( <i>Phaseolus vulgaris</i> )						
+ Indeterminate and black seeds	✓	✓				
+ Determinate and white seeds	✓	✓				
+ Determinate and black seeds	✓	✓				
+ Determinate and red seeds	✓	✓				
Green Peas ( <i>Pisum sativum</i> )						
+ White seeds	✓	✓			✓	✓
+ Red seeds	✓	✓			✓	✓
+ Dark green seeds					✓	✓
Soybean ( <i>Glycine max</i> )						
+ Yellow large seeds	✓	✓	✓	✓	✓	✓
+ Black small seeds	✓	✓	✓	✓	✓	✓

Cultivars and stocks	Lung Cu		Lung Tao		Lung Pu	
	10 years ago	Present	10 years ago	Present	10 years ago	Present
Catjang ( <i>Vigna cylindrica</i> )	✓	✓				
Horse bean ( <i>Vicia faba</i> L.)	✓	✓	✓	✓	✓	✓
Mustard greens ( <i>Brassica juncea</i> L.)						
+ Three months	✓	✓	✓	✓	✓	✓
+ Six months					✓	✓
Amaranth ( <i>Amaranthus cruentus</i> )	✓	✓	✓	✓	✓	✓
Pumkin ( <i>Cucurbita maxima</i> )						
+ Sticky pumpkin	✓	✓	✓	✓	✓	✓
+ Regular pumpkin	✓	✓	✓	✓	✓	✓
Buckwheat ( <i>Fagopyrum esculentum</i> )						
+ Red flowers	✓	✓	✓	✓	✓	✓
+ Light green flowers	✓	✓	✓	✓	✓	✓
Sweet potato ( <i>Ipomea batatas</i> )	✓	✓	✓	✓	✓	✓
Arrowroot ( <i>Canna Edulis</i> )						
+ White flowers	✓	✓				
+ Red flowers	✓	✓				
Taro ( <i>Cocasia esculenta</i> )	✓	✓				
Taro ( <i>Colocasia antiquorum</i> )	✓	✓				
Stock						
+ Yellow cows	✓	✓	✓	✓	✓	✓
+ Black pigs	✓	✓	✓	✓	✓	✓
+ Chickens	✓	✓	✓	✓	✓	✓
+ Musk ducks	✓	✓	✓	✓	✓	✓
+ Ducks	✓	✓	✓	✓	✓	✓
+ Horses	✓	✓	✓	✓	✓	✓
+ Goats	✓	✓	✓	✓	✓	✓
<b>Total</b>	<b>37</b>	<b>35</b>	<b>22</b>	<b>21</b>	<b>30</b>	<b>29</b>

Table 3 shows the agrobiodiversity and similar variations with time in the three sites. In all communes, many traditional crops and stock are still used in the agrosystem, such as

brassica, buckwheat, legumes, native corn, pumpkin, sweet potato and animals. In the three sites, Lung Cu has the highest agrobiodiversity with 35 cultivars and stocks from 24 species, followed by Lung Pu with 29 cultivars and stocks from 17 species. The poorest in agrobiodiversity is Lung Tao with 21 cultivars and stocks from 15 species. Although, the local government has many extensive programmes to introduce improved varieties and stocks to farmers in DVKPGG, agrobiodiversity compared to 10 years ago is nearly stable.

#### **2.4 Genetic agrobiodiversity**

Local DVKPGG farmers still grow three to five cultivars of corn. Most varieties have high stems and long internodes, but take several months to grow. The volume of production for this particular variety is low. However, communities continue to cultivate it because the corn seed is soft and good for eating.

The number of corn varieties planted by farmers may be more than reported, but other varieties may have been lost due to varietal replacement. The PRC reported at least 470 accessions of various varieties of different crops from Ha Giang alone. They were collected in the past three to five years from Ha Giang province. These collections comprise:

**Table 4: Number of plant accessions collected from Ha Giang province and preserving at the National Genebank, PRC**

<b>No</b>	<b>Groups</b>	<b>Number of Species</b>	<b>Number of accessions</b>	<b>Preserving situation</b>
1	Fruit trees	4	8	Safety
2	Taro	13	55	Safety
3	Tea	1	1	Safety
4	Legumes	14	204	Safety
5	Rice	1	55	Safety
6	Other cereals	7	109	Safety
7	Vegetables	17	145	Safety
<b>Total</b>		<b>57</b>	<b>577</b>	

*(Source: PRC, 2015)*

The 577 accessions were obtained from 14 of the 17 ethnic groups in DVKPGG. Almost 50% are from Mong and Dao, followed by the Nung, Tay and Giay.

## 2.5 Herbal medicine diversity

Indigenous people collect many medicinal plants from forests or gardens to cure diseases. Communities collect these medicinal plants: *Xia Mun Nam Dia*, *Dia Xieu*, *Cuu Soi Nghanh* to cure infertility, the root of *Can Giem* to treat anemia, the root of *Gian Tuu* and *Dia Gan* to help a mother's recovery after childbirth and *Sam Cau* as a tonic. Other types of medicinal plants are used to bath women after giving birth, as recorded in Dao households. Medicinal plants such as *May Quat*, *La Sau*, *La Si* and *Cang* are used to treat osteoarthritis. Herbal yeast made from 25-30 plants and collected from the forests is popularly used by many ethnic groups such as Dao, Nung and Tay (SEARICE report, 2014).

Ha Giang province is planning to become the herbal medicine province of Viet Nam. It is promoting the development of medicinal areas in Quan Ba District (571.5ha). The main cultivars planted in these areas are *Rosmarinus officinalis* L., *Amomum aromaticum* Roxb., *Aconitum fortunei*, *Atiso*, *Angelica sinensis*, *Dipsacus japonicus* Miq., *Achyranthes bidentata* Blume., *Panax notoginseng* (Burk.) F. H. Chen, *Semen Amomi* and *Ligusticum wallichii* Franch (Quan Ba district's people committee, 2014).

## 2.6. Forest biodiversity

According to the biodiversity conservation plan of Ha Giang province, there are 106 species of plants and 58 endangered species (Ha Giang province's people committee, 2015), many of which can be found in DVKPGG (see Annex 4).

Species in DVKPGG listed in the Viet Nam IUCN Red Book include: yellow cypress (*Cupressaceae*), green cypress (*Cupressaceae*), *Podocarpus*, *Amentotaxus hatuyenensis*, *Taxus chinensis* (Pilg.) Redher, *Keteleeria evelyniana* Mast, *Pinus kwangtungensis* (Pinaceae), Chinese Red Pine (*Pinus tabuliformis* Carriere), Fujian Cypress (*Fokienia hodginsii*), *Mahonia nepalensis*, *Radix Fallopieae multiflorae*, *Tembusu* (*Fagraea fragrans*, *Lilium brownii* F. E. Br. Ex Mill. var. *viridulum* Baker), *Paris polyphylla* and spruce (*Picea*).

There are about 400 species of plants and 50 species of mammals in natural, special-use, and protected forests (Ha Giang province's people committee Report, 2012). Species of brown salwood (*Acacia mangium*), earleaf acacia (*Acacia auriculiformis*), eucalyptus (*Eucalyptus* sp.), canarium nut (*Canarium*) and bamboo can be found in planted forests (Dang Thi Nhuan, 2013).

There are also rare animal species such as the Wreathed Hornbill (*Rhyticeros undulatus*), Brown-cheeked Fulvetta (*Alcippe poioicephala*), White-breasted Nuthatch (*Sitta Formosa*), some rare birth species such as gold neb hornbill, "Trac Bach Quan Ba" and *Rhinopithecus avunculus* (upturned nose langurs), (Ha Giang province's people committee, 2012).

## ***2.7. Ecosystems services: support to water systems***

The karst topography is believed to serve as water sources for several important rivers and bodies of water, some of which are partly underground. These include the Nho Que River, whose surface water supports three hydropower dams, whose river beds run along the large geological faults in the northwest and southeast direction. (DVKPGG Newsletter, 2012). Other water features include:

- Mien River, runs past Yen Minh and Quan Ba to Ha Giang town
- Nhiem River, receives its water from Mau Due limestone
- Mia Le and Yen Minh streams, run in valleys with terrigenous rocks
- Waterfalls 500-600 meters high, as those in Nho Que and Quan Ba rivers.

Until 2012, the Centre for Planning and Survey National Water Resources had found 23 sources of water with a total flow of more 9,000m<sup>3</sup> of water per day, enough to supply 100,000 people with an average of 80l litres per person, per day.

Additionally, using water from caves could be a potential source to solve water shortages on the plateau. Geological scientists discovered nearly 100 caves in Dong Van Plateau and a plentiful water source in some, like the Ban Ma cave, with a flow reaching 50m<sup>3</sup>/s<sup>2</sup> (Vietnamplus, 2015).

## **3. Knowledge systems and adapted technologies**

The 17 ethnic groups residing in DVKPGG possess a wide range of knowledge systems that can help communities address members' needs from "womb to tomb (birth to death)." The knowledge systems involve tapping the material and spiritual resources (intercession from ancestors) and cover a wide range of practical concerns.

Preparation that includes soil and water conservation, and soil regeneration includes:

- Conserving seeds and raising multiple crops simultaneously in a harsh environment, including natural crop protection from pests and diseases
- Animal husbandry and its integration into farming systems
- Food preparation and food processing
- Fiber production and traditional cloth weaving
- Herbal medicine systems

- Cave management
- Forest regeneration/conservation
- House and fence construction.

Agriculture knowledge systems involve understanding and adapting to the forces of nature and the intervention of “gods” and ancestors so crops can be established in limited soils, extended dry periods, cold seasons, with pests and diseases. The systems demonstrate an understanding of the interactions between man, animals and plants. An example is the sowing of corn when peach flowers start to bloom. Some typical indigenous agricultural knowledge includes:

### ***Cultivating on slopes***

To grow crops on slopes, local farmers often establish terraced fields and upland fields by arranging stones or growing plants according to contours to prevent soil erosion. To make terraced fields, farmers often choose flat areas, with slight slopes with thick cultivated soil sections and easy access to water (harvesting rainwater). To make fields by arranging stones or contour planting, farmers also choose a large area, less rocky with a slight slope. To make field shores, arrange stones or grow seeds according to contours, people only use their eyes to measure (Dong Van, 2015).

### ***Improving soil fertility***

To improve fertile soil before cultivation, farmers apply manure and ash as a base fertilizer, combined with intercropping, rotation of legumes and vegetables with corn. In addition, soybean is cultivated in corn fields when corn is harvested nearby. It can be implemented some nitrogen and organic matter for soil (Yen Minh, 2015).

### ***Water management***

To store water for domestic use, farmers living in DVKPGG and especially in areas with little water, dig wells or make rocky shores in small ravines to keep water. The wells are covered by leaves to reduce evaporation. In recent times, local government has invested to build small lakes to harvest rain water. The lakes are often built at the centre of communes and households nearby must bring water home daily. In terms of water for agriculture, most areas in DVKPGG use rain so farmers often arrange sowing times parallel with the rainy season which often occurs from February to May.

### ***Abandon of upland fields***

In many DVKPGG areas, especially in cold areas, there is often one season of corn per year. After that, fields are abandoned for three to four months during winter. During this period, the soil is rested and weeds and bush will grow and then die due to low temperatures. Before

preparing soil, farmers collect dry weed to burn to get ash for next season.

### ***Establish upland fields***

New fields are usually located in areas with much sunlight with slight slopes and many kinds of plants already growing well (DCST, 2013). Farmers choose fertile soil for slash and burn with 20-30cm of thickness in the cultivated soil layer and located in a valley with forest, blackness, porosity, high moisture, mixed with small black stones (Meo Vac, 2015).

Field clearing is usually conducted in winter from November to January. Firstly, big trees are cut, then weed and bushes are removed upward and kept on fields for two to three weeks for drying. Finally, weeds and bushes are collected into heaps and burned (Nong Thi Yen, 2013).

Large areas with slight slopes can be made into terraced or upland fields. However, places with much surface rock cannot suit building terraced and upland fields. Farmers often arrange stones to make small baskets and add more soil to plant one or two trees of corn, called cultivation on “rock basket”. To build a rocky shore for terraced or upland fields, farmers use hoes to flatten lines surrounding field 30-40cm in width. Stones are gathered to clear field, but mostly huge stones are collected from surrounding areas. Rocky shore includes three layers and are about 40-50cm in thickness. Two outside layers are arranged by stones sized 30-40cm, 20-25cm in width and 25-30cm in height. In order to make full blocks and steady walls, small stones are inserted into spaces among huge stones. The middle layer uses smaller stones. If stones are sharp edged, they are flattened by a hammer for arrangement. According to Mong people, grey sharp-edged stones crack, while white round stones are hard so they use the first ones for building the rock wall because it is easy to flatten and break huge stones. The process of stone arrangements is conducted with simple tools, such as a hammer, chisel and crow-bar (Nong Thi Yen, 2013). Upland field establishment was carried out in large areas two decades ago when the local government had a policy to encourage the extension of cultivated land. The establishment of upland fields has been conducted until now, but the area is small.

### ***Soil preparation***

Soil preparation is often carried out after the Tet holiday. Firstly stones are collected, especially those exposed by the previous season’s cultivation. Then, a hoe and knife are used to clear weeds before drying and burning. Ash from burning is spread on the field as a type of fertilizer. Farmers use a plough to prepare soil on large fields with less stones, while a hoe and rock baskets are used on fields with stones. Soil in rock baskets is supplemented by carrying soil from other areas. In DVKPGG, the animal utilized for ploughing is traditional cows because they can tolerate the hard geomorphology and extreme weather. It is important to train cows to avoid stones when ploughing on rocky fields to avoid breaking ploughshares (Nong Thi Yen, 2013). Soil preparation is often carried out by men, while women do other jobs such as fertilizing manure, sowing and collecting stones. Soil preparing is seen as hard

work in agriculture, so there are often exchanges of labour between relatives to enhance labour productivity.

### ***Agricultural calendar***

In terms of cultivation, the cropping calendar is the most important of traditional knowledge. The seasonal calendar of Mong people has accumulated from hundreds of years of the cultivation process and is suitable to the DVKPGG's special conditions. The calendar of ethnic groups often follows the cycles of the Moon and a year also has 12 months, a symbol of 12 animals. The number of days of a month is based on the circle of the Moon and each day corresponds to an animal that represents things that are auspicious, evil, good, bad for agricultural and general living activities. For example, Mong people avoid sowing seeds on "snake" and "dragon" days because they believe these are bad days and will result in a lost season or gain low yields if seeds are sown (Meo Vac, 2015).

### ***Intercropping and crop rotation***

Intercropping and crop rotation are the most popular traditional cultivation practices of ethnic people. This is a smart climate agricultural strategy to help avoid losses, provide more food for families, reduce soil erosion and improve soil. Intercropping between corn and other crops such as legumes, cucumbers, pumpkins, brassica, buckwheat, flax, amaranth and sweet potatoes is conducted by mixing seeds of these plants with fertilizer to put into each corn cavity. In terms of soybean, it is rotated with corn after 7-10 days of sowing corn or before harvesting corn (Quan Ba, 2015). Another benefit of intercropping and crop rotation is that farmers can harvest agro products seasonally. The process of intercropping sees seeds of legumes and vegetables mixed with manure to fertilize when sowing corn. The farmer then conducts scarification, weeding and topdressing for corn when it has two to three true leaves. At that time, pumpkin and other vegetables grow well and farmers can thin vegetables and corn for food or animal feeding. Each corn niches has two to three trees of corn and one to two trees of each vegetable. Farmers then undertake a second scarification, weeding and topdressing for corn when legume crops can be harvested. Pumpkin fruits and sweet potato are harvested when farmers cut stems of corn as firewood (Nong Thi Yen, 2013). Intercropping has many advantages, as it meets daily food requirements, diverse sources of food on the same land area at the same timescale, protection of soil from erosion and run off (Ha Giang Museum, 2013).

Rotations between corn and soybean are applied in many parts of DVKPGG. When corn has mature seeds, farmers cut old leaves and sow soybean between two rows of corn to reduce the soybean season. When soybean grows to height of 10cm and needs full light, corn is harvested.

### ***Overlapping cropping***

Mong people often overlaps cropping between soybean and summer-autumn corn. To ensure seeding times start before the fall (low yield if sowing late), when field corn nears the stage to fill grains, people cut the bottom part of old leaves and grass, then sow seeds in mid two rows of corn. At this stage, soybean plants have a 5-10cm height and they need sunlight, so people harvest corn and cut corn stems for soybean growth and development.

### ***Sowing experiences***

Before sowing seeds, corn seeds with good quality are removed from cobs with low quality ones used to make wine or animal food. This method follows tradition, helps seeds germinate rapidly, avoids insects and pest damage (Dong Van, 2015). The DVKPGG sowing season is based on the beginning of the rainy season (February to April). However, farmers must prepare soil before the rains. The rainy season is different each year as many farmers in DVKPGG use the blooming of peach blossoms as a sign to start soil preparation. Sowing seeds is conducted from lower to higher levels of upland fields and sowing from the “rock basket” is done last. The sowing process needs at least four farmers, as one hoes niches, one applies fertilizer, one sows seeds and the last one covers soil over niches. Ploughing requires strength, therefore, an adult male usually undertakes this activity. Hoeing niches need strong labour and is best done by men, while other activities are done by women, the elderly or children. To have enough people for sowing, farmers often exchange labour between relatives. Normally, each hole is sown with four to five seeds of corn to prevent insect damage. Mong and Pu Peo people sow corn with 50-60cm between holes, while Lo Lo people sow seeds 70-80cm apart. For sowing with the “rock basket”, one person can undertake all activities, comprising creating holes, sowing seeds, applying fertilizer and covering soil (Ha Giang Museum, 2013).

### ***Storing of agricultural products***

Many ethnic groups from DVKPGG store agricultural products (seed products) on a garret built upon a firewood stove to prevent damage from insects, fungi and humidity. The garret's floor is made from big wood trees 10cm in diameter to withstand weight. The floor surface is covered by a layer of bamboo wattle to avoid falling seeds, such as corn and legumes. After classifying seeds into different kinds such as sticky, yellow, hybrid and local corn, or good or low quality corn for food or animal feed, respectively the corn is placed on the garret in groups. When corn becomes drier (one month later), good quality corn is arranged into rows, 0.8-1m in height while corn used for animals is separated for later use.

Other seed products intercropped with corn are also stored by a similar method. Beans are harvested from the plant before being tied and hanged. Seeds are slowly removed from fruits to satisfy demand. Other products such as taro, cassava and pumpkin are also stored on the garret away from firewood.

### *Seeds selection and exchange*

For native crops, farmers often select and store seeds for next season by themselves. These seeds are carefully preserved. With corn, farmers select large and long crops with full seeds. They are kept separately on the garret for next season. With beans, whole plants are harvested when mature and tied together before being hung on the garret. With vegetable seeds, after fruit farmers choose mature fruits to remove seeds and dry by sunlight for about one week before being stored in a cloth bag for next season (Nong Thi Yen, 2013). According to a survey in Ha Giang province, collecting and storing seeds for next season is mainly carried out by women (SEARICE, 2014). Seed exchanges are still popular in ethnic communities, so farmers who loss seeds for next season can exchange with relatives, neighbours or buy from the local market.

### *Cultivation in gardens*

The concept of gardens in upland sites involves those located near houses (home gardens) and near forests (in buffer zones). Home gardens are often small and used for cultivating herbs and fruit trees, such as plums, apricots, peaches, pears, persimmons or vegetables, such as mustard greens, cabbage and tomatoes. Gardens situated in or near forests are often cleared areas in forests used for cultivating herbs.

### *Livestock system*

The livestock sector plays an important role in food security and livelihoods for local people in DVKPGG. Products come from animals such as cows, goats, horses, pigs, chickens and honey bees. Such products can be used by households to be self-sufficient, except those with good economic conditions that raise a large number to sell products at markets. Cows and horses are often raised to assist in agriculture activities or transportation. Goats can adapt to work on rocky mountains and are raised in large numbers for human food or can replace cows for funerals in poor households. Besides, honey bee hives on the Dong Van Karst Plateau have expanded rapidly as the quality of honey in wild conditions is appreciated and can become a speciality brand (Nong Thi Yen, 2013).

“Raising cows on back” is a unique livestock farming method in upland communities. It is a traditional practice to adapt to tough conditions in the DVKPGG (low temperatures, dense fog, steep slopes and rocky surfaces). Cows cannot be grazed naturally as farmers must gather grass, carry and feed them. Cow manure is a rich fertilizer source for agriculture cultivation. It is composted until it decomposes before being combined with ash and applied to fields (Trieu Thi Tinh, 2015).

### ***Protecting cattle in winter***

Temperatures in winter in Dong Van Karst Plateau are usually low, sometimes below 0°C. This is often detrimental to livestock, especially cattle (cows, horses, goats). During cold weather, people often protect their cattle by stopping grazing and cattle plowing, utilizing shield cages, using warm water mixed with mineral salts for drink and feeding with corn bran and beans for additional energy for cold tolerance to prevent animal fatalities.

### ***Collecting and utilizing traditional herbs for medicine***

Indigenous people collect many medicinal plants from forests or gardens to treat sickness. For example to cure infertility, they collect plants and make drinks with other medicinal plants (*Xia Mun Nam Dia*, *Dia Xieu* and *Cuu Soi Nghanh*, A). Some plants are used to help with pregnancy and breastfeeding, as Can Giem roots are good for blood, Gian Tuu roots for uterine contractions after birth, Dia Gan for dissolving blood after birth. Many types of medicinal plants for women bathing after birth are also used in Dao households. Using medicinal plants for osteoarthritis pain is known, including May Quat, La Sau, La Si and Cang To collected from forests. In addition, herbal yeast is used by many ethnic groups such as Dao, Nung and Tay. Herbal yeast is made from 25-30 plants, mostly collected from forests (SEARICE report, 2014).

In recent times, Ha Giang province has planned to cultivate and exploit herbs in combination with herbal companies focussed on one location, such as Quan Ba district. The main herbs involved are *rosemary*, *cardamom*, *aconitum fortune*, *artichoke*, *angelica sinensis* (*female ginseng*), *dipsacus japonicus* Miq. *achyranthes bidentata* Blume, *pseudoginseng*, *amomum*, *ligusticum wallichii* (Quan Ba district People's Committee, 2014).

### ***Regenerating and protecting forests***

Due to slash and burn cultivation on Dong Van Plateau, a large area of forest has been seriously destroyed and only small area of primary forest remains in the Bat Dai Son (Quan Ba district) and Du Gia (Yen Minh district) natural reserves. On January 20 2009, the Prime Minister approved a project to protect and invest in developing forests in four Dong Van Plateau districts to enhance income, rice production, protection and reforestation. By 2012, some 319,000ha of forest had been contracted to be managed and developed, 106,000ha contracted to be reforested, 11,000ha for new plantations combined with other projects relating to five million hectares of new plantations during 2008-2010 to reach 8,720ha. This will take care of 16,000ha, with protection forests were planted over 500ha and improvements to eight nurseries to supply seedlings for plantation projects in the four districts (Minh Tam, 2013).

### ***Cultivating flax for brocade weaving***

Brocade weaving is a unique cultural feature of many ethnic groups living at DVKPGG, especially Mong people. It plays an important role in local people's spiritual lives. They believe flax fiber can lead the spirits of dead people back to their ancestors and reincarnate as humans. Brocade weaving is also considered criteria to assess the talent, ethics, personality and business ability of women. Girls are taught cultivating and flax weaving skills by their mothers, grandmothers, aunts or sisters. Before marriage, they have at least one traditional dress weaved by themselves.

To harvest good flax stems with long internodes and smooth bark, farmers must choose fertile soil located on flat areas with high humidity and sunlight. Flax is often harvested in June, when it reaches 3m in height. People cut the whole plant, with the remaining part 10-15cm in height. After removing whole leaves, they are dried by sunlight for up to three weeks. Then, the rind covering the stem is removed before fiber is prepared for fabric production. Fabric made from flax fiber is durable and a traditional fabric of Mong ethnic people. However, spinning requires patience and is time consuming. Therefore, women carry flax fiber with them to work whenever there is free time (Le Duy Dai and Trieu Duc Thanh, 2003).

### ***Food processing***

Traditional foods in festival or normal days are diverse and abundant, depending on different ethnic groups. For instance, unique Mong people foods include “men men”, made from corn powder, “*thang co*”, from horse meat mixed with internal organs, corn cake, bacon, beef jerky, rice porridge, corn wine and sticky rice. Dao ethnic people mostly cook normal and sticky rice and cake types from these rices. Nung unique food involves a combination of pork and eggs rolled into bamboo shoots and “*Khau nhuc*”, a meat steamed until tenderness. Giay and La Chi people often cook rice, boiled until half-cooked before steaming until thoroughly cooked (Le Duy Dai and Trieu Duc Thanh, 2003).

- “Men men” is cooked from corn powder with many steps before becoming an attractive, tasty and aromatic dish. It is the main food of many ethnic communities living in mountainous areas, such as Mong, Lo Lo, Pu Peo and Phu La (Le Duy Dai and Trieu Duc Thanh, 2003).

- “*Thang co*” is traditional Mong food. Ingredients include meat, bones and internal organs of cows, goats or horses, together with special spices such as cinnamon. This dish can be eaten together with “men men” and corn cake.

- Corn cake: There are two kinds - made from yellow or sticky corn. Before making cake, “men men” is made with cooked rice and a mixture of sugar for three to five days. After fermentation of the rice, corn powder is prepared and carefully mixed before placement

into a model frame covered by banana leaves. Cakes with semicircular shape and 25-26cm in diameter are steamed by cookers or pans. They can be kept for use five to seven days after being steamed. They can be fried or grilled again to become softer and more attractive. Yet, they taste sour due to yeast and an aromatic smell from harvested corn.

- Corn wine: Lo Lo, Mong and Tay ethnic groups from mountainous locations also make wine from corn (a unique drink for ethnic communities on festival days). Corn wine is also used in meetings between friends together with “*thang co*”. The hosts only invite close friends or familiar guests to drink corn wine, which is considered a specialty by ethnic communities. Making corn wine involves yeast from unique leaves collected in forests. Wine mostly meets households’ demand, but in recent times with economic development, wine was traded in markets and wine-making became a job (Ha Giang Museum, 2013).

### ***Systems for passing on knowledge***

There are many systems to pass knowledge on agricultural land use and techniques to young people, such as through local songs, dances, festivals and literature. The most effective way for knowledge transmission Mong generations is through daily activities. In highland ethnic communities, little children must assist parents in agricultural activities, animal husbandry or housework. This process helps children accumulate knowledge and experiences from parents, grandparents or older siblings. Girls are taught how to spin, weave fabric, sew clothes and sing rhymes. Boys are taught how to shot bows, play the trumpet and flute. Little girls aged 10-11 years are usually taught by their mother and/or grandmother about weaving. By the time they are ready for marriage, they are able to prepare at least one traditional dress by themselves (Le Duy Dai and Trieu Duc Thanh, 2003).

## **4. Customs and beliefs related to agriculture and social organizations**

### ***4.1 Customs and beliefs related to agriculture***

Intangible culture revolves around the indigenous production system and consists of beliefs and various artistic expressions (ceremonies, songs, dances, architecture) that recognize, admire and emulate the various age-old practices for conservation of soil and water, production of corn in harsh physical environments and protection of forests and biodiversity. Each ethnic group has its own customs and traditions, but they generally follow some common pattern.

Many ethnic people in Dong Van Karst Plateau, such as the Dao, Mong, Nung, Pa Then and Tay believe in polytheism. There are many gods related to agricultural production such as the god of forests, rain, wind, thunder and lightning. They also believe that everything has a soul, especially crops with corn, rice and livestock the most important. Therefore, relationships among humans, crops and livestock are not only through daily agricultural activities, but also

through religious rituals and taboos. Documented agricultural rituals include:

- Forest-praying ceremony: This is held by many ethnic minorities in DVKPGG such as Dao, Nung and Pu Peo. The festival's timing and processes may be different among groups. But in all groups, the ceremony expresses villagers' reverence for the god of the forest and wishes for good health, wealth, climate harmony and a good season. Apart from religious significance, the ceremony also has an education role to protect forests and the environment around humans. In addition, it is an opportunity for villagers to create relationships between members and exchange experiences in agricultural production. This ceremony is held once a year at the forbidden forest, protected by customary laws and taboos.
- New rice (corn) ceremony: The new rice (corn) ceremony is held by many ethnic minorities in DVKPGG such as Bo Y, Dao, Hoa, Lo Lo and Pu Peo. It is held at the family level. After harvesting, people cook rice or the "men men" dish or make cakes from corn powder dedicated to ancestors and wish for a good season and climate harmony (Ha Giang Provincial Museum, 2013).
- Welcoming new season ceremony: Held on March 3rd of the lunar year by Mong people. On this day, every family prepares corn cakes, a boiled chicken, paper flowers and three cups of wine to dedicate to the god of fields to pray for a good season. Paper flowers with various colours are hung up on corn plants to symbolize having more flowers and the host family prays for a fruitful harvest (Nong Thi Yen, 2013).
- Welcoming corn flowering ceremony: Often takes place on May 5th of the lunar year by Mong people, who prepare a chicken and sticky rice to pray to deities. They do not visit maize fields on such days, because they think the corn flowering time should be kept quiet for a fruitful harvest. Offerings include a boiled chicken, bottle of wine and a piece of paper. The host family brings the offerings to the altar, pours wine into a cup and read vows to invite deities and calls ancestors to return home. Then, they speak about their desires for the new year - a fruitful corn season with big, full cobs and the safety of their plants.
- Welcoming harvest ceremony: Held on July 4th of the lunar year, it takes place for several days after local farmers harvest corn in July. After harvesting, the host household chooses the best cobs of corn to boil and bring them and a bottle of wine to the altar. They call ancestors of three generations to eat the new corn and thank them for the fruitful harvest. Incense is then burnt for ancestors to send them to the afterlife.
- New season festivals, named Long Tong: Held by Giay and Tay groups, in spring Tay people usually worship deities on fields before preparing soil. Each family offers meat, wine, cakes and sticky rice with various colours. A priest calls all gods and local demons to pray for good weather and a fruitful harvest.

- Going to mountain ceremony (worship at temple): This is an important ceremony for the Dao group held on February 2nd every lunar or every three years due to economic conditions. It is public ceremony where offerings are contributed by all households in the village. On this day, each household contributes a chicken, half a bottle of wine and a small amount of money. They are carried from the house, then people bring all offerings to the temple to pray. The ceremony thanks those who have explored land for agriculture, prays for good harvests and banishes demons that destroy crops.

- Drums festival: A traditional Giay group ceremony in Tat Nga commune, Meo Vac district held during the Lunar New Year, from the morning of January 1 until the end of January. The festival is an opportunity for Giay people to achieve harmony with ancestors and send their aspirations. Shaman read vows to pray for good weather, for water during the crop season and for children to be healthy (Duong Anh, 2014).

- Other ceremonies:

- A Dao ceremony to pray for a good crop season
- A Nung ceremony to pray for fruit harvests (God of agriculture)
- Ceremony to worship rice (similar to the ceremony to worship rain)
- Cultivation techniques expressed in folk song, fairy tales relating to activities in rocky field cultivation and manufacturing experiences handed down and remembered generationally (Ha Giang Museum, 2013).

#### ***4.2 Social organization***

The social organization of ethnic groups living in Dong Van Karst Plateau differs. Co Lao, Dao, Lo Lo, Mong, Pa Then and Tay people often lead separate lives according to each family. Ethnic groups such as Bo Y, Giay and La Chi live with others. Most ethnic groups have close kinships. These relationships are to implement conventions on cultivation, livestock and help each other with work and obligations. Family organization is considered to be an effective and important self-controlling system in traditional Mong societies. The system includes the family head, aunt and ruler of ghosts, and guests who monitor, promote and resolve problems relating to physical and mental lives of family and community members (Le Duy Dai and Trieu Duc Thanh, 2003).

Ethnic minorities always have a village head elected by all village members using criteria such as credibility impartiality, ability to worship, knowledge of customs and relatives. This person is responsible for village rituals, distribution of water resources and resolving conflicts under customary law. The village head, together with elders (who have credibility and knowledge of customs), priests and family heads have important roles in solving village problems (Le Duy Dai and Trieu Duc Thanh, 2003).

Currently, people must comply not only with village customs, but also guidelines and State laws through communication with the village head. If a conflict of interest occurs, relevant personalities must negotiate with each other. If they cannot agree, the conflict is resolved by village people and finally by the local authority. The community relationship is also characterized by labour exchanges and sharing difficult tasks needing much labour, such as cultivating, building, funerals and weddings (Yen Minh, 2015).

#### ***4.3 Access to land resources***

According to traditional beliefs of ethnic groups, land is common property of the community. When establishing residence, people determine boundaries with surrounding villages. Although sometimes the boundary is streams, cliffs or trees it is respected by all people. This boundary is often regulated by village elders and recognized by local government. The family is free to break new ground for farming, hunting, gathering and collecting forest products on their boundary, but not to infringe on other village boundaries. When choosing a suitable plot, Mong people arrange stones in a cone shape, pile green leaves or use a hoe to draw a line to signal other landowners. Other families will not infringe on his land (Nong Thi Yen, 2013).

#### ***4.4 Gender roles in decision-making***

Power dynamics in ethnic families in DVKPGG follows the patriarchal system. The household head is often a man, who decides on all important issues, such as building, weddings and purchasing. Women have a little authority in the family, although they must work hard. In many families, the daughter-in-law cannot sit and share the same meal as the father- and brother-in-laws (Le Duy Dai and Trieu Duc Thanh, 2003). According to the SEARICE report, gender equality has significantly changed in recent times, especially young generations. Men and women share work and decision-making. In agricultural activities, they have a similar responsibility in soil preparation and harvesting. Women are mainly responsible for weeding and fertilizing, while men carry out pest and disease management. However, men have more power in important decisions within families.

Men and women are involved in land preparation, the former plow land and latter harrow. In the next stage, women sow, plant, weed, fertilize and water, while men do pest and disease control. During harvesting, men and women work together<sup>3</sup>.

- Composition of National Assembly for 2011-2016: a) Ethnic minority deputies (78), accounting for 15.60%, b) Women deputies (122), accounting for 24.40%.

<sup>3</sup>

SEARICE report, 2014, [http://isos.gov.vn/News\\_Detail/tabid/179/ArticleId/296/language/en-US/Default.aspx](http://isos.gov.vn/News_Detail/tabid/179/ArticleId/296/language/en-US/Default.aspx)

- Composition of deputies elected by provincial People's Council: a) Ethnic minority deputies (688), accounting for 18.0%, b) Women deputies (122), accounting for 24.40%.
- Composition of communal People's Council delegates: a) Ethnic minority deputies (62,383), accounting for 22.46%, b) Women deputies, (60,302), accounting for 21.71%.

#### ***4.5 Youth and traditional culture***

Viet Nam has a traditional culture imbued with national identity. However national culture has been seriously eroded, especially in youth ethnic groups. This is because Western culture has a powerful appeal for young people, magnified by Viet Nam's re-emergence from international isolation. Young people like to discover new things, but traditional culture has not met this need. In addition, the development of internet-driven social media has had a strong impact on traditional culture.

### **5. Remarkable landscapes, land and water resource management features**

There are many spectacular landscapes in DVKPGG. Components of this landscape include natural landscapes (physical features of the earth's surface geology), agricultural landscapes (interaction between land and people) and biodiversity (variety of living things). In terms of natural landscapes, DVKPGG is famous for its majestic geomorphology with many "cat ear" rocky mountains, steep slopes, deep abysses and karst cave systems. In addition, there are various kinds of exposed rock surfaces formed about 542 million years ago. There are well-known landscapes in DVKPGG, such as Ma Pi Leng Peak, Cong Troi Peak and Double Mountain in Quan Ba district, Stork Mountain, The stone garden in Lung Chinh commune, stone forest in Khau Vai commune, Thuy Mac valley and stone desert in Sang Tung commune as well as Kho My and Na Luong caves (Ha Giang People's Committee, 2012).

The agricultural landscape embedded in the geomorphology further makes it remarkable as it represents the symbiotic interaction between people and nature in the form of ecologically-sound agriculture. Agro-oriented culture is a complex mosaic of 17 cultures involved in ecologically-sound "land engineering", carried out for hundreds of years. The practices are meant to provide more arable land, but also conserve land resources such as soil and biodiversity (forests and agro-biodiversity).

The agricultural landscape portrays outstanding physical features in the form of conserved soils in rock interstices, where farming is conducted in homesteads (with stone fences) where people live, in forest gardens as well as changing landscape colours as different crops are grown in an annual cycle. The stunning contrast by the panorama of "stones and flowers" is often referred to in the landscape's mosaic of stone and farm vegetation. Roughly, 70% of the panorama is considered rock and stone, while vegetation comprises 30%.

Yet, the physical features are only a manifestation of day-to-day land use decisions of a heterogeneous population adapted to a harsh physical environment through the centuries. Examples of the unique, almost heroic practices include bringing eroded soil up hills, plowing at night and planting in caves.

Another important artificial DVKPGG landscape is the Happiness Road ,which connects downtown Ha Giang to the four northern mountainous districts of Dong Van, Meo Vac, Quan Ba and Yen Minh stretching 185km. The road was the result of great efforts and creativity of nearly 2,500 people working manually from 1959-1965. The Happiness Road reveals the majestic karsts and the area's heritage values. It has also contributed to socio-economic development, national security and defence stability, while enhancing the lives of ethnic minority groups.

As a member of the Global Geopark Network, DVKPGG has been subjected to basic spatial planning to allow for the rational management of population growth and land use patterns. The MoCST recently declared rock-based farming systems (officially referred to as amethyst farming) as part of the national list of intangible cultural property. As such, the Government has committed itself to the conservation of the area, while simultaneously ensuring sustainable socio-economic development of ethnic groups that depend on agricultural landscape resources.

### **III. OTHER SOCIAL AND CULTURAL CHARACTERISTICS**

#### **1. Other important festivals in DVKPGG**

##### ***Love Market in Khau Vai commune***

This is a unique market for couples broken in love, held on the lunar March 26-27 in Khau Vai commune, with the participation of many locals and tourists. The oldest person in the commune does not know when the love market began.

In the market area, there are two temples Ong (Mr) and Ba (Mrs) temples. The story concerning these temples is once upon a time, there was a boy and a girl born from two different places of the Dong Van Plateau. Since their families prevent them get married, they decided to leave home and settle down together in Khau Vai, a prosperous land with green plants. In honour of their merits in cultivating the wild land into a rich one, the local people built the two temples to worship them.

Another local myth tells of a young couple from different tribes who fell in love. The girl belonged to the Giay group and the boy, the Nung group. The girl was so beautiful that her tribe did not want her to marry a man from another tribe. Consequently, a violent conflict arose between the two tribes. To stop the bloodshed, the two lovers sorrowfully decided to part. However, they planned to meet once a year on that day, lunar March 27. The place where they used to meet is Khau Vai, which thereafter became a meeting place for all those in love (Ha Noi Culture University, 2015).

Since then, on every lunar March 27, Khau Vai has attracted couples of different ages, including those who seek partners for the first time. Yet most love each other, but cannot marry due to different reasons. On the day when the market session takes place, it is likely a wife and husband go to the market together, but they look for their own ex- partners to share emotions. If one of them stayed at home, he/she was not jealous because dating at the marketplace was only a temporary and had no negative influence on real life. The Love Market is considered a way to reconcile a community deadlock as well as an emotional outlet for a couple out of love (Tourist portal information of Ha Giang, 2015).

##### ***Gau Tao festivals of Mong ethnic group***

Gau Tao is the most important festival for Mong people to ask for happiness, longevity and luck for children. If a family has no children or only males or females, the household head may ask the wizard to celebrate the Gau Tao festival. If another family has unwell children or failing crops they may also ask the wizard to hold the Gau Tao festival – to ask for health and longevity. A Gau Tao festival is not held by a village, but a single household so there could

be numerous Gau Tao festivals during the year. But, most are during the Tet Holiday or when the farm is dormant.

Normally, a day before the festival the village leader will tell other families about the event and get ready with traditional clothes and instruments, like the flute. This event consists of ritual and festival sections. The ritual is to organize the family to prepare a meal for ancestors at the family altar and a shaman will help them connect with ancestors, call their souls to return and pray for them. The host also plants a tall tree, called “*Nêu tree*”, at the centre of the festival location with a bag of alcohol and a red strip to call for the Gods and announce the festival to the whole village. The festival section is for guests and villagers and is the fun part of the event with many traditional activities, such as fighting (for sport) or crossbow shooting. Moreover, boys and girls meet each other and find love via cultural activities like flute dancing or singing. A common Gau Tao festival might last for three to five days and occur many times a year. When the festival is over, the shaman on behalf of the house owner, expresses gratitude to the earth, heaven and Gods, then get off “*Nêu tree*”, burn the worship paper and spray alcohol. The piece of red cloth is taken off and tied to the house door, meaning it will be protected by God. A boy-girl or newly wed couple is asked to make a bamboo mat from the tree (Vietsense Travel, 2015).

### ***Cap Sac festival of Dao ethnic group***

The Cap Sac festival is called by different names such as Kem Mien, Ku Mien or Man festival held by the Dao group to mark the maturity of a man in a family. In traditional thinking, a Dao man is recognized as mature after the Cap Sac festival. The festival for boys aged 13 is to thank the gods of the forest, water, new rice and earth and report to the gods that their son had grown up. When boys are recognized as mature man, they can attend big village events. The concept of mature for Dao is the simple enhancement of ethnic pride, but also a deep spiritual meaning in intangible culture. The festival often takes place within three days and nights with many pigs and chickens slaughtered depending on the owner’s economic conditions.

## **2. Stone arranging practice**

Stone arranging is familiar with DVKPGG communities as stones are often more common than soil. Local people often say “living is on stone and dead is also on stone” to emphasize the important role of stone in their lives. This practice is utilized during building house foundations, stone fences surrounding houses, roads, rocky shores in fields or tombs. To build rocky shores on fields, farmers first use hoes to flatten the soil surface 30-40cm in width. Stones are then gathered to clear fields, but mostly huge stones are collected from surrounding areas. The rocky shore includes three layers 40-50cm thick. Two outside layers are arranged by stones sized 30-40cm and 20-25cm in width and 25-30cm in height. To make

blocks and steady walls, small stones are inserted amongst large ones. If stones are sharp edged, they are flattened by a hammer for arrangement. According to Mong people, grey sharp-edged stones crack, while white round stones are hard and the first ones used to build a rock wall because they are easy to flatten. The stone arrangement process is conducted with simple tools, such as hammers, chisels and crow-bars (Nong Thi Yen, 2013).

## **IV. HISTORICAL RELEVANCE**

### **1. Traditional farming system in DVKPGG**

The system is considered to be from ancient Mong people who migrated to this area about 300 years ago (Nong Thi Yen, 2013). However, there is controversy about the exact time the system was realized. The migration of Mong people from China is a journey to find freedom and justice as well as a struggle against oppression and exploitation. Mong believed that Viet Nam had fertile soil. After migrating, they generated productive fields from arid and rocky areas through creativity and hard work.

To adapt to the DVKPGG's harsh conditions, Mong people arranged stones into shores to retain soil. According to Nguyen Ngoc Anh (1975), stone arrangements were practiced for a long time to retain soil and fields to make small plots of plants during two to three years, not for formation of upland fields cultivated for a durable period. The stone arrangement-formatted upland fields were significantly developed when the Government of Viet Nam had a policy to encourage sedentarization for ethnic groups during the 1960s. The result of this programme was a large area of terraced and upland fields.

### **2. How the system is maintained despite social changes**

In recent years, Viet Nam has had many policies to develop agriculture and rural areas to improve food production, especially in mountainous regions, including the DVKPGG. There are numerous new varieties, stocks and agricultural technology introduced into agricultural systems. This has led to a significant loss of native cultivars and traditional farming knowledge and practices. In addition, increasing populations and deforestation have resulted in genetic erosion and traditional knowledge losses in many areas of Viet Nam. However, indigenous farming practices and native crops and stocks have been utilized in DVKPGG due to adaption to harsh conditions. In most agricultural areas of DVKPGG, intercropping and rotations between corn and legumes, vegetables and taro are evident. Even a intercropping system is used for hybrid corn.

### **3. Special contributions of the system to national history, politics and society**

This system represents the creativity and hard work of local communities to overcome the DVKPGG's harsh conditions. It has contributed to food and security for this area and helped protect Viet Nam's frontier. This farming system has existed for a long time and has been essential to address the area's unique agricultural production difficulties. It has played an important role to maintain biological diversity in agriculture and protect the environment and ecological functions. In addition, it has rich heritage on paleontology and geology which are significant for research and education.

## **V. CONTEMPORARY RELEVANCE**

### **1. Quality of produce and potential improvements to support communities**

Heritage agriculture is a top absorber of labour from the uplands.

It provides specialty products that may appeal to certain sectors concerned with health and wellness (e.g. yellow cows, black pigs and mint honey).

### **2. Contribution to agro-biodiversity conservation and crop improvements for food production**

Farming systems involve in-situ genetic conservation through regular use of native species and varieties.

The VAAS-PRC reported 450 accessions from Ha Giang province, that represent collections by ethnic farmers. There is potential for breeding programmes to determine the morphological and genetic quality to contribute to overall crop improvements for upland agriculture.

Many practices are important foundations for introducing climate change adaptation measures. An example is the complex intercropping system introduced by farmers.

### **3. Unique contributions to local forests and watershed protection**

The DVKPGG hosts important limestone forests, which have a special role in protecting the water quality of runoffs and ground water in karst topography. The same forests host a range of important wild flora and fauna.

The surface waters of the Nho Que River of the Dong Van Karst Plateau are an important contributor to operation of the three hydroelectric plants in Ha Giang province.

### **4. Unique practices that provide potential lessons/techniques for land conservation**

Rock-based farming systems demonstrate the capacity of Viet Nam's upland communities to maintain ecologically sound farming, even in a harsh physical environment with limited development resources.

The system shows the importance of soil. Areas with abundant and fertile soil in hilly land should strive to conserve it. Otherwise, it is impossible to haul soil up to upper slopes of upland farms.

## **5. Unique contributions to national cultural heritage**

Promoting diverse ethnic culture is not only about songs and dancing, but also about livelihoods and especially agriculture.

Agriculture heritage in DVKPGG is an example of high agro-biodiversity, local knowledge and remarkable landscapes that may also be designated as national agricultural heritage sites.

## VI. THREATS AND CHALLENGES

1. The natural increase in population density in the four districts (1.5-1.7%) covering the DVKPGG is higher than the average growth rate of Ha Giang province (1.4%). There is a high poverty incidence, more than the national average. Low productivity and land fragmentation due to inheritance and lack of education may drive segments of the upland population in these areas to intensify land use (higher use rate of hybrids and fertilizers) beyond the natural carrying capacity of the ecosystem. One symptom of this is much shortened periods for traditional fallows (Yen Minh, 2015).

2. Government agricultural programmes to enhance application of advanced techniques to develop local economy have promoted the use of new corn varieties, including hybrids. The use of new corn varieties, 66.8% of total corn land as well as commercial fertilizer, has increased overall corn production of the province (Ha Giang's People Committee, 2014). But, it has also tended to reduce the availability of traditional corn varieties which are important for crop genetic improvements for better climate change adaptation in Vietnamese agriculture. The current estimate is less than 50% of corn land has continued to use native varieties. Concurrently, new rice varieties are promoted in 93% of rice land with positive impacts on overall productivity. Some 68% is from hybrid rice. As with corn, many native varieties of rice have been replaced. Thus, introduction of new crop varieties is a risk of declining native genetic diversity.

3. Accordingly, farmers are unable to use new corn varieties in the long-term due to variable productivity, higher exposure to rodents due to low plant heights, exposure to early rotting due to insufficient husks to cover corn ear, short storage life and lower eating quality (Nong Thi Yen, 2013).

4. While these varieties yield more, they also require increased chemical inputs that stress thin fragile soil and sensitive underground water supply systems. Farmers have maintained intercropping practices with hybrid corn, advisable to reduce soil acidification due to commercial fertilizer. Still, large areas of single varieties of corn during the main growing season may make the system vulnerable to unexpected pest and disease infestations.

5. Climate change is affecting normal patterns of rainfall and temperature. This is now elaborated in a climate scenario developed by recent climate studies (IFAD, 2014). This change combined with decreased diversity of corn plantings and increased use of agricultural chemicals may also make the system more vulnerable to shocks, such as pest and disease infestations or to dry spells and frost.

6. A sharp increase in mass tourism has led to serious impacts on the utilization of natural resources, traditional culture as well as the ability of ethnic communities to meet the demand

for participation in tourism-related activities. If tourism is not adequately managed, cultural features of host communities may be unduly commercialized, thereby diluting the essence of the local culture, which has partly maintained the value of the unique farming system found in Dong Van Karst Plateau. Concerns have also been raised about the need for ensuring communities benefit in a meaningful way from revenues generated by the growth in DVKPGG tourism (Trieu Thi Tinh, 2015).

Development of mass tourism is pressuring the natural resources and livelihoods of indigenous peoples. When tourism is developed it will cause economic restructuring in agriculture (shift from farming for food security to farming for tourists), pressure the reallocation of land (land for rice and corn cultivation, other crops, for constructing infrastructure and tourism projects) and influence local people's resilience to cope with the change in direction towards mass tourism.

7. Lack of access to markets will remain a challenge for specialty products produced by upland communities. In fact, farmers have no choice but to hike to transport agricultural materials from fields to houses as motorbikes cannot be used.

## VII. PRACTICAL CONSIDERATIONS

### 1. Ongoing efforts (national and local) to promote dynamic conservation of candidate GIAHS site

The Vietnamese Government aims to assist sectors with high incidences of poverty, such as ethnic minority communities in DVKPGG. The programme emphasizes farm productivity improvements, together with support for livelihoods, education, infrastructure and conservation of traditional cultures. There are some representative programmes such as Programme 135 on poverty reduction and development schemes for ethnic minorities in Viet Nam, Programme 30a for fast and sustainable poverty reduction in 61 poor districts, the National Target Programme on New Rural Development during 2010-2020 and the National Target Programme for Rural Water Supply and Sanitation.

Local government also has many programmes to demonstrate a commitment to improving indigenous people's livelihoods, economic development and to preserve traditional cultural identity of ethnic communities in upland areas.

a. Master Plan of Tourism Development of DVKPGG to 2020 and vision to 2030. The plan emphasizes that agro-tourism associated with the potential and advantages of cultural diversity, natural and historical landscapes of DVKPGG is an important product for Ha Giang province's tourism development to supply new livelihoods for local people. Agricultural tourism development is based on the homestay model which involves tourists experiencing agricultural activities with farmers at their houses, growing and developing products made from buckwheat to serve to tourists and development of agricultural products and handicrafts.

b. Master Plan of Conservation, Embellishment and Improvement of DVKPGG in Ha Giang province from 2012 to 2020 and vision to 2030. The DVKPGG Steering Committee has seven action areas:

- Protect the originality of local traditional architecture
- Raise awareness of conservation and promotion of heritage values
- Develop appropriate tourism, including fees and training of guides
- Raise awareness of creative tourism, pilot the concept of UNESCO's public use planning (PUP), develop tourism cultural villages and help the local economy focus on tourism
- Improve potential of local products that serve tourism, develop agricultural tourism and upgrade corn made wine and beef products
- Participate in development activities carried out by regional and international organizations, such as the Global Geopark Network.

c. Master Plan of Development of Tourism of Ha Giang from 2015 to 2020 and vision to

2030. It focuses on developing key tourism products, such as geological, cultural, community and border trading tourism, traditional craft products, natural specialties and cuisine. It also endeavours to systematize and connect tours and attractive destinations in the province, region and internationally to create new tourism products. Various aspects of tourism being developed include:

- Landscape tourism
- Ecological research and discovery tours
- Ecological tourism for healing and treatment
- Tours to craft villages (textiles, wine-making)
- Cuisine tourism based on local agriculture
- Agro-tourism such as participation in buckwheat production.

The orientation of developing agriculture products for tourism in DVKPGG centres on practical experiences in agricultural activities in relation to food, work and accommodation at homestays and traditional craft villages. Buckwheat products will also be diversified for tourism with enhanced promotion and product designs.

d. Restructuring of Agricultural Sector of Ha Giang Towards Higher Added Value and Sustainable Development till 2020. This plan contains views, goals, tasks and solutions to restructure the province's agricultural sector by 2020. In particular, horticulture will focus on six main crops: corn, oranges, peanuts, rice, tea and soybean as well as animal management will focus on yellow cows, buffaloes and honey bees. The forestry sector will centre on developing productive forests and medicinal plants.

e. Master Plan of Conservation of Biodiversity in Ha Giang province from 2015 to 2020 and vision to 2030. The plan emphasizes that Ha Giang province must establish systems for biodiversity conservation and botanical gardens in protected areas to preserve and sustainably exploit germplasm of rare wild animals and plants, crops and stocks with high economic value. To 2030, Ha Giang will minimize declines in biodiversity, restore important ecosystems and sustainably utilize valuable genetics.

f. All districts in DVKPGG have a tourism development master plan which emphasize the necessity to learn tourism development lessons from other provinces such as Quang Ninh and Sa Pa town to sustainably exploit its comparative advantages such as topography, geology, cultural diversity and biodiversity to attract local tourists. The plans also note the vulnerability of traditional culture to uncontrolled tourism development. The main tourist products to be emphasized are exploring natural landscapes, community tourism and agritourism.

g. Programmes to conserve and recover several native crops and indigenous stocks that have high economic value to DVKPGG, such as “Chum” mandarin, native sticky corn, “Gia Dui” and “Khau Mang” rice, Quan Ba seedless persimon and yellow cows as well as theme

costumes and some Ha Giang plant food specialties. In addition, the PRC also collected native crops and wild relatives of crops in Ha Giang province as part of a programme.

h. Projects to establish and maintain Chi San Natural Reserve at Meo Vac district, conserve the habitat of the Snub-nosed monkey, the Bat Dai Son Nature Reserve and Du Gia National Park.

## **2. Potential and opportunities for sustainable management**

a. If viewed from the conventional meaning of intensive agriculture, the potential of DVKPGG's agricultural landscape is limited. This is because actual land areas, which depend on pockets of land between the Karst mountain rock outcrops, are limited. Farmers' technology and skills are also unsuitable for conventional intensive monoculture, where high single crop yields are important.

b. Specialty products have potential to be further developed to benefit communities as well as districts and the province, as rare farm products have appeal for small niche markets that prefer native, natural and safe products. Such products include beef from yellow cows, meat from black chickens, buckwheat products, mint honey and others. Specialty products from farms and heritage values can promote sustainability of the system.

c. Cultural heritage values, recognized by the MoCST as intangible cultural property, are equally important for these farming systems. Through this recognition, low volume specialty farm products may merit higher premiums from people who not only want to be healthy, but also contribute to the conservation of a national treasure.

d. The system is part of the global classification of DVKPGG, part of the Global Geopark Network. Thus, it adheres to certain global protocols for land use, heritage management, culture conservation and biodiversity preservation.

## **3. Expected impacts of GIAHS on society and ecology**

a. Rock-based farming systems and agro ecosystems are part of the overall landscape that hosts watershed forests and other ecosystem elements (soils, bodies of water, flora and fauna). The dynamic conservation of such farms, including their contributions to stability and diversity, will also aid the conservation of mountains, rock formations, watersheds, forests and biodiversity. This is because farms keep communities intact in terms of food security and act as a platform for diverse local culture. The aggregate of daily land use decisions by local communities and government stakeholders means the same communities will protect their natural resources. In addition, traditional farming systems can preserve watersheds as they often limit use of chemical fertilizers and pesticides, which are major causes of water pollution from agricultural production.

b. GIAHS has practical significance for the conservation and enhancement of important ecosystem services for wider society, such clean water and air, genetic stocks for crop improvements and income from nature tourism.

c. Dynamic conservation of traditional agriculture systems also contribute to preserving indigenous cultural values of ethnic communities. This is because agricultural activities of certain communities in Viet Nam are the foundations to establish the cultures such communities. For example, there are many poems, songs and folk dances describing agricultural activities in DCKPGG. Many festivals of ethnic groups in DVKPGG are related to agricultural production. Thus, maintaining and developing the traditional agricultural production system also preserves and promotes indigenous cultural values.

d. Conservation of the system as a form of cultural heritage reinforces pride among ethnic minority communities about their work, trials and aspirations. It also contributes to the lowland Kinh culture's better appreciation and education of ethnic minority culture.

#### **4. Motivation of the community, local authority and other relevant stakeholders**

The national and provincial governments are key advocates, sponsors and investors of the DVKPGG. They not only worked hard to have it recognized internationally, but also formulated a programme of action in consultation with different stakeholders. The management board's advocacy publication issued in 2014 identified the following conservation priorities: a) heritage value of geology and geomorphology, b) value of culture and humanities as well as value of biodiversity and the environment.

The board also suggested the following voluntary contributions from stakeholders:

a. Communities within the DVKPGG:

- For geological and geomorphological heritages: Protection of geology, fossils, surface landscapes, caves and natural resources
- For cultural heritage: Protection of tangible and intangible heritages. This involves prioritizing heritage to be protected and assessing certain customs that may hinder meaningful conservation and development including “man above woman”, “child marriage” and “time and money in folk festivals”.
- For biodiversity and environment protection: Protection of flora and fauna.

b. Communities living outside the DVKPGG:

- Avoid mining, hunting, gathering of heritage geology and forest products
- Planting of trees and reforestation
- Observe travel restriction
- Contribute to local conservation efforts.

- c. Party organizations, leadership and communication.
- d. Government at all levels, development of coherent plans and programmes of action.
- e. Mass organizations, propaganda and mobilization of voluntary contributions.

## **VIII. CONCLUSION**

The agricultural heritage of the “rock-based farming system” meets the essential requirements under the five GIAHS criteria. However, several challenges must be addressed to ensure adherence to GIAHS criteria is sustainable. Notable challenges to this agro-ecosystem include a massive adoption of new varieties of corn and corresponding reductions in the use of native varieties, adoption of new forms of agricultural land management practices/techniques such as use of chemical fertilizers and the potential impacts of climate change. As a result, there may be high a vulnerability to major “shocks”, such as weather aberrations and pest infestations, affecting large numbers of farmers.

## **IX. INITIAL DYNAMIC CONSERVATION PLAN FOR THE GIAHS SITE**

### **1. Background of the dynamic conservation plan**

Declaration as a GIAHS site requires a dynamic conservation plan be prepared by the lead Government agency in consultation with the farming community concerned and other key stakeholders, such as local government authorities and civil society.

As the proponent for the declaration of the agricultural farming system in DVKPGG as a GIAHS site, Viet Nam's Ministry of Agriculture and Rural Development (MARD) is identifying areas of action to be included in the required dynamic conservation plan. The guiding point in developing the plan would be to further enhance capacity of the system to meet the five GIAHS criteria as well as to sustain it. The five criteria are:

- Food and livelihoods security
- Agro-biodiversity, biodiversity and ecosystem functions
- Knowledge systems and adapted technologies
- Cultural value systems and social organizations
- Remarkable landscapes, land and water resources management

The key challenge for dynamic conservation of the system in DVKPGG is how to balance the need to maintain the heritage aspects of the agro-ecosystem (heirloom varieties, intangible cultural heritage such as food processing), and the need to increase agricultural productivity and resilience to reduce poverty.

### **2. Method for formation of dynamic conservation plan**

The dynamic conservation plan is based on the methodology of Parviz Koohafkan and Miguel Altieri (2011), named: "A methodological framework for the dynamic conservation of agricultural heritage systems".

The method is based on the participatory approach to encourage strong participation from all stakeholders, especially local communities who live in GIAHS sites and maintain traditional agricultural activities. Applying the "Free prior and informed consent" principle is emphasized for local community consensus to proposed projects.

The key challenge in dynamic conservation planning for a GIAHS sites is that there are many controversies about roles of agricultural heritage in agricultural development and the benefits of dynamic conservation. On one hand, it is said that agricultural heritage belongs to the past and is considered backward agriculture. On the other hand, it is recognized that agricultural heritage plays an important role in culture and biodiversity conservation, and adaptation to climate change. Another idea is that conservation means freezing agricultural production activities and preventing development. However, GIAHS dynamic conservation activities not

only allow the agricultural system to continue to develop and adapt to current conditions, but also ensure that the system maintains the original values considered as traditional heritage by local communities.

To establish a dynamic conservation plan, the GIAHS initiative has proposed at least seven steps for countries to establish a GIAHS. They include:

1. Develop a participatory planning strategy at national level. Establish detailed profiles of the system that require GIAHS recognition and determine the steps for local government to do this.

2. Determine the key features of the system and criteria for a GIAHS. Evaluate the characteristics of the selected site based on the criteria for a GIAHS and other requirements.

3. Determine the best principles and tools for dynamic conservation activities. Review approaches to enhance the efficiency of adaptation to GIAHS.

4. Establish and carry out action plans for dynamic conservation on the demonstration site.

5. Assess the progress of dynamic conservation. This process monitors conservation activities, estimates impacts and costs, assesses the project's direction to adjust interventions for obtaining desired impacts.

6. Dissemination of results and scaling-up of successful initiatives.

7. Achievement of local people's goals and aspirations.

The MARD of Viet Nam, in collaboration with FAO, has nominated the Plant Resources Centre (PRC) under the Viet Nam Academy of Agricultural Sciences (VAAS) as a national focal point for the GIAHS initiative in Viet Nam since 2014. The PRC proposed the list of 10 agricultural systems in Viet Nam as candidates for GIAHS. These are the traditional farming system in DVKPGG, the floating rice farming system in the Mekong Delta, the terraced cultivating system in Lao Cai province's Sa Pa, the terraced cultivating system in Ha Giang province's Hoang Su Phi, the terraced cultivating system in Yen Bai province's Mu Cang Chai, the rice fish (shrimp) farming system in the Mekong Delta, the intergrated crops-fish-stocks system in the Hong River Delta, the integrated agro-forestry system in the northern mountainous region, the tea system in the midland hills and the home garden in semi-mountain areas in Phu Tho province. This agricultural system in the DVKPGG was selected as the first GIAHS candidate in Viet Nam and the first two steps were carried out through collaboration between PRC and FAO in 2015. This section addresses the requirements of Steps 3 and 4.

### **3. Traditional farming system**

This agricultural system involves 17 ethnic groups in the DVKPGG, that have grown corn and other crops, raised animals and cared for forests for several hundred years in the harsh physical environment of the Karst terrain on the Dong Van Karst Plateau in northwest Viet Nam's Ha Giang province. The DVKPGG is a globally recognized geopark, part of UNESCO's Global Geopark Network.

The system involves ingenuous practices of conserving and managing limited land in the interstices of the rocky terrain, for food production and livelihoods. Soil conservation is accompanied by adaptive land preparation, while an age-old multiple cropping system that minimizes the loss of fertility, helps maintain resilience and diversify income sources. In addition, soil fertility is improved by abandoning soil during winter. The system supports biodiversity in forests and agricultural land. It is supported by local knowledge passed generationally through customs and traditions. Overall, the system is manifested by a remarkable landscape characterized by diverse geomorphic forms of Karst, as well as pockets of agriculture and forest in the midst of a predominantly rocky landscape. DVKPGG has global recognition as part of the Global Geopark Network. Thus, it adheres to certain global protocols for land use and heritage management. The system is also recognized nationally by the MoCST as part of the country's intangible culture. Some advantages and drawbacks to dynamic conservation of the system are:

#### ***3.1 Advantages***

- Firstly, there is much potential for DVKPGG tourism development to create thousands of jobs and improve living standards for local residents as well as preserve traditional farming systems. This area has many majestic natural and historical landscapes as well as agricultural, cultural, palaeontological and geological heritage, traditional craft villages and abundant cultures from 17 different ethnic groups. These comparative advantages of the DVKPGG to develop tourism could be a major component of future incomes. To maintain these benefits, it is essential to preserve traditional farming systems. Therefore, preserving traditional farming systems in the DVKPGG is an objective need for its development.
- The DVKPGG's harsh conditions can be considered another advantage for dynamic conservation of its traditional cultivating system. The key features in the DVKPGG are steep slopes, strong fragmentation, major rocky surfaces, water deficits and low temperatures in winter. As a consequence, it faces many difficulties in the application of new agricultural production technology. In recent times, the local government has strongly promoted the introduction of new technologies such as machines, improved crops and stocks in the agricultural system through extensive programmes. However,

they cannot completely replace native crops and stocks nor traditional practices to adapt to harsh conditions. On the other hand, many traditional agricultural products can develop special products for niche tourism markets such as mint honey, wine and cakes made from buckwheat, corn wine and brocade-woven products. In other words, local people can get more income from the traditional agriculture system together with preserving it.

- Farming system conservation activities in the DVKPGG have prioritized by national and local governments. Firstly, rock-based farming practices were recognized as a national intangible cultural heritage by the MoCST. In addition, all economic and tourism development plans of Ha Giang province and four districts in the DVKPGG emphasize the important role of traditional agricultural systems in development. Moreover, local government has many programmes to preserve and restore native crops and stocks as well as develop agri-tourism. For example, Ha Giang province organized a flower buckwheat festival to attract tourists in 2015.
- The system is part of the Global Geopark Network. Thus, it adheres to certain global protocols for land use and heritage management. Ha Giang also has a master plan for conserving and promoting heritage values of the geopark, emphasizing the conservation of heritage geology, geomorphology, conservation of cultural heritage, traditional craft villages and biodiversity conservation in the Dong Van Plateau.

### ***3.2 Disadvantages***

- Traditional farming systems have insufficiently provided for food demands of local people. Therefore, there is an objective need to promote application of new technology (modern crops and stocks, machines) to meet food demand. As a consequence, traditional DVKPGG agricultural systems have been partly replaced by modern systems.
- Local policies and agricultural programmes based on intensive farming to enhance agricultural production have been over emphasized. For example, a large area of rocky mountain is unsuitable for hybrid maize, but the local government encouraged farmers by subsidizing hybrid seeds. Many farmers who supported hybrids have in fact sold the subsidized seeds in favour of local varieties.
- The mechanism for sharing tourism benefits with indigenous communities has not been finalized. Thus, the holders of conservation activities cannot be assured livelihoods to continuously maintain the traditional systems.
- Conservation activities in the DVKPGG still overlap. There are two agencies in charge of conservation activities, the Ha Giang Department of Culture, Sports and Tourism and the Dong Van Plateau Geopark Management Board.

## **4. Purposes and extent of the dynamic conservation plan**

### ***4.1 General purpose:***

Promote national and international recognition of the DVKPGG's rock-based farming systems (RBFS) as a GIAHS and establish a long-term programme for dynamic conservation and sustainable management to enhance the system's viability as well as improve DVKPGG local people's living standards.

### ***4.2 Detailed purpose:***

- Establish GIAHS demonstration sites for the RBFS in DVKPGG to sustainably preserve traditional knowledge and practices, intangible and tangible cultural values, biodiversity and ecosystem functions.
- Ensure food security and improve livelihoods for local communities at demonstration sites, based on enhanced sustainable utilization of its competitive advantages such as agro-tourism, unique landscapes, diverse cultures of at least 17 ethnic groups, traditional agro-products with high value, traditional craft villages, paleontological and geographic heritage.
- Recommend good practices and lessons for national and local governments to build policies and master plans for GIAHS dynamic conservation in Viet Nam.

## **5. Extent of the dynamic conservation plan**

The dynamic conservation plan includes a national and local strategy as well as accompanying local selected projects that are key to sustainable development. The plan is focused on immediate actions by using national and local resources, and can also be enhanced by the external resources if necessary. It requires a multi-sector approach to participate in the planning process, implementation and assessment. The document includes: a) a framework for action on important topics related to RBFS at DVKPGG, b) proposed actions to develop effective policies and c) the proposed work plan during the next five years.

## **6. Representation GIAHS sites in DVKPGG**

The representation GIAHS sites are in Lung Cu commune in Dong Van district, Lung Tao and Lung Pu communes in Meo Vac district. All communes have representative features for RBFS in DVKPGG and the system has been relatively well conserved by the local people until now.

## **7. Framework for action plan**

This part provides an overall perspective of ongoing national and local efforts to promote dynamic conservation of the candidate GIAHS site. One of the most critical efforts is the joint initiative of national and provincial governments to support the establishment and sustainability of DVKPGG as a GeoPark as part of the Global Geo Network. This joint initiative will support the implementation of an international commitment as part of Global Network and is supported by UNSECO.

Until now, three local consultation workshops and one national workshop have been conducted to develop the strategic action framework. The main elements of the strategic action framework at local and national levels include:

1. Create a national master plan to manage and restore the system
2. Reinforce local community resource management
3. Enhance the viability and resilience of the system
4. Raise public awareness on GIAHS and its benefits
5. Encourage development of agro-tourism accompanied by preservation of traditional culture.

### ***7.1. Master plan, national management and restoring the traditional farming system***

The planning process will be undertaken, based on participatory and ecosystem approaches. Stakeholders will participate to establish the strategic plan. The process will enhance understanding of the current situation, share the long-term vision of the desired development, find a consensus on action priorities as well as divide roles and responsibilities among various stakeholders (central and local governments, organizations, farmers). Priority activities will receive local and central government budgets to ensure sustainable funding and will be mainstreamed with other programmes. Planning will focus on the following concerns:

- Restore the ecosystem function of the traditional DVKPGG farming system
- Enhance the efficiency of water resource use for domestic and agricultural purposes to adapt to climate change
- Develop the sustainability, resilience and benefits of agricultural production through smart-climate agriculture practices, improved agrobiodiversity and market access for traditional agro-products
- Conserve and manage cultural heritage to strengthen the social system to follow strict rules and practices to support preserve the system
- Develop tourism products accompanying with protection of landscapes, such as agro-

tourism, traditional festivals, community and adventure tourism

- Establish dedicated conservation offices to enhance State management to support the system.

## ***7.2. Reinforce resource management at local community***

Priority actions include:

- Evaluate the resource utilization and existing legal framework on resource management for adjustments to better match the current situation on the ground
- Build consensus in local communities based on evaluations to restore traditional rules on protecting forests, land, water reservoirs and wildlife. Make such adjustments more consistent with the current situation, such as population growth, climate change, and official legislation.
- Promote forestland allocation and empowerment for farmers to develop agro-forestry
- Provide incentives to encourage the implementation of ecosystem protection and improvements to incomes from special agricultural products such as, mint honey, yellow cows, brocade weaving and herbs to stabilize livelihoods and development.

## ***7.3. Enhance the viability and resilience of the system***

DVKPGG agricultural systems include traditional and modern farming as well as farming systems. Modern farming systems have revealed some weaknesses, such as over-use of chemical fertilizers and pesticides, outbreaks of insects, ineptitude of new varieties, soil degradation and biodiversity erosion due to increased frequency of land use to meet food demand for population growth.

The benefits of traditional DVKPGG agro-products are quite low, due to weak competitiveness of such products. In addition, land limitations and fragmentation, low levels of education, lack of employment, poor infrastructure, high costs of input materials and losses from local harvests have significantly reduced profitability. Recently, the local government made efforts to build agriculture and tourism development plans to address traditional agro-production issues. However, they have obtained little success so far. Therefore, the master plan will build, launch and expand support of agriculture-related systems, including:

- Raise public awareness of GIAHS and RBFS features to drive dynamic conservation
- Support local people to access niche markets for organic and traditional products
- Support farmers to reduce input materials and production costs, for example using native crops and livestock with good quality.
- Restore desired traditional genetic resources from gene banks and reintroduce them to

the DVKPGG production system. An example would be cow-raising programme which uses native yellow cows to enhance incomes for local people as well as manure for soil fertilization.

- Establish a climate-smart agricultural strategy to adapt to climate change
- Diversify income resources through developing agro-forestry, agro-tourism and mixed crop-livestock systems.

#### ***7.4. Raise public awareness of GIAHS and its benefits***

Dong Van Plateau is a member of the Global Geopark Network, recognized by UNESCO, and has intangible and tangible heritages such as "agricultural practices on rocky pocket and fields" and the "Khau Vai love market festival". These are favourable conditions for recognition of the system as a GIAHS. The dynamic conservation plan can mainstream many programmes to achieve the twin objectives of conservation and promotion of sustainable heritage.

The dynamic conservation of RBFS will not prejudice the rights of local farmers in the adaption of new varieties and stocks as well as modern agricultural production technologies. It will allow local communities to access high technologies without losing the integrity and core values of ancient traditional systems.

For these reasons, the action plan to help the Government and stakeholders will include the following activities:

- Documentation of ethnic groups' traditional cultures to be recognized globally and nationally. This means enhancement of cultural mapping with the participation of local communities, documentation of traditional oral knowledge of older community members and registration of various cultural heritage related to DVKPGG farming systems.
- Preparation of documents recognized at national level (according to current law on cultural heritage) and local levels.
- Apply an innovative communication strategy, infused into community education programmes, schools (community learning centres, interactive local museums) to increase recognition of heritage by young generations in ethnic communities and the general public.

#### ***7.5. Encourage ecological agriculture tourism connected with protection of traditional cultural values***

The action plan will encourage business investment in agro-tourism to generate additional income, provide motivation to maintain and conserve traditional farming systems as well as restore appropriate livelihood activities which have been eroded as well as attract young people to stay in communities to enhance economic development.

- In conjunction with tourism development planning on the plateau, build infrastructure connected with the ecological space for traditional farming systems and RBFSs
- Develop eco- or agro-tourism villages and spiritual tourism, such as in Lung Cu and Lung Tao communes as well as tourism in Meo Vac focussed on adventure, agriculture and culture
- Establish value chains for special agricultural products.

## **8. Institutions involved, including specific roles**

With conservation plan activities related to multiple sectors, successful implementation of the plan requires participation by all parties. Institutional support also requires actions (as per mandates) of the key institutions cited below:

- VAAS and PRC, representing MARD and as focal point of GIAHS, will play an important role to catalyze such activities as well as implement actions related to agrobiodiversity conservation (important GIAHS criteria).
- Office of the Vice Minister of MARD for Science and International Cooperation will, upon initiation of the VAAS-PRC, will lead dialogue with other ministries.
- Ha Giang People's Committee, Dong Van and Meo Vac districts and Lung Cu, Lung Tao and Lung Pu communes.
- Ha Giang Department of Agriculture and Rural Development, Ha Giang Department of Culture, Sports and Tourism, Ha Giang Department of Natural Resources and Environment, Ha Giang Department of Planning and Investment and the Geopark Management Board will have a direct mandate to support commune level initiatives.

**Table 6. Proposed activities and expected results**

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5
	1	2	3	4	1	2	3	4			
<p><b>Result 1: Raising public awareness</b></p> <p>PRC to coordinate with Ha Giang People’s Committee to carry out consultation meeting with Viet Nam-UNESCO, Dong Van Geopark, MoCST and FAO Viet Nam to determine actions to ensure synergy for GIAHS development.</p> <p>Activities:</p>											
<p>Activity 1:</p> <p>a) Share information about RBFS and develop a general mechanism framework to avoid overlaps from national and local governments with local community support.</p>	x	x	x	x							
<p>Activity 2: Combine values related to agricultural biodiversity and other GIAHS criteria to promote conservation of cultural heritage (based on MoCST’s recent act to recognize rock-based farming as a national intangible heritage. Actions include:</p> <p>a) Document RBFS features such as traditional knowledge and practices, agro-biodiversity, traditional culture related to agriculture and agriculture landscapes.</p> <p>b) Establish principles, approaches and practices for information exchanges among stakeholders.</p>		x	x	x	x	x					

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5
	1	2	3	4	1	2	3	4			
<b>Result 2: Analyze threats and solutions</b> Activities:											
a) Establish action plans for agricultural development and sustainable tourism without seriously impacting on the agricultural system.			x	x	x	x					
b) Establish a master plan for mainstreaming heritage conservation with ongoing programmes. (Refer to results of programmes related to agro-forestry, agro-tourism and conservation of agro-heritages).			x	x	x	x	x	x	x	x	x
<b>Result 3: Conservation of biodiversity and agro-biodiversity at DVKPGG</b> Activities:											
a) Prepare overall master plan for biodiversity conservation			x	x	x	x					
b) Promote preservation and sustainable use of genetic diversity by piloting approach for dynamic conservation of preferred native varieties. Specific action areas include: - Establish, maintain and develop in-situ conservation sites - Support establishment of community gene banks - Support participatory varietal selection - Reintroduce “lost” varieties preferred by farmers stored in gene banks (ex-situ).				x	x	x	x	x	x	x	x

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5
	1	2	3	4	1	2	3	4			
<b>Result 4: Solutions to promote economic development of GIAHS</b> Activities:											
a) Support establishment of value chain for main agricultural products, facilitate market access for “niche” ABD products communities are interested to produce. Support piloting of interventions that interest young farmers to sustain traditional practices and maintain agrobiodiversity.					x	x	x	x	x	x	x
b) Coordinate with MoCST to release programmes to introduce RBFS and GIAHS for education and tourism.					x	x	x	x			
c) Support local governments to build and implement local legislation on dynamic conservation of GIAHS.					x	x	x	x	x	x	x
d) Establish agro-tourism programmes, with agro-tourism villages.				x	x	x	x				
<b>Result 5: Resource mobilization</b> Activities:											
Activity 1. Enable, immediate resource mobilization at international and national levels grant facilities such as Global Environmental Facility Small Grants Programme (GEF SGP) and IFAD Grants Program (Northwest support for ethnic peoples).		x	x	x	x	x	x	x			

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5	
	1	2	3	4	1	2	3	4				
Activity 2. Identify ongoing efforts to design large projects oriented to agriculture, livelihoods and biodiversity. Cooperate with relevant offices to mainstream dynamic conservation in new projects (e.g. for GEF 6, IFAD project) + MARD projects + MoNRE projects.			x	x	x	x	x	x	x			
Activity 3. Obtain support from the National Research Programme for Agriculture and/or Biodiversity Conservation to support in-situ agro-biodiversity conservation in the DVKPGG.				x	x	x	x	x	x	x	x	
Activity 4. Obtain sustainable technical and financial support from local authorities in pilot sites for implementation of important local regulations supporting dynamic conservation of the agricultural heritage system.				x	x	x	x	x	x	x	x	
Activity 5. Provide training support to enrich knowledge and hands-on skills for facilitators of dynamic conservation such as:  Key topics through orientation, seminars, workshops: • GIAHS concept and strategies, plus dynamic conservation • Facilitate in-situ conservation of agro-biodiversity, including reintroduction of important heirloom varieties • Facilitate agricultural mapping and heritage planning • Documentation of heritage agriculture and inclusion in ethnographies, plans and				x	x	x	x	x	x	x	x	

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5
	1	2	3	4	1	2	3	4			
<p>programmes</p> <ul style="list-style-type: none"> <li>• Farm and village-wide climate change adaptation strategies.</li> </ul> <p>Key target groups:</p> <ul style="list-style-type: none"> <li>• Focal persons in ministries and local authorities (MARD, MoET, MoCST)</li> <li>• Farmer leaders</li> </ul> <p>Key researchers and extension personnel in the frontline.</p>											
<b>Result 6: Conservation and promotion of cultural values in DVKPGG:</b>											
Activity 1. Document traditional culture of 17 ethnic groups in DVKPGG	x	x	x	x							
Activity 2. Restore and preserve the national intangible cultural heritage: “Farming practices on rocky fields” and other cultural heritage related to agriculture.			x	x							
Activity 3. Restore and organize traditional festivals.					x	x	x	x	x	x	x
<b>Result 7: Enhance coordination among stakeholders and other organizations related to agriculture and conservation activities to effectively implement activities</b>				x	x	x	x	x	x	x	x
Activities:											
Activity 1. Mainstream dynamic conservation programmes with other projects carried out at demonstration sites to interact with development											

Activities and Results	Year one (four quarters)				Year two (four quarters)				Yr3	Yr4	Yr5
	1	2	3	4	1	2	3	4			
Activity 2. Establish coordination mechanisms with potential organizations, such as universities and research centres											
<b>Result 8: Supervision and evaluation</b> Activities:											
Activity 1. Establish a special office for cooperation with local governments to nationally supervise and evaluate effectiveness of conservation activities			x	x	x	x	x	x	x	x	x
Activity 2. Collect and establish informative data to supervise implementation approaches and determine progress			x	x	x	x	x	x	x	x	x

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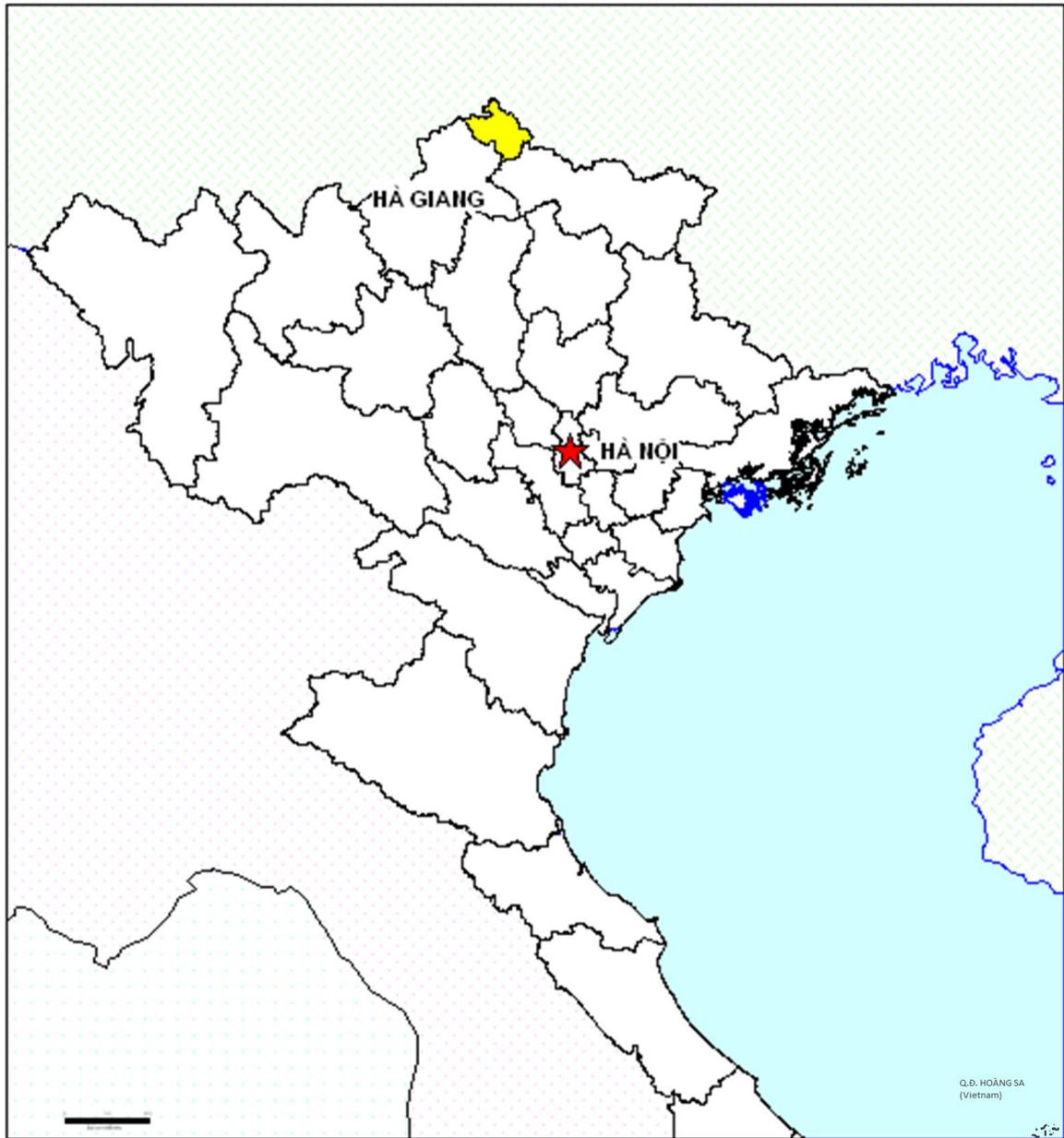
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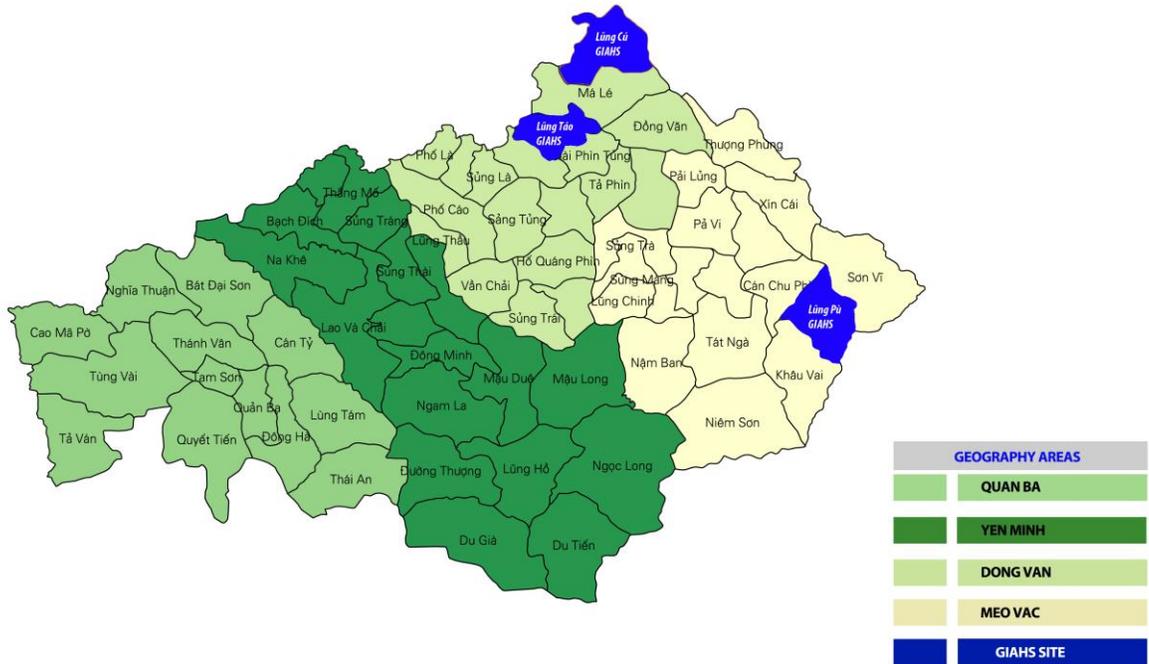
## ANNEXES

### ATTACHMENT 1. MAP OF DONG VAN KARST PLATEAU

LOCATION OF GIAHS SITES IN DONG VAN KARST PLATEAU GLOBAL GEO-PARK



**Picture 1. Location of GIAHS representative site in DVKPGG**



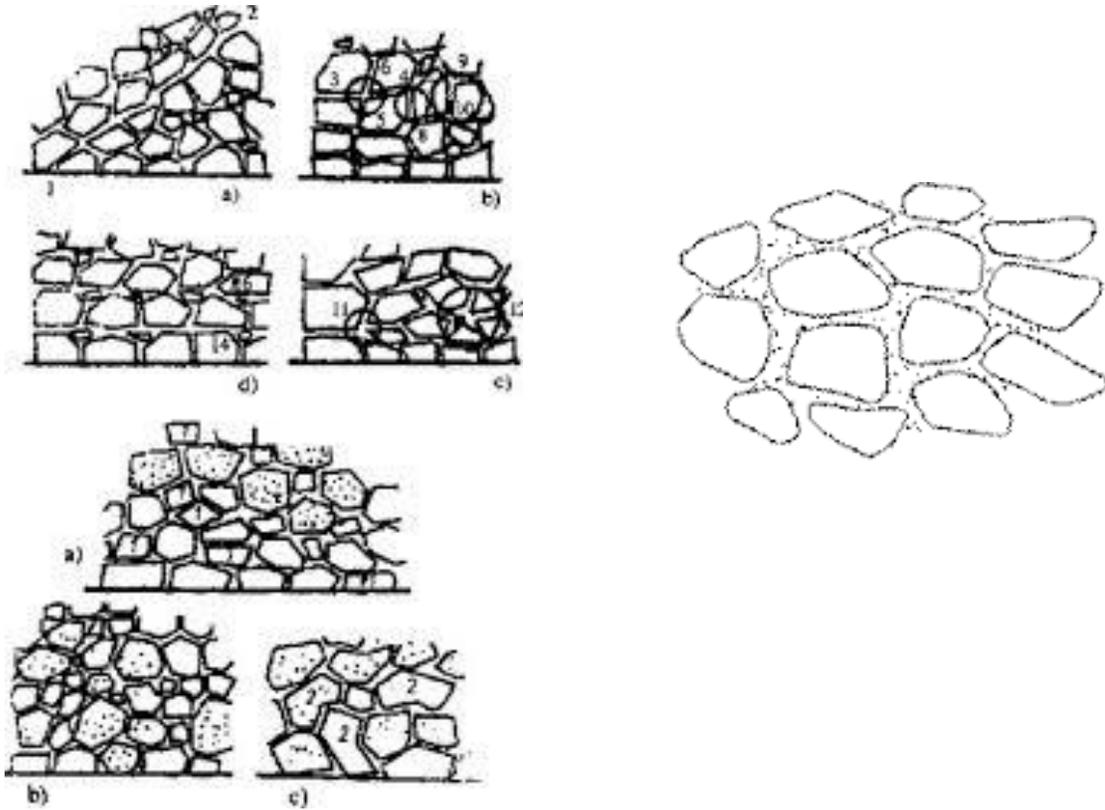
**Picture 2. Location map of four districts in DVKPGG**

**Note:**

1. Dong Van Karst Plateau includes four districts: Dong Van, Meo Vac, Quan Ba and Yen Minh which cover 2,530km<sup>2</sup> and have a population of 250,000. The representative sites for GIAHS are Lung Cu and Lung Tao communes in Dong Van district and Lung Pu commune in Meo Vac district.
2. Lung Cu commune: Total area of 34.6km<sup>2</sup> and population of 3,000 people
3. Lung Tao commune: Total area of 21.19km<sup>2</sup> and population of 2,554 people
4. Lung Pu commune: Total area of 31.8km<sup>2</sup> and population of 4,952 people.

## ATTACHMENT 2: ADDITIONAL INFORMATION ON RELEVANT KNOWLEDGE SYSTEMS

- Structural model of upland field with rocky fence and holes





Rocky field



Plowing on rocky field



Plowing on rocky pockets



Corn beds on rocky field



**Cultivation for maize**



**Cabbage flowering**

## *Cultivation knowledge on rocky pockets by dwellers living in Dong Van Karst Plateau, Ha Giang*

The Karst Plateau is located in northern Ha Giang province and belongs to Dong Van, Meo Vac, Yen Minh and Quan Ba districts. This karst, rivers and streams, often lack running water and arable land. For agriculture, the mostly Mong inhabitants and other groups such as Co Lao, Dao, Lo Lo and Pu Peo must utilize every rock pocket for farming. Therefore, a unique rock pocket farming technique was developed that was maintained by generations.

Rock pocket techniques are performed on soil mixed with stone, which acts as a shield for the land, erosion control and soil runoff. People take soil from lowlands to fill rocky holes halfway up mountains to become rock pockets for farming. Thanks to the creation of rock pocket farming techniques and planting maize on rock fields and intercropping techniques, people have adapted to special natural conditions. Rock pocket farming is still a key production method in the DVKPPG.

With rock pocket farming, farmers use specific agricultural utensils suitable for cultivation, such as plows, harrows and butterfly hoes. Plows, used on stone fields and made by Mong ethnic people, are manipulated and suitable for sloping and rocky terrain. The plow body is strong, its blade is a triangle, small and thick. The blade's top is heavy and can withstand heavy impacts with rock. There are two types - hand and leg harrows. A hand harrow has a horizontal pin to hold and press while using. A leg harrow is used more commonly and has a rectangular shape, with two rows of teeth and no holding pin. Operators must put rocks on the harrow for weight to work on dry and hard soil to rake at more depth. The butterfly hoe has a thin and large blade, with a triangular shape, curved at the handle and pointed both ends. This makes it easy to rake, weed and earth on rock fields.

Ethnic minorities on the Dong Van Karst Plateau must explore for suitable land and undertake soil preparation, seeding, cultivation and harvest products. Exploring for arable land is time-consuming and requires intensive labour. This work is often done in the dry season. When farmers want to create a new field, they choose areas with more sunlight, soil not too steep and preferably with plants. Next, grass and shrubs are cut from bottom-up and all wooden matter is burnt during the proceeding few weeks. Then, stones are lined up on the bottom of the slope to prevent landslides, erosion and fertility runoff. This work is conducted manually with primitive tools, such as hammers, chisels and crowbars. Land with more arable soil is framed by high rock fences along with low side of the field. For a large and slopped area, it can be made into terraced fields. Normally to make arable land, people not only build up wide fields, but on slopes and upper reaches of the field, they create pockets with soil for cultivation. Each pocket can generally grow up to two maize plants. Rock fence loading requires much effort and technique so stones can be fit snugly with no soil erosion during the rainy season.

Soil preparation usually takes place after the New Year's festival. For old fields cleared and cultivated, the first task is to clean rocks exposed by the cultivation process from the previous

season, then repair eroded sections. People using butterfly hoes and knives then cut the grass, dry and burn it. Ashes are spread evenly throughout the field surface to make fertilizer. For rock fields with more stones, ash is put into baskets and carried on site with arable land. With large fields with few rocks, people turn the soil and this task is usually undertaken by men. Cattle offer traction for this task and when soil is broken, corn from the previous season is cleared. A butterfly hoe is used to clean grass, put additional soil into pockets and mend any erosion damage.

After tillage, farmers use manure compost to apply to the soil. Corn seeds are sometimes soaked in water for two or three days for germination to avoid infestations of pests and mice. Mong ethnic people avoid seeding on 'Snake' and 'Dragon' days according to their beliefs grain yields will be limited.

Seeding is conducted from lower to higher fields, with individual rock pockets seeded at the end. Typically, seeding is done by four persons who are usually men, one hoes niches, another seeds, one dispenses fertilizer and the last backfills. The next step is usually reserved for women, the elderly and children. Every pocket receives up to five seeds to prevent insect damage. The distance between the maize holes is 50-60cm, in rows of 50-60cm (for Mong and Pu Peo), but Lo Lo ethnic people apply distances of 70-80cm between holes in rows of 70-80cm. People usually complete seeding in lower fields then move to high fields. Seeding work in rock pockets is usually done by one person. After 20-25 days, corn seedlings grow approximately 20cm higher and farmers start pruning work, kept to two-three seedlings, with more seedlings added for missing holes. When corn grows two-three leaves, weeding starts. When corn is at the flowering and pollination stage 1m high, weeding and then fertilizer is applied along with earthing for a second time. This is also the last time for root earthing. For corn planted in rock pockets, if grass grows, people can weed another time.

Due to the scarcity of land resources, people apply intercropping and overlap-cropping methods for sowing crops. Maize is usually intercropped with spinach, cucumbers, squash and cabbage by mixing the seeds of these plants with rotten fertilizer applied to each cavity for corn. These vegetables and corn also grow together. After two months, weeding, earthing and fertilizing of corn is applied and some vegetables harvested. Intercropping and overlapping cropping are integrated farming methods, that are systematic and compiled over many generations to become customary. Intercropping maintains vegetation covering ground surfaces, limiting soil erosion and runoff.

Harvesting and storage is the last stage of the production cycle. Harvesting usually takes place in June, July and sometimes August and September of the lunar calendar depending on crops. First, farmers harvest beans, squash and then harvest corn. Corn is grown in highlands with mostly local varieties, with growth duration of seven months. Local people reported that local maize varieties could resist drought and cold spells, consistent with the regional climate in the four districts of Dong Van Plateau.

### *Agricultural calendar of Mong people*

In considering the cultivation process, the agriculture production calendar is the most important of traditional knowledge. Mong people's seasonal calendar was accumulated from cultivation hundreds of years ago and is suitable with local conditions. In general, it follows knowledge relating to cycles of the sun and moon with the seasonal calendar applied to agriculture cultivation and living. The traditional calendar for cultivation of upland people relates to the origination calendar pattern with months and years corresponding to 12 animals and the zodiac. Animals are symbolized throughout the year, with months representative of auspiciousness, evil, good and bad relating to harvests and life generally (Report of Meo Vac district, 2015).

The agricultural calendar of the Mong people contains 12 months, based on the lunar year. Each month is represented by an animal and certain field activities.

- First month after the Tet Holiday is Rabbit Month with agricultural activities such as field worshipping, field cleaning and soil preparing.
- Second month is Dragon Month with agricultural activities such as soil preparing and bringing manure to fields.
- Third month is "Snake" Month with agricultural activities such as sowing corn and intercropping with many vegetables.
- Fourth month is Horse Month with agricultural activities such as weeding and turning of soil for the first time.
- Fifth month is Goat Month with agricultural activities such as turning over soil for the second time, harvesting peas and making corn mats.
- Sixth month is Monkey Month with agricultural activities such as harvesting soybeans, flax fibers and making corn cakes.
- Seventh month is Chicken Month with agricultural activities such as growing soybeans and common beans.
- Eighth month is Dog Month with agricultural activities such as harvesting corn.
- Ninth month is Pig Month with agricultural activities such as growing vegetables.
- Tenth month is Mouse Month with agricultural activities such as harvesting soybeans and common beans.
- Eleventh month is Cow Month with activities such as building houses and holding weddings.
- Twelfth month is Tiger Month with activities such as cooking wine, collecting wood and preparing for Tet Holiday.

However, the time between agricultural activities can be flexibly changed with weather variations as local people with traditional knowledge can recognize such changes.

### ***Story of buckwheat crop***

Years ago, Rice and Corn Fairies come to the earth for seeding. After finishing their work, they put down rice and corn husks into a creek. Rice and corn seeds grew up and produced grains. Local people collected them for cooking. Soon, rice and corn stored was nearly finished but next season had not come. The sun light nearly set behind forest trees, but no homes fire for cooking. Famine had become serious and villagers had to divide into subgroups to find food in forests. Many days passed, the villagers went to many places from caves to mountains but they had not seen anything for their empty stomachs. One day, there was a strange smell in the wind which no one has ever smelled before. Everybody came to the creeks and was very surprised about what they saw. There were a lot of tiny flowers in the creeks, covering from the sides of the mountain. If one looked carefully, small triangle leaves hiding under flowers could be seen. Villagers took their seeds to try them and learned that they were no less than corn or rice. Their bellies were satisfied and no longer cried for food. Kitchen smoke flew up each afternoon. Because plants grow from rice and corn husks and have triangular leaves, it was therefore named “triangle wheat” (buckwheat) (*Adapted from the Dong Van buckwheat of writer Nguyen Binh*).

### ***Some traditional dishes in DVKPGG:***

- Traditional foods consumed on festival or normal days are diverse and abundant, depending on different ethnic groups. For instance, Mong people’s unique foods include “*men-men*”, made from corn powder, “*Thang co*” made from horse meat mixed with internal organs, corn cake, bacon, beef jerky, rice porridge of aconitum fortune, corn wine and sticky rice. Dao ethnic people mostly cook normal and sticky rice and cake types from such rice. Nung food involves a combination of pork and eggs rolled into bamboo shoots and “*Khau nhuc*”, a kind of steamed meat.
- “*Men-men*” is cooked from corn powder with many steps before becoming an attractive, tasty and aromatic dish. It is main food of many ethnic communities living in mountainous areas, such as Lo Lo, Mong, Pu Peo and Phu La (Le Duy Dai and Trieu Duc Thanh, 2003).
- “*Thang co*” is a traditional Mong food with ingredients including meat, bones and internal organs of cow, goat or horse, together with special spices such as cinnamon and amomum. This dish can be eaten together with “*men-men*” and corn cake.
- Corn cake: there are two kinds, yellow or sticky corn. Before making such cake, “*men-men*” is made from cooked rice mixed with sugar for three to five days. After fermentation of rice, corn powder is prepared and mixed with rice before put into a frame covered with banana leaves. Cakes of a semicircular shape 25-26cm in diameter are steamed by cooker or pan. They can be kept for consumption for up to seven days after being steamed. They can also be fried or grilled to become softer. They taste sour due to yeast and aromatic smells from harvested corn.

- Corn wine: Mong, Lo Lo and Tay ethnic groups on mountainous locations also make wine from corn (unique drink of ethnic communities in festival days), corn wine is also used in meetings between friends together with “*thang co*”. Corn wine is considered a specialty in ethnic communities. Making corn wine involves yeast from unique leaves collected from forests. Wine mostly meets household demands, but in recent times with economic development, wine is being traded at markets commercially (DCST, 2013).

## **ATTACHMENT 3: BRIEF PROFILE OF CANDIDATE PILOT SITES**

### ***1. Introduction and overall analysis of project sites***

DVKPGG covers 2,356sqm and encompasses Dong Van, Meo Vac, Quan Ba and Yen Minh districts. Its topography is mainly limestone mountains fragmented into high mountains and abysses. The plateau’s elevation is 800-1,200m above sea level. Topography is lower from north to south and northeast to southwest. Most of the area is located upstream of the Mien and Nho Que rivers with many steep and dissected limestone ridges. Limestone areas account for 55-60% of the total area, interspersed with other rocks. This leads to variations in terrain, between rough and rugged limestone, and soft rocks. The continuous flow of water on limestone has caused erosion, forming sharp rocks.

With its diverse terrain, Dong Van Plateau has many unique and well-known landscapes, such as Breast Moun in Quan Ba, Cattle Gate in Can Ti and Ma Pi Leng Peak. Recently, scientists discovered nearly 40 nationally and globally important natural heritage sites. Of these, seven are heritages of the Earth’s evolution, three panoramic viewpoints, seven stone gardens and forests, six heritages of 200-600m steep cliffs, seven cave heritages, five heritages of tectonic karst depressions and three ancient conservative paleontology. On October 3, 2010 in Greece, Dong Van Plateau of Ha Giang province officially became a member of the Global Geoparks Network. The plateau is the world’s only geopark with residents living with unique farming systems on karst stone.

The fragmented patches of rugged mountains, sharp cut gorges together with deep narrow ravines and steep soaring cliffs with mountain tops like pyramids have caused a variety of difficulties for agricultural production.

The farming systems on rock fields were formed under harsh natural conditions in Dong Van Plateau. Over hundreds of years, people have laid stones on arable land and cultivated the narrow rolling stone forest. In addition, lower soil layers are characterized by lumpy rock that cause plowing and transplanting difficulties. However, local people have created an effective plow with a special blade to plow rock. Corn, rice and beans can grow and cling to rocks for farmers to harvest.

Cultivation on a rocky plateau is entirely dependent on rain water from April to October (wet season). The dry season is from May to November, and initiates crop seasons. To ensure food security, ethnic minority groups use indigenous varieties passed generationally. These cultivars adapt well to the harsh conditions and are highly disease resistant. The main food crops are maize varieties with diverse cultivars such as glutinous, yellow, white and purple corns. Due to limited land, cultivation is mainly carried out in small rocky caves, local people have highly intensive inter-cropping techniques. For example in a corn field, squash and melons are grown. Legumes are especially diverse, with more than 10 different varieties, such as cowpeas, snake and cove beans.

Culture and beliefs related to agricultural production, such as harvest festivals and rituals, are evident before and after the planting season. Festivals throughout the year pray for good seasons and rain as well as thank field or forest gods.

In addition, stone fences for protecting cultivated soil and rocky fields around local houses creates a unique architecture for houses, with cattle sheds made between cliffs.

As this region is located 1,000m above sea level, it is susceptible to the northeast monsoon and external factors. Therefore, its plant population is prominently subtropical, typical of northern Viet Nam. Evergreen forests are typical with some tropical plants, with tolerance to drought and cold. Examples of these plants are pine, castanea, *Michelia mediocris* Dandy, *Parashorea chinensis* Wang Hsie, *Magnolia dandyi*, *Burretiodendron hsienmu*. Plant and animal species are relatively diverse, as food crops include rice, corn, circuit, beans, vegetables and pumpkins, industrial plants include Shan Tuyet tea, soybean, flax and peanuts. Fruit trees include peaches, pears, plums, medicinal plants are eucommia and cardamom, while animals are cows, buffaloes, goats, pigs, poultry and honey bees.

Long-practiced traditional ethnic minority farming methods in Dong Van Plateau feed about 250,000 people from 17 ethnic minority groups in this region. They have enhanced food security, livelihoods and socio-cultural significance. The biodiversity of agricultural crops, in particular agricultural crops and vegetation, still exist in this region. Therefore, it is necessary to preserve and promote this important farming system.

### **Quan Ba district**

Quan Ba has 12 communes and one town on the Dong Van Plateau. Like other mountainous Ha Giang districts, Quan Ba has complex, steep slopes and a strongly fragmented terrain, which causes difficulties for the local community. Based on terrain, Quan Ba can be divided into high mountainous terrain in Cao Ma Po, Nghia Thuan and Tung Vai communes, Bat Dai Son with an altitude of 900-1,800m and fragmented and steep (>25°) terrain with bedrock clusters, low mountainous terrain in Dong Ha, Quang Ba, Quyet Tien and Thanh Van communes with an altitude below 900mm and slopes of more than 25°. However, there are some areas of slightly fragmented terrain. The topography of valleys in Dong Ha, Lung

Tam, Tung Vai, Ba, and Tam Thai Son communes is relatively flat. The casto topographic distribution in Cao Ma Po, Nghia Thuan and Thanh Van was formed by limestone mountains. With fragmented terrain and steep slopes, the exploitation of surface water for agricultural activities faced many difficulties. Water shortages are common, especially in the dry season from November to April, but the region is also prone to flash floods in the rainy season. Agricultural activities rely on rain-fed water sources.

The complex terrain poses many obstacles to agricultural production and livelihoods of local people in Quan Ba. However, it provides for a unique landscape (rugged mountains and karst caves) valuable for tourism, such as Couple mountain (Breast mountain), Quan Ba Paradise gate, Can Ty port, Bac Sum slope, Pho My cave, Ba Tien ecological forest, and the stone domain in Quyet Tien commune.

The dissected topography and diverse soil types have created abundant vegetation, including three endemic plant species from 44 species and 34 animal species in the Red Book of Viet Nam. Indigenous crop varieties include local corn, vegetables, beans, forest trees and medicinal plants especially in mountainous area communes.

The agriculture and forestry sectors play an important economic role in the district and accounted for 38% of the district's GDP in 2010, feeding nearly 95% of the population and employing 88% of the labour force. Such farming systems play a key role in ensuring the district's food security and livelihoods.

Quang Ba has 18 ethnic groups with different cultures and languages. The main ethnic groups are Mong (60.14%), Dao (13.14%), Tay (8.66%), Nung (7.12%) and Kinh (5.79%). Ethnic communities are not evenly distributed across 107 villages and are dependent on agriculture on the rocky plateau. Out of 107 villages, there are several craft villages with special agro-products to attract tourists. For example, cultivating flax and weaving in Hop Tien and Nam Dam villages in Lung Tam commune, herbal yeast corn wine in Thanh Van commune's Hau Lung village and handicraft products from bamboo and rattan in Thai An commune.

### **Yen Minh district**

The 78,365ha district in northeast Ha Giang province shares a border with Yunnan in China, is northeast of Dong Van district, east of Meo Vac district, southeast of Bao Lam district (Cao Bang province) and west of Quan Ba district. Yen Minh's topography is fragmented with many steep slopes and can be divided into:

*High mountain terrain:* Located in Lao and Chai, Ngam La, Ngoc Long and Du Gia communes with slopes of more than 25°

*Low mountain terrain:* In Bach Dich, Mau Due and Na Khe communes and Yen Minh town under 900m in altitude and slopes of less than 25°

*Valleys:* Yen Minh has some closed, flat valleys surrounded by low mountains, distributed in Bach Dich and Mau Due communes and Yen Minh town

*Casto topography:* In Duong Thuong, Lung Ho, Phu Lung, Sung Chang, Sung Thai and Thang Mo communes, mostly limestone mountains. The type of soil is often Feasols with yellow and red colours, thick layers and good texture. However, water shortages are often serious during the dry season.

There are two major rivers, called Mien and Nhiem, which supply agricultural production in the district. In addition, there are many small springs.

Yen Minh is located in a subtropical area with hot and humid climate, influenced by the monsoon. From May to October, the climate is hot and rainy, while it is dry and cold between November and April. The annual average temperature is about 15.7°C. The average highest temperature is approximately 20.9°C in July and the lowest 8.8°C in January.

Yen Minh has 17 communes with more than 80,000 people in 2011. There are 15 ethnic groups with 54.4% Mong, 14.6% Dao and 13.29% Tay, with Kinh, Lo Lo and Pu Peo the remainder. Every group has its own traditional culture. As a consequence, Yen Minh has a rich and diversified culture, as Tay has Coi folksongs, Nung has Phuon folksongs, while Dao and Mong have Giao Duyen folksongs.

### **Dong Van district**

Dong Van is Viet Nam's northern most district. It covers 446.66km<sup>2</sup> and has two towns and 17 communes. The former centre of district was Pho Bang town. Now the centre has moved to the old town of Dong Van. It is a core zone of Dong Van Karst Plateau, so people call it the same name. To the northwest, north and northeast is Yunnan. To the south is Meo Vac and Yen Minh districts.

Dong Van's terrain is rather complex, with limestone mountains largely fragmented, creating many high mountain cliffs and deep gorges, with an average altitude of 1,200m above sea level. Dong Van Karst Plateau has many spectacular natural landscapes and high mountains such 1,911m Lung Tao and 1,475m Lung Tu San.

By the end of 2008, Dong Van district's population was 63,254, with 11,069 households and its population density at 129 people/km<sup>2</sup>. Dong Van is inhabited by 15 ethnic groups, the largest of which is Mong accounting for 85%. Hoa, Kinh, Lo Lo and Tay make up the other groups.

The agricultural sector supplies a significant amount of food for local consumption and the main crops are maize, canna, arrowroot and buckwheat. Its farming system is focussed on upland, sloping land and because of limited cultivating soil, stone gardens and rocky fields maintain soil and water for crops and reduce erosion. Rock holes are particularly popular.

The sowing season runs from March to April, but water shortages can be problematic. In order to adapt, local people create water reservoirs and engage in sound water management.

### **Meo Vac district**

Meo Vac is a rocky mountainous district in Ha Giang province, situated entirely on the Dong Van Plateau. The district has rugged mountains and has fragmented topography with an altitude of 1,150m above sea level, which results in a diverse climate that significantly affects agricultural production.

Based on natural and social conditions, the district can be divided into three sub-regions. Sub-region 1 has three border communes, Son Vi, Thuong Phung and Xin Cai. These areas have rugged and mostly limestone steep terrain, which causes many difficulties for agricultural production. Sub-region 2 has 11 communes, Can Chu Phin, Giang Chu Phin, Khau Vai, Lung Chinh, Lung Pu, Meo Vac town, Pai Lung, Pa Vi, Sung Tra, Sung Mang and Ta Lung. This mainly limestone area has less rugged terrain and better growing conditions than sub-region 1. Sub-region 3 has Niem Son, Niem Tong, Nam Ban and Tat Nga communes. Although its topography is complex, fragmented and steep, it has good conditions for agro-forestry and livestock. Chief obstacles for Meo Vac are the severe lack of water for agricultural and domestic use during the dry season from October to April along with landslides and floods during the rainy season.

The agricultural sector's economic structure accounts for one-third of the district's GDP, but is still an important economic sector to ensure local people's food security and livelihoods. Because nearly 89% of its labour pool is engaged in agricultural activities, more than 78% of natural land is used for agriculture, which feeds 93.5% of its total population (2010).

Like other Dong Van districts, Meo Vac's farming system speciality is cultivating rocky fields. This system possesses a national cultural value, especially as this indigenous agricultural knowledge was formed through long-term cultivation on rock, such as laying stones to make terraced fields, soil preparation on rock, intercropping, prevention of erosion and increasing soil fertility, keeping seeds for future seasons and preserving plant and animal varieties, predicting weather and seasonal calendars. This knowledge was formed to deal with extreme natural conditions.

The district has 17 ethnic groups, Hmong (77.33%), Giay (6.72%), Dao (5.64%), Kinh (3.62%), Tay (3.06%), Nung (2.12%) and others (1.5%). The diversity in ethnic community leads to an abundance of culture in Meo Vac district. Attractions include the Khau Vai love market in Khau Vai commune, Lo Lo people festivals such as those to pray for rain, the picking corn dance (a dance to celebrate a good season), the sword dance festival of the Hmong people and the Giay people's drum festival dance. So far, the district has built five cultural tourism villages of the Dao, Giay, Mong and Lo Lo ethnic groups.

The district's rugged terrain and harsh climate creates a unique landscape and environment, with roads winding along rugged mountains, passing the Ma Pi Leng peak and Nho Que River. Valuable natural landscapes include the Khau Vai rock gardens, Pung Lung rock zoo and a dense cave system with 37 caves.

## ***2. Selected project demonstration sites***

### **Lung Cu commune**

Lung Cu is a border commune, sharing a 16km border with China. It has a complicated topography (steep slopes, fragmentation, rocky surface), extreme weather (cold in winter, low rain, fog), poor infrastructure, limited agricultural land which can mainly be cultivated one season per year. There are nine villages in Lung Cu: Can Tang, Lo Lo Chai, San Cho, San Sa Phin, Seo Lung, Si Man Khan, Ta Gia Khau, Then Van and Then Pa. Seo Lung village is the northern most point of Viet Nam and seven out of nine villages are on the border. Its area is 3,379ha, with 1,484ha of agricultural land (43.9%), 983ha of forest land (29%) and other land (27%). The main agricultural systems are upland and terraced cultivation systems. In addition, Lo Lo and Mong groups grow flax for brocade weaving.

### **Lung Tao commune**

Its area is 2,119ha, with 890ha agricultural land and 600ha forest land. There are 16 villages in Lung Tao commune and the main ethnic group is Mong, accounting for 90% of the population, followed by Lo Lo, Pu Peo and Tay.

The percentage of poor household in Lung Tao is large (above 60%) due to limited agricultural land, fragmentation in crops (cultivating in rock baskets), low education, poor infrastructure and complicated topography. In addition, soil erosion is common because rainfall is concentrated in a short period and the topography is steep with fragmentation. Extreme weather (cold in winter, little rain, frosts) and limited agricultural land means it can only be cultivated one season per year.

### **Lung Pu commune**

Lung Phu commune is far 12.7km from Meo Vac. It has about 3,180ha and 4,950 people. Most local people are Mong who live on agro-forestry. This commune has typical geological heritage, named "rocky animal gardens", that took many years to create, but is now being lost due to human activities. Limestone is common in Lung Pu and the topography is less rugged than other villages in the district, but agricultural activities face difficulties due to the rocky fields. The survey team visited the district at during the sowing of corn and collected much information on local cropping activities.

Planting usually lasts for several days, depending on rain-fed water. The use of buffaloes to plow rocky fields is a unique feature of minority ethnic groups in this region. A small plow can be used for small amounts of land or a hoe for bigger sections. Although fields are

fragmented into small areas and are steep, use of buffalos and farmers are flexible and smooth. Sometimes local people carry baskets of soil to small caves to have more arable land. Local people also use manure and ash, put in baskets and carried to fields to increase soil fertility. Then manure and ash are mixed with seeds, like pumpkin, flax and buckwheat in the cavity to grow corn. Each cavity has six maize plants after mixed with rat poison. Soil preparation is often done by men and women are responsible for carrying manure, ash and planting. Cultivation work, such as weeding and fertilizer dressing is done by women, while harvesting is done by men and women.

#### ATTACHMENT 4. LIST OF AGROBIODIVERSITY AND BIODIVERSITY

##### 1. Crops of genetic diversity in DVKPGG

**Table 1. List of species and number of accessions collected from DVKPGG**

No	Species	Numbers of accessions
1	<i>Allium fistulosum</i> L.	1
2	<i>Allium sativum</i> L.	2
3	<i>Alpinia officinarum</i> Hance	4
4	<i>Amaranthus</i> sp.	9
5	<i>Amorphophallus konjajae</i> K. Koch	1
6	<i>Anethum graveolens</i> L.	1
7	<i>Apium gravesleus</i> L.	1
8	<i>Arachis hypogea</i> L.	8
9	<i>Basella rubra</i> L.	2
10	<i>Benincasa hispida</i> (Thunb.) Cogn	3
11	<i>Brassica campetrus</i> L.	2
12	<i>Brassica juncea</i> (L.) Czern	35
13	<i>Brassica oleracea</i> L.	1
14	<i>Brassica oleracea</i> var. capitata	1
15	<i>Brassica oleracea</i> var. gongilodes	1
16	<i>Camellia sinensis</i> L.	1
17	<i>Canna edulis</i> Ker Gawl.	7
18	<i>Capsicum frutescens</i> L.	14
19	<i>Coix lacrysnajobi</i> L	1
20	<i>Colocasia esculenta</i> Schott var. antiquorum(Schott) Hubb.	13
21	<i>Corchorus aestuans</i> L.	1
22	<i>Coriandrum sativum</i> L.	5
23	<i>Cucumis melo</i> L.	3

No	Species	Numbers of accessions
24	<i>Cucumis sativus</i> L.	6
25	<i>Cucurbita moschata</i> Duchense	29
26	<i>Curcuma longa</i> L.	3
27	<i>Chrysanthemum coronarium</i> L.	1
28	<i>Dioscorea alata</i> L.	1
29	<i>Diospiros kaki</i> L.	3
30	<i>Eleusine coracana</i> (L.) Gaertn	2
31	<i>Fagopyrum esculentum</i> Moench	5
32	<i>Glycine max</i> (L.) Merr	34
33	<i>Impomoea batatas</i> (L.) Lam	6
34	<i>Lablab purpureus</i> (L.) Sweet	9
35	<i>Lactuca sativa</i> L. var. <i>capitala</i> L.	1
36	<i>Langernaria siceraria</i> (Molina) Standl.	5
37	<i>Luffa cylindrica</i> (L.) M Roem	11
38	<i>Lycopersicon esculentum</i> Mill.	3
39	<i>Manihot esculenta</i> Crantz	2
40	<i>Mangifera indica</i> L.	2
41	<i>Monordica charantia</i> L.	2
42	<i>Mucuna cochinchinensis</i> (Lour.) A.Chev.	2
43	<i>Oryza sativa</i> L.	55
44	<i>Pachyrrhizus erosus</i> (L.) Urb.	1
45	<i>Panicum miliaceum</i> L.	1
46	<i>Perilla frutescens</i> (L.) Britton	1
47	<i>Pium sativum</i> L.	6
48	<i>Prunus persica</i> (L.) Batsch	1
49	<i>Prunus salicina</i>	2
50	<i>Phaseolus vulgaris</i> L.	78
51	<i>Raphanus sativus</i> L.var. <i>longipinnatus</i> Bail	3
52	<i>Sechium edule</i> (Jacq.) Sw.	1
53	<i>Sesamum indicum</i> L.	4
54	<i>Setaria italica</i> (L.) P. Beau V.	1
55	<i>Solanum undatum</i> Poir.	2
56	<i>Sorghum bicolor</i> L.	8
57	<i>Vicia faba</i> L.	1
58	<i>Vigna angulasis</i> (Wild.) Ohwi&H.Ohashi	10
59	<i>Vigna radiata</i> (L.) R. Wilezek	1
60	<i>Vigna umbellata</i> (Thumb.) Ohwi & H. Ohashi	16
61	<i>Vigna unguiculata</i> (L.) Walp.	4

No	Species	Numbers of accessions
62	<i>Vigna unguiculata</i> (L.) Walp.ssp..sesquipedalis (L.) Verdc.	30
63	<i>Xanthosoma</i> sp.	4
64	<i>Zathoxylum nitidum</i>	1
65	<i>Zea mays</i> L.	91
66	<i>Zingiber officinale</i> (Willd.) Roscoe	6
67	<i>Zingiber zercebmet</i> Sm	2

(Source: PRC, 2014)

**Table 2. List of plant genetic resources collected from DVKPGG and preserved at national plant genbanks of Viet Nam**

No	Groups	Number of species	Number of accessions	Preserving situation
1	Fruit trees	4	8	Safety
2	Taro	13	55	Safety
3	Tea	1	1	Safety
4	Legumes	14	204	Safety
5	Rice	1	55	Safety
6	Other cereals	7	109	Safety
7	Vegetables	17	145	Safety
<b>Consumption</b>		<b>57</b>	<b>577</b>	

(Source: PRC, 2015)

## 2. Genetic biodiversity in Ha Giang

**Table 3. Abundant family of plants in Ha Giang**

No	Family	Numbers of species	Number of genus	Percentage of total species (%)	Percentage of total genres (%)
1	Orchidaceae	290	85	10.05	7.61
2	Asteraceae	139	66	4.82	5.91
3	Fabaceae	125	49	4.33	4.39
4	Euphorbiaceae	107	42	3.71	3.76
5	Lauraceae	103	15	3.57	1.34
6	Rubiaceae	94	29	3.26	2.60
7	Poaceae	91	56	3.15	5.01
8	Moraceae	66	8	2.29	0.72
9	Cyperaceae	56	13	1.94	1.16
10	Rosaceae	55	19	1.91	1.70
11	Annonaceae	52	19	1.80	1.70
12	Araliaceae	52	16	1.80	1.43
13	Araceae	52	16	1.80	1.43
14	Apocynaceae	47	23	1.63	2.06
15	Rutaceae	44	14	1.52	1.25
16	Urticaceae	43	13	1.49	1.16
17	Fagaceae	41	3	1.42	0.27
18	Primulaceae	40	5	1.39	0.45

(Source: Viet Nam Institute of Ecosystems and Genetic Resources, 2014)

**Table 4. Abundant genus of plants in DVKPGG**

No	Genus	Belong to family	Number of species	Percentages of total species (%)
1	<i>Dendrobium</i>	Moraceae	47	1.63
2	<i>Ficus</i>	Orchidaceae	29	1.01
3	<i>Carex</i>	Cyperaceae	25	0.87
4	<i>Litsea</i>	Lauraceae	25	0.87
5	<i>Bulbophyllum</i>	Orchidaceae	24	0.83
6	<i>Cinnamomum</i>	Lauraceae	22	0.76

(Source: Viet Nam Institute of Ecosystem and Genetic Resources, 2014)

**Table 5. Phytogeography in Ha Giang**

<b>Phytogeography</b>	<b>Sample</b>	<b>Number of species</b>	<b>Percentages of species (%)</b>	<b>Plant contribution (%)</b>
Global	1	26	0.90	0.92
Intertropical	2	61	2.11	2.16
Old tropical	3	45	1.56	1.59
Asian – African tropical	3.1	20	0.69	0.71
Asian – Australian tropical	3.2	92	3.18	3.26
Asian tropical	4	477	16.51	16.88
ASEAN	4.1	222	7.68	7.86
Continental Asian Tropical	4.2	525	18.17	18.58
Indochina - Himalaya	4.3	66	2.28	2.34
Indochina - South of China	4.4	568	19.65	20.10
Indochina	4.5	107	3.70	3.79
Temperature	5	6	0.21	0.21
Northern Temperature	5.1	21	0.73	0.74
East Asia	5.4	111	3.84	3.93
Endemic	6	266	9.20	9.41
Narrow endemic	6.1	32	1.11	1.13
Close endemic	6.2	29	1.00	1.03
Crops	7	152	5.26	
Total		282	97.79	100

(Source: Viet Nam Institute of Ecosystem and Genetic Resources, 2014)

### **3. Diversity of ecosystems**

According to the master plan of biodiversity of Ha Giang from 2014 to 2020, with a vision to 2030, the diversity of ecosystems includes:

#### **a) Evergreen temperature ecosystem on high mountainous areas (altitude of 1600m)**

Total area: 1,787.87ha. Sites include: Po Ly Ngai and Ho Thau communes in Hoang Su Phi district, Trung Thinh, Thu Ta, Quang Nguyen communes in Xin Man district, Thang Mo commune in Yen Minh district, Pho Cao, Pho La and Ma Le communes in Dong Van district and Cao Ma Po commune in Quan Ba district.

***b) Ecosystem of evergreen subtropical and mixed broadleaf-coniferous (altitude of 600-1,600m)***

Total area: 103,748,29ha. Sites include Tan Lap, Huu San, Liep Hiep communes and Viet Quang town in Bac Quang district, Thanh Thuy, Thuong Son, Minh Tan, Thuan Hoa, Ngoc Minh, Bach Ngoc communes in Vi Xuyen district, Phuong Thien commune in Ha Giang City, Minh Son, Giap Trung, Yen Cuong, Phu Yen, Phu Nam, Duong Am, Duong Hong communes in Bac Me district, Ma Le, Dong Van, Ho Quang Phin, Sung Trai, Pho Cao, Pho La communes in Dong Van district and Son Vi, Thuong Son, Pai Lung, Pa Vi, Sung Tra and Sung Mang communes in Meo Vac district.

***c) Rainforest tropical ecosystem (altitude below 600m)***

Total area: 51,893ha. Sites include Bac Quang district, Phuong Do and Phuong Thien in Ha Giang City, Nam Ban, Niem Son and Tat Nga communes in Meo Vac district, Yen Minh Town, Dong Minh, Mau Long, and Ngoc Long communes in Yen Minh district, Thuan Hoa, Thanh Thuy, Linh Ho, Ngoc Linh, Ngoc Minh, Cao Bo, Viet Lam and Vi Xuyen town in Vi Xuyen district.

***d) Karst mountain ecosystem***

Total area: 67,841ha. Sites include Dong Van, Quan Ba and Vi Xuyen districts, Duc Xuan, Liep Hiep and Vo Diem communes in Bac Quang district, Na Chi commune in Xin Man district and Minh Son, Giap Trung communes and Yen Phu town in Bac Me district.

***e) Bamboo forest ecosystem***

Total area: 86,550ha. Sites include Na Chi, Khuon Lung, Quang Nguyen, Nam Dan, Che La and Thu Ta communes in Xin Man district, south of Hoang Xu Phi district, Bac Quang district, Trung Thanh, Bach Ngoc, Ngoc Linh, Ngoc Minh, Phuong Tien, Xin Chai, Thanh Duc, Thuan Hoa, Kim Linh, Phu Linh, and Kim Thach communes in Vi Xuyen district, Ngoc Duong commune in Ha Giang city, Minh Son, Duong Am, Phu Nam, and Yen phong communes in Bac Me district and Lao Va Chai commune in Yen Minh district.

***f) Bush ecosystem***

Total area: 101,168ha. Sparsely allocated in all districts with regeneration forests.

***g) Natural wetland ecosystem***

Total area: 4,126ha. Sites include waterbodies of Nho Que, Nhiem, Mien, Lo, Chay and Con rivers.

**Table 6. Matrix of relationship between ecological factors and type, subtype vegetation in Ha Giang**

Altitude	Temperat.	Geography	Humidity	Intensity of factors	Vegetation
<b><i>Terrestrial Vegetation</i></b>					
Below 700m	Cool	Karst	Humid	Little	Evergreen broadleaf forests
				Mediate	Secondary green broadleaf forests
				M&KTC	Secondary bush forests
			Wet	Mediate	Secondary evergreen broadleaf forests
				Strong	Secondary bush forests
				Cultivating	Planted forests or fields
Below 700m	Warm	Other stone	Humid	Little	Closed evergreen broadleaf forests
				Mediate	Secondary evergreen broadleaf forests
				Mediate	Mixed broadleaf and bamboo forests
				Strong-KTK	Secondary bamboo forests
				Strong-NR	Secondary bush forests
				M&SNR-CT	Secondary grassland forests
				Cultivating	Planted forests, fields or residential areas
	Warm	Other stones	Wet	Little	Closed evergreen broadleaf forests
				Mediate	Secondary evergreen broadleaf forests
				Mediate	Mixed broadleaf and bamboo forests
				Strong-KTK	Secondary bamboo forests
				Strong-SNR	Secondary bush forests
				M&SNR-CT	Secondary grassland forests
				Cultivating	Planted forests, fields or residential areas
700 -1,000m	Cool	Karst	Humid	Mediate	Secondary evergreen broadleaf forests

Altitude	Temperat.	Geography	Humidity	Intensity of factors	Vegetation
		Other stones	Humid	M&KTC	Secondary bush forests
				Cultivating	Planted forests or fields
				Little	Closed evergreen broadleaf forests
				Mediate	Closed secondary green broadleaf forests
				Mediate-KTK	Secondary mixed broadleaf and bamboo forests
				Strong SNR	Secondary bush forests
				M&SNR-CT	Secondary grassland forests
1,000-1,800m	Cold	Other stones	Humid	Little	Closed mixed coniferous and broadleaf forest
				Mediate	Closed secondary green broadleaf forests
				Mediate-KTK	Secondary bamboo forest
				Strong-SNR	Secondary bush forests
				M&SNR-CT	Secondary grassland forests
				Cultivating	Planted forests, fields or residential areas
Above 1,800m	Very cold	Other stones	Humid	Little	Closed evergreen broadleaf forests or mixed coniferous forests
				Mediate	Secondary evergreen broadleaf forests
				Strong SNR	Secondary grassland forests
				M&SNR-CT	Secondary bush forests
				Cultivating	Planted forests, fields or residential areas
<b>Aquatic plants</b>					
-	-	-	-		Communities of aquatic plants

(Source: Viet Nam Institute of Ecosystem and Genetic Resources, 2014)

Note: M&SNR-CT: strong and after cultivating-grassing, SNR: after cultivating, KTK: overexploitation, KTC: selected exploitation and M&KTC: strong and selected exploitation.

## **ATTACHMENT 5. PRA SURVEY ON AGRICULTURAL FARMING SYSTEM AND KEY INFORMANT INTERVIEWS AT GIAHS DEMONSTRATION SITES**

### **A. Lung Cu commune, Dong Van district**

#### *A1. Results of key informant interviews with local leaders*

##### **Local leader participants**

1. Mr Vang Mi Cau: head of commune
2. Mr Vang Di Xoang: vice president of commune
3. Mr Va Di Dan: head of farmers union
4. Ms Hoang Thi Kim: staff of extensive agency.

##### **I. Background of commune**

Lung Cu commune is located 24km south of Dong Van town and has a 16km border with China. It has complicated topography (steep slopes, fragmentation, rocky surfaces), extreme weather (cold in winter, low rain, fog), poor infrastructure and limited agricultural land only cultivated once per year.

There are nine villages in Lung Cu: Lo Lo Chai, Seo Lung, Ta Gia Khau, Can Tang, Then Van, Then Pa, Si Man Khan, San Cho and San Sa Phin. Seo Lung village is the northernmost point of Viet Nam and seven out of nine villages are on the border. Its area is 3,379ha, with 1,484ha of agricultural land (43.9%), 983ha of forest land (29%) and other land (27%). Its population is 4,340 people with 845 households, 46% defined as poor. The main ethnic group is Mong (more than 90%), followed by Lo Lo. The main agricultural system is upland and terraced cultivating. In addition, growing flax for brocade weaving is undertaken by Lo Lo and Mong.

##### **II. Results of key informant interviews**

###### **1. Description of agricultural systems at Lung Cu commune**

###### *1.1 Cropping*

- Total cultivated land during the year covered 945.5ha, with annual crops and perennial trees at 751.1ha and 194.4ha, respectively.
- Total annual production of food (rice, corn) comprised 1,883 tonnes in 2014, a fall of 19.2 tonnes compared to 2013 due to low rainfall and a long drought from late April to mid-June. As a result, there was insufficient water for transplanting in some terraced fields on high hillsides.
- For corn, the total planted area in 2014 covered 343.4ha, with hybrid corn

accounting for 96%. The yield was approximately 4.55 tonne/ha and corn products weighed in at 136.5 tonnes.

- For rice, the total cultivated area in 2014 covered 91.5ha. The yield was approximately 5.74 tonne/ha and rice products weighed in at 45.9 tonnes.
- For soybeans, the total cultivated area in 2014 covered 155.8ha. The yield was approximately 1.10 tonne/ha and products weighed in at 171.9 tonnes.
- For legumes, the total cultivated area in 2014 covered 138.7ha and the yield was approximately 0.68 tonne/ha.
- For vegetables, the total cultivated area in 2014 covered 179.6ha and yield was approximately 0.58 tonne/ha.
- For buckwheat, the total cultivated area in 2014 covered 27.5ha and the yield was approximately 0.25 tonne/ha.
- For fruit trees, about 104ha was planted.
- For other crops, planted areas and yields were 17ha and 0.38 tonne/ha for flax, 75ha and 0.28 tonne/ha for arrowroot and 118 tonne/ha for sweet potato.
- For grasses, the accumulated area covered 67.2ha and the new planted area 16.4ha.

### ***1.2. Livestock***

Total cattle on the commune amounted to 5,245, with 35 buffaloes, 1,935 cows, 1,874 pigs, 1,236 goats and 165 horses. The number of poultry amounted to 10,723.

In 2014, there were 11,950 vaccine doses for animals (3,600 FMD doses, 3,600 THT doses for cattle, 1,350 THT doses for pigs, 1,800 doses of Anthrax, 1,350 Hog Cholera doses and 250 doses of rabies for dogs). Effective quarantines for transporting cattle and poultry through the commune were tight and no disease outbreaks were recorded in 2014.

Improving cow quality by artificial insemination was carried out on 16 animals, with 10 successful.

The development livestock model saw each household grow 600 clumps of grass to feed two cows. Some 620 out of 781 households (79.3%) in the commune participated which brought about significant incomes for local people.

### ***1.3 Forests***

About 1,703ha of forests are being regenerated and protected. Some 620 households (3,200

people) in nine villages participate in the protecting forest programme that has resulted in 66.3ha of forests cared for, of which 1,300ha is for forest restoration and 470ha for protecting plantations and natural forests.

#### ***1.4 Agricultural knowledge***

- Soil was classified into A, B, C:

+ A: Flat surface, high yield (>7,8 tonne/ha)

+ B: Remote areas close to Nho Que River

+ C: Rock basket and ungrounded soil.

- Plant rotation and intercropping:

+ Plant rotation between corn and vegetables, legumes or buckwheat: Corn is grown in March and April and harvested in July and August. Then vegetables, legumes and buckwheat are planted in August or September.

+ Intercropping: Corn + amaranth + pumpkins + legumes and vegetables.

- Chemical fertilizer is used for planting as a base fertilizer, as local people do not use pesticides.

- Comparison between new and native cultivars:

+ New varieties (corn and rice): High yield, short stems but comes with high prices (100,000VND/kg) and storage difficulties. Modern varieties of corn have been introduced since 2001 and most planted areas of corn use CP99 due to its ability to adapt to the harsh climate and limited soil conditions.

+ Native cultivars: (corn and rice): long stems, low yields but high quality, resistant to harsh condition.

## **2. Trends, challenges and opportunities for conservation of the traditionally agricultural system in the commune**

- Trends for tourism development:

+ Tailoring traditional clothes

+ Restoring flax weaving

+ Restoring embroidery brocade villages.

- Challenges and difficulties in restoring traditional craft villages:

- + Needs budget
- + Processing flax into cloth requires much work and time
- + Limited market for traditional products.
- Opportunities in restoring traditional craft villages:
  - + Diverse cultures within ethnic minority communities
  - + Mong use sticky corn for worshipping in many festivals
  - + Lo Lo people dance and play drums during worshipping and ancestor ceremonies.
  - + Colourful traditional clothes
- + The commune has a programme to establish a community learning centre for older generations to teach traditional culture to younger ones.

## A2. RESULTS OF PRA SURVEY AT LOCAL LEVEL

### I. General information

- Location: Lung Cu commune, Dong Van district, Ha Giang
- Survey method: Focus Group Discussion
- Date: 11/11/2015
- Facilitator: Nguyen Duc Chinh
- Reporter: Tran Van Luyen

### II. Participants

Nine participants, including women, men and youth, with much experience in agricultural practices at local level from five villages: Lo Lo Chai, Seo Lung, Can Tang, Then Pa and Say Sa Phin. Participants were divided into three groups (elderly, middle-aged and young). Topics related to the dynamic conservation of the traditional agricultural system were discussed in small and large groups.

### III. Content

Facilitators first introduced the purpose, content and expected duration of the research. Then the researchers introduced themselves to create an intimate, informal atmosphere. Then questions were conducted during discussions in small and large groups agreed to record A<sub>o</sub>.

### 3.1. Food security and livelihoods

- *Agricultural system:*

Question (Q): What are there forms of local agricultural production?

Answer (A): Agricultural system in Lung Cu commune concludes: cultivating on upland fields, rock baskets, arranging stone fields, upland plots between the arranging stone shores, terraced fields, flat rice fields, home gardens, forest protection areas and livestock.

Q: What is any thing else?

A: No, that is all in Lung Cu.

Q: In term of area, can you sort in the order from the largest to lowest, please?

A: The largest system is upland fields, following by terraced fields, rock baskets, upland plots between the arranging stone shores, forest protection areas and home gardens.

Q: Comparing to 5 years and 10 year ago, how do the systems change?

A: According to the elder group, the cultivating forms: terraced fields and upland plots between the arranging stone shores have occurred since a long time but they were expended significantly for resent decades when local government had a policy to encourage to carry out sedentary farming and residence for ethnic people. So far, the two forms rise less significantly and only in barrenness areas.

Q: What is main income of your families?

A: They come from cropping and livestock with equal contribution of both sectors.

Q: What kinds do you often use to raise cows?

A: The main kind is raising cows in stables. Only calves can be fed outside.

Q: What is the main income from cropping?

A: This is corn. After that, it can be legumes, pumpkin or buckwheat depending on each household.

Q: Do you have the hunger period now?

A: No, the hunger period has not recorded in our villages.

### **3.2. Agrobiodiversity**

Q: What crops do you plant in the commune?

A: These are corn, pumpkin, legumes (rice bean, common bean, green bean, soybean, catjang, horse bean), mustard greens, sweet potato, amaranth, buckwheat, flax, cucubit, taro and arrowroot.

Q: In term of planted areas, how can you sort them in decreasing order?

A: The decreasing order is corn, pumpkin, cucubit, mustard greens, common bean, soybean, sweet potato, buckwheat and flax.

Q: Does rice be planted in the commune.

A: Yes. It is

Q: Does upland rice be planted in the commune.

A: No. it isn't. Before about 1983, there was upland rice but now there is only paddy rice.

Q: Why does not upland rice be planted up to now?

A: Because it is low yield

Q: What do kinds of corn be grown in the commune?

A: Both native and hybrid cultivars of corn are grown in the commune

Q: Which is one planted more?

A: That is hybrid corn

Q: How many kilogrammes of seeds of native and hybrid corn did your family use last season?

A: Individual answers are synthesized in the following table.

No	Participants	Hybrid corn (kg)	Native corn (kg)	Percentages of hybrid corn (%)	Percentages of native corn (%)
1	Vang Di Chu	5	1	83	17
2	Sinh Di Trai	3	2	60	40
3	Ly Chu Sung	10	3	77	23
4	Giang Sinh Dinh	12	30	28.5	71.5
5	Vu Thi My	3	1	75	25
6	Giang Mi Ho	5	3	62.5	37.5
7	Lau Mi Phinh	12	4	78	22
8	Sinh Chung Phu	8	0	100	0
9	Thao Mi Phu	3	1	75	25
<b>Average</b>				<b>78.3</b>	<b>21.7</b>

Q: How many types of native corn planted in the commune?

A: Native corn can be divided into two types: sticky and regular corn. Sticky corn can be classified into two kinds: white and yellow seeds while regular corn can be classified into three kinds: white, yellow and red seeds.

Q: How does corn be utilized?

A: Corn is used for wine cooking, animals feeding and food (*men-men* dish). The most consumption of corn is wine cooking, following by animal feeding and food.

Q: Does corn be sold?

A: Most of corn often used for domestic purpose.

Q: How can native cultivars of corn be changed comparing with 5 or 10 years ago?

A: There is no change in native corn.

Q: How many kinds of legume do you planted?

A: Common bean contains 4 types: indeterminate and black seed, determinate and white seeds, determinate and black seeds and determinate and red seeds; Rice bean contains one type: black seed; Soybean can divided into two types: small black seeds and large yellow seeds; Green pea includes two kinds: red flowers and white flowers; in addition, there are catjang and horse bean.

Q: Do you planted other legume else?

A: No, that is all

Q: How many kinds of mustard green do you planted?

A: That is only one kind.

Q: How many kinds of pumpkin do you planted?

A: There are two kinds of pumpkin: Sticky and regular pumpkin.

Q: How many kinds of buckwheat do you planted?

A: There are two kinds of buckwheat: the first one has red flower, young tree as a vegetable and planted in July to August; Another kind is light green flower, bitter stems and grown in April.

Q: How many kinds of taro do you planted?

A: There are two kinds of taro: large and small tubers.

Q: How many kinds of flax do you planted?

A: There is only one kind.

Q: How many kinds of arrowroot do you planted?

A: There are two types: white flower and red flower

Q: What main stocks do you usually feed?

A: Main stock is yellow cow which is native cattle of this reason. In addition, other animal raised are black pigs, goats, chickens and musk ducks.

### **3.3. Traditional practices**

Q: What do crops planted on upland fields?

A: Main crop is corn

Q: What crops do often you intercrop with corn?

A: We often intercrop corn with vegetables, amaranth, mustard green, rice beans, soybean, sweet potato and arrowroot.

Q: do you plant all above crops with corn in the same place?

A: No, we don't. Some of them are planted with corn in this area and some are grown in other areas. Some intercropping formulas:

- Corn + amaranth + pumpkin + mustard greens
- Corn + rice bean + soybean + sweet potato
- Corn + arrowroot
- Corn + Sweet potato + pumpkin + amaranth

Q: How do you sow these seeds?

A: For grout crops (example legume, pumpkin, brassica), seeds will be mixed with manure to put into niches when sow corn while sweet potato is grown by stems and arrowroot is planted by tubers a little bit later sowing corn.

Q: What experience do you apply to maintain soil fertility when cultivate on rock fields.

A: Raising more cattle, pigs and poultry to collect manure for crops; rotation and intercropping with legume; using plant residues to cover soil surface.

### ***3.4 Seasonal calendar***

Q: Which calendars do you follow for agricultural activity?

A: We base on the lunar calendar.

Q: How many corn seasons do you grow annually?

A: Only one season per year.

Q: When do you sow corn?

A: Corn is sown from the end of February to finishing of April when it rains. Sowing seeds often is occurred during the period of from the end of February to finishing of March. Sowing seed in April just is carried out when it do not rain in February and March.

Q: When do you harvest corn?

A: Normally, hybrid corn is harvested more early than native corn. The first one is harvested from the end of July to the finishing of August while the second is from the end of August to the finishing of September.

Q: When do you harvest pumpkin?

A: For pumpkin shoots, they are ready for harvest 30 days after sowing and the harvesting time is until May or June. For young fruits, the harvesting time is in June. Mature fruits are harvested at the same time with corn.

Q: When do you harvest amaranth?

A: To get leaves as vegetable, they are ready for harvest 20-30 days after sowing and the harvesting time is until May. To get seeds for bakes, they are harvested at the same time with corn.

Q: When do you harvest soybean?

A: The time for soybean harvest is from the middle of June to the middle of July. It often carries out 5-10 days before harvesting corn.

Q: What do crops planted on terraced fields?

A: Normally, regular rice is grown on terraced fields but it also planted corn when it is lack of water.

Q: When do you sow and harvest flax for fiber?

A: The time for flax sowing depends on the places grown. For example: growing flax on flat fields is carried out at the beginning of January while growing on upland plots between the arranging stone shores is carried out from February to March. Optimal soil for flax growing is flat, porous and humid. The time is ready for harvest 60 days after sowing.

### **3.5 Experience in seed selection for next season**

Q: How do you select seeds for next season?

A: For corn, the criteria of good caps are big cap, regular seed rows and no diseases. For rice, select a small plot with good appearance. After removing bad clumps and spikes, they are harvested to keep for next season.

### **3.7. Farmers' difficulties and expectation in agricultural production**

Q: What difficulties do you face in agricultural production?

A: Main challenges are limitation of agricultural land with rocky surface; lack of good cultivar adapted well to hard condition; water deficit for domestic and agricultural use; lack of woodfire in winter; low temperature damaging crops and stocks in winter; stock diseases such as haemorrhagic septicemia.

Q: What supports do you want to promote agricultural development and preserve traditionally farming practices?

A: We want to restoring native cultivars of corn to reduce input material (hybrid seed of corn

is high price and we can not select ourselves for next season). Support to buy good stocks, training in husbandry of stocks and prevent diseases, and support to find market for agricultural products with high value such as buckwheat.

#### **IV. List of participants in Lung Cu commune**

<b>No</b>	<b>Name and family</b>	<b>Age</b>	<b>Gender</b>	<b>Ethnic group</b>	<b>Village</b>
1	Vang Di Chu	68	Male	Lo Lo	Lo Lo Chai
2	Sinh Di Trai	55	Male	Lo Lo	Lo Lo Chai
3	Ly Chu Sung	56	Male	Mong	Seo Lung
4	Giang Sinh Dinh	56	Male	Mong	Can Tang
5	Vu Thi My	24	Female	Mong	Can Tang
6	Giang Mi Ho	23	Female	Mong	Can Tang
7	Lau Mi Phinh	42	Male	Mong	Can Tang
8	Sinh Chung Phu	41	Male	Mong	Then Pa
9	Thao Mi Phu	31	Female	Mong	San Sa Phin

#### **B. Lung Tao commune, Dong Van district**

##### ***B.1. Results of key informant interviews with local leaders***

##### **Local leader participants**

Mr Khong Quoc Van, vice president of commune people's committee

##### **I. Background of the commune**

There are 16 villages in Lung Tao commune. The main ethnic group is Mong, accounting for 90% of its total population, following by Lo Lo, Pu Peo and Tay group. The total area is 2,119ha, with 890ha of agricultural land and 600ha of forest land.

There is a high percentage (60%) of poor households in Lung Tao is large, due to limitations in agricultural land, fragmentations in crop fields (mainly cultivating with rock baskets), low education and poor infrastructure as well as a complex topography with steep slopes and fragmentation. In addition, soil erosion is commonplace due to heavy rainfall. Extreme weather (cold in winter, low rain, frosts) and limited agricultural land cause cultivating only a season per year.

## II. Result of key informant interviews

### 2.1. Description of agricultural systems at Lung Tao commune

#### 2.1.1 Cropping

- Total cultivated land during the year made up 890ha.
- Total annual production of food (rice, corn) comprised 1,698 tonnes in 2014, with rice and corn productivity amounting to 161.3 and 15.36 tonnes, respectively.
- For corn, the total planted area in 2014 covered 397ha, with hybrid corn accounting for 257ha. The yield was approximately 3.87 tonne/ha and corn productivity weighed in at 1,536 tonnes. The yield and productivity of hybrid corn was 4.41 tonne/ha and 1,133 tonnes, respectively. The yield of native corn was 2.87 tonne/ha and corn weighed in at 403 tonnes.
- For rice, the total cultivated area in 2014 covered 28ha. The yield was approximately 5.76 tonne/ha and rice weighed in at 161.3 tonnes. Most of the area was cultivated with hybrid rice.
- For soybeans, the total cultivated area in 2014 produced 187 tonnes.
- For other legumes, the total cultivated area in 2014 covered 132ha. The yield was 0.71 tonne/ha.
- For vegetables, the total cultivated area in 2014 covered 181.5ha. The yield was approximately 0.595 tonne/ha. The main vegetables were brassica, cauliflowers, kolrabi and cabbage.
- For fruit trees, 104ha was planted with native peaches, pears and plums, with 33ha producing 45 tonnes of fruits. In 2014, 9.12ha of new peach and plum trees were planted all villages in the commune.
- For grass, the accumulated area covered 90.2ha, with 15ha of new areas.
- For other crops ,sweet potatoes, flax, buckwheat and arrowroot covered 13.5, 21, 20.5, and 56ha, respectively.

#### 2.1.2 Livestock

The commune's livestock sector has developed sustainably with no animal diseases recorded in 2014. Total cattle on the commune amounted to 3,920, with 36 buffaloes, 1,182 cows,

1,420 pigs, 1,186 goats, 14 horses, 9,830 poultry and 226 bee hives.

### ***2.1.3 Traditional agricultural practices***

+ Seasonal calendar: corn (sowing in March-April and harvesting July-September) and rice (May-October).

+ Intercropping: corn + vegetables, legume, flax, sweet, pumpkin, common beans

+ Rotation: corn (sowing in March-April and harvesting July-September) then sowing vegetables, soybeans and buckwheat.

+ Non use of pesticides.

- Comparing new and native cultivars:

+ New rice: Mostly Chinese hybrid rice with 55.6 tonnes/ha of yield and 100,000-120,000VND/kg of seed price.

+ Native sticky rice: long stem and low yield

## **2.2. Trends, challenges and opportunities for conservation of the traditionally agricultural system in the commune**

- *Trends for agro-development:*

+ Agro-tourism model

+ Canola development

+ Traditional agro-products with high value: (Walnuts, native pears, potatoes, mint honey, black chicken, yellow cows, black pigs).

- *Ongoing local government efforts to conserving practices*

+ Regeneration and protection of forests: preventing the reclaim of forestland and cutting trees, with violators punished with forfeiture of 30kg of pork meat and 30 wine bottles.

+ Restoring the festival of floating corn cake.

+ Finding markets for buckwheat products.

- *Challenges and difficulties in conserving traditional farming system activities*

+ Lack of water for domestic and agricultural use.

+ Foggy customs, such as worshipping fresh and dry ghosts

- + Difficulties in accessing agro-products markets
- + Backward storage technology.

## B2. RESULTS FROM PRA SURVEY AT LOCAL LEVEL

### I. General information

- Location: Lung Tao commune, Dong Van district, Ha Giang
- Survey method: Focus Group Discussion
- Date: 11/11/2015
- Facilitator: Nguyen Duc Chinh
- Reporter: Tran Van Luyen

There were seven participants (women, men and youth) with much experience in agricultural practices at local level from Tua Ninh village in Lung Tao commune (list attached). Participants were divided into two groups (middle-aged and young). Topics related to dynamic conservation of the traditionally agricultural system were discussed in small and large groups.

### III. Content

Facilitators first introduced the purpose, content and expected duration of the research. Then the researchers introduced themselves to create an intimate, informal atmosphere. Then questions were conducted during discussions in small and large groups agreed to record A<sub>o</sub>.

#### 3.1. Food security and livelihoods

- *Agricultural system:*

Question (Q): what are there forms of agricultural production in local?

Answer (A): Agricultural system in Lung Tao commune concludes: cultivating on upland fields, rock baskets, arranging stone fields, upland plots between the arranging stone shores, terraced fields, flat rice fields, forest protection areas and livestock.

Q: What is any thing else?

A: No, it isn't. We don't have home garden.

Q: In term of area, can you sort in the order from the largest to lowest, please?

A: The largest system is rock baskets, following by upland fields, upland plots between the

arranging stone shores, terraced fields, rice flat field, forest protection areas and growing flax.

Q: Comparing to 5 years and 10 year ago, how do the systems change?

A: They have not changed at all.

Q: What is main income of your families?

A: They come from cropping and livestock with equal contribution of both sectors.

Q: What kinds of stocks do you raise?

A: These are cows, pigs, goats, chickens, ducks and musk ducks.

Q: can you sort in the order from the largest to lowest, please?

A: The largest income is from cows, following by pigs, goats, chickens, ducks and musk duck.

Q: What is main income of your families from cropping sector?

A: This is corn. After that, it can be pumpkin, soybean and buckwheat

Q: Do you have the hunger period now?

A: There is a hanger period in our village.

Q: How is hanger period?

A: The hanger period means time when we are lack of corn and rice for cooking food.

Q: When does the hunger period be occurred?

A: It often happens in May and June before harvesting corn.

Q: How often do you eat meat per week?

A: It is different from households, but it is rare to eat meat, about two time per month.

Q: What can you do to overcome the hunger period?

A: It is different from households but many people work with a payment to buy corn and rice. They also can borrow rice or corn from relatives or neighbours.

### **3.2. Agrobiodiversity**

Q: What crops do you plant in the commune?

A: These are corn, rice, legumes, pumpkin, amaranth, flax, mustard greens, sweet potato and buckwheat

Q: In term of planted areas, how can you sort them in decreasing order?

A: The decreasing order is corn, pumpkin, amaranth, flax, buckwheat, sweet potato and legumes.

Q: Does rice be planted in the commune.

A: Yes. It is

Q: Does upland rice be planted in the commune?

A: Upland rice was grown long time ago. But we don't plant it.

Q: Why don't you continue to grow it?

A: Because it is very low yield and now we can replace by other cultivars with high yield.

Q: What do kinds of corn be grown in the commune?

A: Both native and hybrid cultivars of corn are grown in the commune

Q: Which is one planted more?

A: Native corn is grown more than hybrid corn in our village.

Q: Why is native corn planted more than hybrid corn?

A: Because majority of agricultural land in our village is rock baskets and upland plots between arranged rocky shores where is only suitable for native corn. Hybrid corn only adapts well to flat lowland.

Q: How many kg of seeds of native and hybrid corn did your family use last season?

A: Individual answer is synthesized into the following table.

No	Participants	Hybrid corn (kg)	Native corn (kg)	Percentages of hybrid corn (%)	Percentages of native corn (%)
1	Ly Sai Ca	4	11	26.7	73.3
2	Ly Chu Gia	3	9	25.0	75.0
3	Ly Mi Chu	3	1	75.0	25.0
4	Vang Mi Gia	2	14	12.5	87.5
5	Lau Thi Mai	4	18	18.2	81.8
6	Vang Thi Va	2	12	14.3	85.7
7	Vu Thi Song	4	10	28.6	71.4
<b>Average</b>				<b>28.6</b>	<b>71.4</b>

Q: How many types of native corn planted in the commune?

A: Native corn can be divided into two types: sticky and regular corn. Sticky corn can be classified into two kinds: white and red seeds and regular corn also can be classified into two kinds: white and yellow seeds.

Q: How does corn be used?

A: Majority of corn is used for wine cooking. Lung Tao's wine is very well known. Corn also use as food and feed animals.

Q: Do you sell corn?

A: No, we don't. Corn is only used for domestic purposes.

Q: How can native cultivars of corn be changed comparing with 5 or 10 years ago?

A: There is no change in native corn.

Q: How many kinds of legume do you planted?

A: There are two kinds: horse bean and soy bean?

Q: Do you plant other legumes?

A: No, that is all.

Q: How many kinds of mustard green do you planted?

A: That is only one kind.

Q: How many kinds of pumpkin do you planted?

A: There are two kinds of pumpkin: Sticky and regular pumpkin.

Q: How many kinds of buckwheat do you planted?

A: There are two kinds of buckwheat: red flowers and light green flowers.

Q: What stocks do you usually feed in your village?

A: There are yellow cows, pigs, goats, chickens, duck and musk ducks.

Q: Are these native or improving stocks?

A: All of them are local stocks.

Q: Which stock are the most popular?

A: The most important stock is yellow cow, following by chicken, pig, goat, mushduck and duck.

Q: do you raise cow in tables or grassing?

A: Most of families raise cows in tables.

Q: Comparing with ten years ago, is there any change in livestock in your village?

A: No, there isn't.

### **3.3. Traditional agro-practices**

Q: What crops do you plant on upland fields?

A: Main crop is corn

Q: What crops do often you intercrop with corn?

A: We often intercrop corn with pumpkin, mustard green, soybean and sweet potato.

Q: How do you intercrop between corn and other crop?

A: We can grow corn with pumpkin, sweet potato and mustard greens at the same time. After harvesting corn, we can sow soybean or buckwheat.

Q: How do you sow above seeds?

A: For grout crops (example pumpkin, brassica etc.), seeds will be mixed with manure to put into niches when sow corn while sweet potato is grown by stems.

### **3.4 Seasonal calendar**

Q: Which calendars do you follow for agricultural activity?

A: We base on the lunar calendar.

Q: How many corn seasons do you grow annually?

A: Only one season per year.

Q: When do you sow corn?

A: Corn is sown from the end of February to the finishing of April when it rains. But it is often occurred in March.

Q: When do you harvest corn?

A: Normally, hybrid corn is harvested more early than native corn. The first one is harvested from the end of June to the finishing of August while the second is from the end of July to the finishing of September.

Q: When do you harvest pumpkin?

A: For pumpkin shoots, they are ready for harvest 30 days after sowing and the harvesting time is until May or June. For young fruits, the harvesting time is in June. Mature fruits are harvested at the same time with corn.

Q: When do you harvest sweet potato?

A: Stem can be harvested during a long period for animal feeding, any time when go to the fields after 40 days planting. We can also harvest tubers in October.

Q: When do you harvest mustard greens?

A: The time is ready for harvest 30 day after planting and it can prolong until April when corn is nearly full development.

Q: When do you harvest soybean?

A: For soybean, we can sow together with corn in March to select seeds for next season. After harvesting corn, we can sow soybean again to collect seed for food and we can harvest in October.

### ***3.5. Farmers' difficulties and expectation in agricultural production***

Q: What difficulties do you face in agricultural production?

A: Main challenges are main rock baskets; lack of water; lack of woodfire in winter; low temperature damaging crops and stocks in winter; stock diseases such as haemorrhagic septicaemia, lack of grass for cattle in winter.

Q: What supports do you want to promote agricultural development and preserve traditionally farming practices?

A: We need more good stocks and crops, small reservoirs, training for husbandry, markets for gro-products.

#### IV. List of participants in Lung Cu commune

No	Name and family	Age	Gender	Ethnic group	Village
1	Ly Sai Ca	45	Male	Mong	Tua Ninh
2	Ly Chu Gia	39	Male	Mong	Tua Ninh
3	Ly Mi Chu	19	Male	Mong	Tua Ninh
4	Vang Mi Gia	22	Male	Mong	Tua Ninh
5	Lau Thi Mai	30	Female	Mong	Tua Ninh
6	Vang Thi Va	34	Female	Mong	Tua Ninh
7	Vu Thi Song	45	Female	Mong	Tua Ninh

#### C. Lung Pu commune, Meo Vac district

##### C1. Results of key informant interviews with local leaders

##### Local leader participants

1. Mr. Hop: vice president of commune
2. Mr. Sung Mi Vu: staff of extensive agency.

##### I. Background of the commune

Lung Phu commune is located 12.7km southeast of the centre of Meo Vac. It covers 3,180ha and has 4,950 people. Most local people are Mong who live on agroforestry. This commune has typical features such as a geological heritage, called “*rocky animal gardens*”, an ancient practice that is being lost. Limestone is common in Lung Pu and the topography is less rugged than other villages in the district, but the agricultural activities face difficulties due to the rocky fields that are typical of this region.

- *Climate*: There are two annual seasons, the wet season from May to October and dry season from November to April.

- Lung Pu has 12 villages with 835 households and 4,950 people, with 436 households (52.22%) classified as poor.

##### II. Results of key informant interviews

##### 2.1 Description of agricultural systems at Lung Pu commune

##### 2.1.1 Cropping

- For corn, the total planted area in 2014 covered 446.4ha, with hybrid corn accounting

for 82.6%. The yield was approximately 3.45 tonne/ha and corn products amounted to 1,540 tonnes. Farmers grow significant amounts of hybrid corn due to Government subsidies. In 2014, the commune also planted a second season of corn covering 41ha at 0.2 tonne/ha.

- For rice, the total cultivated area in 2014 covered 3ha, with the yield at approximately 5.67 tonne/ha and rice products amounting to 16.8 tonnes.
- For root crops, the total area of taro, sweet potato, cassava, arrowroot covered 9ha, with sweet potato spread across 2.5ha and obtained 11.6 tonnes, cassava at 1.5ha and 10.5 tonnes, taro at 3.5ha and 35 tonnes and arrowroot at 1.5ha and 27.8 tonnes.
- For buckwheat, the cultivated area in 2014 covered 6ha and the yield was approximately 0.48 tonne/ha and rice products amounted to 0.96 tonnes.
- For legumes and vegetable crops, the planted areas covered 123ha and 145ha and resulted in 97 and 659 tonnes in 2014, respectively. The commune currently has a project to promote production of some high value vegetables such as mustard greens and green peas.
- For industrial crops, two popular kinds in Lung Pu are soybean and flax covering 201ha and 1.7ha and producing 240 and 0.9 tonnes, respectively.

### ***2.1.2 Forest***

- The total forest regeneration and protection area covers 796ha, with forests accounting for 487ha (Sang Chai A village (67.2ha), Sang Chai B (21.6ha), Quan Xi (48.2ha), Lang Tinh Dao (66.4ha), Vang Dao Tia (30ha), Lung Lu (40ha), Chi Di Phin (84.5ha), Lung Lu (24ha), Ha Tua So (21ha), Xua Do (26ha), Phan Hia (22ha) and Lang Tinh Dao B (27ha)) and plantations 308ha. From 2009 to 2013, the Government provide VND173 million to subsidize farmers who help regenerate and protect forests in Lung Pu commune.
- In 2014, the agricultural extension agency of the commune provided 4,500 seedlings of *docynia indica* to 209 households in 12 villages, with 75% growing well in Lung Pu's conditions. In addition, 1ha of *delavaya toxocarpa* has grown to illustrate that this native forage can adapt to local conditions and prevent soil erosion.

### ***1.1.3. Livestock***

- The commune has carried out a project to promote intensive grass planting and cattle



- + Diverse culture of deeply imbued ethnic minorities
- + Numerous festivals.

## **C2. RESULTS OF PRA SURVEY AT LOCAL LEVEL AT LUNG PU**

### **I. General information**

- Location: Lung Pu commune, Meo Vac district, Ha Giang
- Survey method: Focus Group Discussion
- Time: 12/11/2015
- Facilitator: Tran Van Luyen
- Reporter: Nguyen Duc Chinh

### **II. Participants**

Nine participants, including women, men and youth, with much experience in agricultural practices at local level from three villages: Xa Chai A, Xa Chai B and Chi Diu Phi. Participants were divided into three groups based on villages. Topics related to the dynamic conservation of the traditional agricultural system were discussed in small and large groups.

### **III. Contents**

Facilitators first introduced the purpose, content and expected duration of the research. Then the researchers introduced themselves to create an intimate, informal atmosphere. then questions were conducted during discussions in small and large groups agreed to record A<sub>o</sub>.

#### **3.1. Food security and livelihoods**

##### ***3.1.1 Agricultural system***

Question (Q): what are there forms of agricultural production in local?

Answer (A): Agricultural system in Lung Cu commune concludes: cultivating on upland fields, rock baskets, upland plots between the arranging stone shores, terraced fields, home gardens, forest protection areas and livestock.

Q: What is any thing else?

A: no, that is all in Lung Pu.

In term of area, can you sort in the order from the largest to lowest, please?

A: The largest system is rock baskets, following by upland fields, upland plots between the arranging stone shores, forest protection areas and home gardens.

Q: Comparing to 5 years and 10 year ago, how do the systems change?

A: Most of the systems are the same, except for livestock which have extended significantly recent time.

Q: What is main income of your families?

A: They come from cropping and livestock sector in which livestock contributes about 65-70%.

Q: What kinds of income from two sectors?

A: These are cow, pig, corn, goat, legume and buckwheat

Q: Can you rank these incomes in order from the largest to lowest?

A: The order is cow, corn, pig. It can be followed by goat, buckwheat or legume depending to different households.

Q: Do you face the hunger period?

A: Yes, we do. 70% of households in Xa Chai A village are lack of food. 10% of households have the hunger period of 3 months, 20% of household face the two month hunger period and there are about 40% of households whom are lack of food in one month.

Q: How about for Xa Chai B and Chi Diu Phi?

A: The situation is nearly the same as Xa Chai A.

Q: How is hanger period?

A: The hanger period means time when we are lack of corn and rice for cooking food.

Q: What can you do to overcome the hunger period?

A: It is different between different households. Some families sell their cows, pigs, chickens. Some households find paid works or some borrow food from their relatives.

Q: When does the hunger period be occurred?

A: It often happens before harvesting corn from April to June.

### **3.2. Agrobiodiversity**

Q: What crops do you plant in the commune?

A: These are corn, legumes, pumpkin, amaranth, flax, mustard greens, sweet potato, buckwheat, soybean and delavaya toxocarpa French (*mắc rãc*).

Q: In term of planted areas, can you sort them in the decreasing order?

A: The most popular crop is corn. It is followed by flax, legume, pumpkin, buckwheat, mustard greens and sweet potato.

Q: Does rice be planted in your place?

A: No, it isn't. We do not rice flat land in my village.

Q: Does upland rice be planted in the commune?

A. Upland rice was grown long time ago. But we don't plant it.

Q: Why don't you continue to grow it?

A: Because it is very low yield.

Q: What do kinds of corn be grown in the commune?

A: Both native and hybrid cultivars of corn are grown in the commune

Q: Which is one planted more?

A: Native corn is grown more than hybrid corn in our village.

Q: How many kg of seeds of native and hybrid corn did your family use last season?

A: Individual answers are synthesized into the following table.

No	Participants	Hybrid corn (kg)	Native corn (kg)	Percentages of hybrid corn (%)
1	3.0	10.0	23.1	76.9
2	2.0	10.0	16.7	83.3
3	5.0	1.2	80.6	19.4
4	1.0	15.0	6.3	93.8
5	5.0	20.0	20.0	80.0
6	4.0	10.0	28.6	71.4
7	3.0	11.0	21.4	78.6
8	4.0	15.0	21.1	78.9
<b>Average</b>	<b>3.4</b>	<b>11.5</b>	<b>27.2</b>	<b>72.8</b>

Q: How many types of native corn planted in the commune?

A: Native corn can be divided into two types: sticky and regular corn. Regular corn also can be classified into three kinds: white, yellow and red seeds (it is not as good as the white and yellow). Sticky corn can be classified into two kinds: white and yellow seeds.

Q: How does corn be used?

A: Majority of corn is used for wine cooking. Corn also use as food and feed animals.

Q: Do you sell corn?

A: No, we don't. it not enough corn for selling.

Q: How can native cultivars of corn be changed comparing with 5 or 10 years ago?

A: There is no change in native corn.

Q: How many kinds of legume do you planted?

A: Rice bean (three kinds: black, red and light purple seeds), green peas (three kinds: white, red and dark green seeds), horse bean and soy bean (yellow large and slight green seeds).

Q: Do you plant other legumes?

A: No, that is all.

Q: How many kinds of mustard green do you planted?

A: There are two kinds: three and six months of duration.

Q: How many kinds of pumpkin do you planted?

A: There are two kinds of pumpkin: Sticky and regular pumpkin.

Q: How many kinds of buckwheat do you planted?

A: There are two kinds of buckwheat: red and light green flowers.

Q: What stocks do you usually feed in your village?

A: There are yellow cows, pigs, goats, chickens and musk ducks.

Q: Are these native or improving stocks?

A: All of them are local stocks.

### **3.3. Traditional agro-practices**

Q: What crops do you plant on upland fields?

A: Main crop is corn

Q: What crops do often you intercrop with corn?

A: We often intercrop corn with pumpkin, amaranth, flax, sweet potato, mustard green, soybean.

Q: do you sow these crops with corn at the same time?

A: Pumpkin, amaranth, flax for seeds and sweet potato are sown together with corn. Mustard green is sown before one week harvesting corn while soybean and buckwheat are sown after harvesting corn.

Q: How do you intercrop pumpkin, amaranth, flax for seeds and sweet potato with corn please?

A: For pumpkin, amaranth and flax for seeds, they are mixed together and sown in one place while sweet potato are planted with corn in other place where is good soil.

Q: How can you maintain soil fertility for long time?

A: Raising more cattles pigs and poultry to collect manure for crops; rotation and intercropping with legume; using plant residues to cover soil surface.

### **3.4 Seasonal calendar**

Q: Which calendars do you follow for agricultural activity?

A: We base on the lunar calendar.

Q: How many corn seasons do you grow annually?

A: Only one season per year.

Q: When do you sow corn?

A: After Tet holiday, corn is sown when it rains a lot.

Q: What time do you sow corn?

A: It often is from the end of lunar February to the finishing of April.

Q: When do you harvest corn?

A: For hybrid corn, the harvesting time is from lunar July while it is from August for native corn.

Q: When do you harvest pumpkin?

A: For pumpkin shoots, they are ready for harvest 30 days after sowing and the harvesting time is until May or June. For young fruits, the harvesting time is in June. Mature fruits are harvested at the same time with corn.

### **3.7. Farmers' difficulties and expectations in agricultural production**

Q: What difficulties do you often face in agricultural production?

A: Main challenges are limitation of agricultural land with rocky surface; lack of good cultivar adapted well to hard condition; water deficit for domestic and agricultural use; lack of woodfire in winter; low temperature damaging crops and stocks in winter; stock diseases such as haemorrhagic septicemia.

Q: What supports do you want to promote agricultural development and preserve traditionally farming practices?

A: We need good varieties and fertilizer, supports to build stables for stocks, water reservoir, bags for restoring dry grass for the Winter period.

## **IV. List of participants in Lung Pu commune**

### **The list of participants in PRA survey in Lung Pu, Meo Vac, Ha Giang**

<b>No</b>	<b>Name and family</b>	<b>Age</b>	<b>Gender</b>	<b>Ethnic group</b>	<b>Village</b>
1	Vang No Sinh	36	Male	Mong	Xa Chai B
2	Vang Mi Sinh	24	Male	Mong	Xa Chai B
3	Giang Mi Gia	25	Male	Mong	Xa Chai A
4	Ho Mi Po	33	Male	Mong	Chi Diu Phi
5	Lau Mi Lau	34	Male	Mong	Xa Chai A
6	Giang No Sinh	32	Male	Mong	Xa Chai A
7	Vang Mi Gia	32	Female	Mong	Xa Chai B
8	Vang Mi Xua	23	Female	Mong	Xa Chai B
9	Ho Mi Sinh	42	Female	Mong	Chi Diu Phi

## **ANNEX 6. CULTURAL, SOCIAL AND HISTORICAL VALUES OF HERITAGES ON DONG VAN KARST PLATEAU**

### *1. Identification of cultural diversity of Ha Giang ethnic groups*

Ha Giang has rich ethnic identity with 17 ethnic groups that have created a rich and unique culture. Each ethnic minority group gives Ha Giang a distinctive culture. Almost all minority groups represent cultures of the north, northwest and northern mountainous border regions such as Co Lao, Dao, Giay, La Chi, Lo Lo, Mong, Nung, Pa Then and Tay. These groups have a long history of living in Ha Giang through farming and animal husbandry together with hunting and gathering in the hilly, mountainous and valley topography. In particular, a cropping culture on upland fields is undertaken to take advantage of the natural environment. Like most ethnic groups in northern mountainous regions, ethnic groups in Ha Giang are good at cultivating on upland and terraced fields. They grow food crops and vegetables on valleys, slopes and rocky pockets. They also domesticate and raise cattle and poultry which adapt to climatic and natural conditions. Besides, they engage in traditional handicrafts with sophisticated technical levels that result in the cultivation of cotton, flax growing, spinning, weaving, rattan basketry, woodwork, pottery, forging and casting.

The family is especially important for ethnic groups in Ha Giang. The family is the birthplace of culture passed generationally, especially knowledge, experience, occupations and perceptions of natural and cultural activities as well as traditional medicine. All ethnic groups in Ha Giang give high respect to blood ties, not only due to family customs, but also the origins of history. This is perhaps a natural reaction of local people in danger of assimilation, colonialism and loss of origin. For example, Lo Lo people give the father's name to children to be the first name.

Ha Giang people's culture is evident through communities, with living spaces and blood or neighbour relations operating under customary laws and practices with a sense of community on basic rules of conduct and social relations, clearly manifested in ritual activities and beliefs. This rich culture is also clearly reflected in festival activities, performing arts, folk and emotional exchanges.

#### **1.1. Mong ethnic group**

Mong is the largest ethnic group of 17 ethnic communities in Dong Van Karst Plateau Geopark. The Mong people in Ha Giang province are similar to those from the northern mountainous Viet Nam-China border area having originated from China, then migrated to Viet Nam more than 300 years ago. They are mainly concentrated in mountainous provinces, including Ha Giang, Lao Cai, Tuyen Quang and Yen Bai. Mong in Ha Giang account for

32% of the province's population with two main sub-groups, White and Flower Mong.

Mong people are famous for traditional farming milpa, planting rice, maize and other crops. Their handicraft products are highly regarded for their skillful production, especially evident in weaving, knitting, forging and casting and wooden furnitures.

Mong houses are made from earth with three compartments, the middle one is reserved as the altar for ancestor cult. The main and extra doors are opened inward.

Mong people have an abundant wealth of traditional culture evident in customs, habits, ceremonies and rites, religion and beliefs. Mong families have different methods of ancestor workshop, as principal worships can be "door ghost worship", "great mother ghost worship" along with different levels and content of worship, arrangements, eating and drinking customs. Their literature and art reveals a community psychology and awareness as well as other issues about nature, society and history. Prominent mediums are love songs using pan-pipes, flutes, leaf-horns and lip-horns. All are invaluable Mong community assets which have been conserved and inherited generationally.

### **Costumes of Mong people**

Traditional Mong clothing is unique and variable, particularly of women. Typically a woman's clothes would consist of a skirt, blouse, shirt parcelled at the breast coupled with a brassiere, belt, leggings and a turban around the head. The skirt is usually in the form of a truncated cone with a series of creases which can spread widely. Sometimes the skirt is in the form of a tube dress with creases at the two haunches. Decorative patterns on the dress include butterflies, snakes, flowers, harrow teeth, eyes of birds and pig's feet harmonized with colour. Stylized patterns of squares, circles, triangles, parallel lines and zigzags vary in costumes. Decorative patterns on fabric play an important position in shaping folk art and are the most obvious differences between Mong dress of other peoples as well as a cultural characteristic of ethnic Mong from black Mong, flower Mong and white Mong.

Mong costumes have their own character in colours and patterns compared to traditional costumes of other ethnic groups. The cajuput colour on Mong linen is more sparkling than on cotton cloth. Mong clothes are often colourfully decorated, revealing the vitality of the mountainous area, and traditional costumes are decorated with silver jewellery like ear rings, rings, necklaces and key chains.

The wide creases on Mong women's skirts make them a truncated cone shape. Skirts of white Mong women are made from linen, while women of other Mong groups wear cajuput-coloured skirts with an embroidered fringe. Besides clothes, Mong women also wear artificial hair for beautification. Mong girls keep their hair long until marriage, when they gather their hair into a bun with use of a hairpin made from horse hoofs.

Unlike women, Mong men wear similar clothes, trousers, short-sleeved shirts, rope-belts and headscarves. Male trousers have one long and short leg. Black Mong men dress in short shirts, with the front not enough to cover the chest and long sleeves decorated with colourful fabrics.

White Mong men wear tight-sleeved, round-necked shirts. Flower Mong men dress in collar-less shirts which have side buttons (along the arm), and wear scarves on their head and neck in winter. They also wear necklaces, bracelets and rings during festivals and market days.



## 1.2. Dao ethnic minority

The Dao ethnic group in Dong Van Karst Plateau can be divided into sub-groups such as the Red Dao (Dao Do), Coin Dao (Dao Tien), White Trousers Dao (Dao Quan Trang), Long Robe Dao (Dao Ao Dai), Lo River Dao (Dao Lo Giang) who live on slopes and undertake terrace farming. Dao people have unique handicraft making such as forging, casting, jewelry, embroidery and wax print dyed clothes. They live in stilt, earth or half stilt-earth houses, close to water sources. Their dresses usually show traditional features and designs using colour thread, with turbans, shirts and skirts. Their traditional religious culture is complex, demonstrating communal spirit, conscience and conception. Worshipping and wizardry are not simply superstition, but something special indicating their depth of culture. Dao folk literature is rich in legends, myths, narratic stories, pop songs, quizzes, proverbs implying their communal perception of the universe and human life.



Pic. Costume of Dao group

## Costumes of Dao people

In the past, men had long hair with chignon or top tuft, with the rest shaved smoothly. Different groups have different types of head-scarves and ways of wearing them.

Dao women's clothes are diverse as they usually wear a long blouse with a dress or trousers, with their clothes colourfully embroidered. When embroidering, they create designs based on memories. They have several designs such as the letter "van", the pine tree, animals, birds, humans and leaves. Their method of creating batik garments is unique, they put batik stylus or a pen into hot bee's wax and then draw the design onto the cloth. The portion of the cloth receiving the waxed pattern resists the indigo blue dyeing which follows, creating a cloth of beautiful blue and white patterns.

Each Dao group is easily identified by its costumes. Generally, a woman's costume includes shirt, skirt, headscarf, a pair of leggings and jewelry. A man wears a short shirt with a line of buttons. The Red Dao wear red costumes from top to toe. They have red shirts, leggings, pants, headscarves, and belts. The Dao Tien are the only Dao group who wear skirts embroidered with the images of coins. The Dao Quan Chat are also called Son Dau, which means painted head, because women shave their hair, paint their heads, and cover their heads with traditional headscarves. White Pants Dao always wear white pants.

### 1.3. Tay group

The Tay is the second large ethnic minority in Ha Giang, accounting for 25% of its total population. They mainly live by planting wet rice in fields near rivers, mountains and gentle slopes. Tay villages are usually at the foots of mountains and include about 15-20 houses. They live in stilt houses with thatched roofed houses using palm leaves or grass. Family handicrafts are developed and include knitting, wooden furniture and pottery. Besides, Tay fabric weaving is well



known, especially blankets and brocade turbans with rich patterns. Tay culture is highly diversified with different kinds of ceremonies involving production, human life, weddings, funerals and new house celebrations. The folkloric literature of the Tay community is a rich treasure of legends, myths, ancient stories, verse stories and folkloric songs. Of which, Tay's folkloric songs are well known for a song "glider", a form of Vietnamese culture.



Pic. Costume of Tay group

### **Costume of Tay people**

Tay traditional dress is made from homegrown cotton that is indigo dyed, with few embroidery or other decorations. Both men and women wear clothes made of hand-woven cotton, dyed with indigo. Women wear skirts or trousers, with short shirts inside and long one worn on the outside. Women wear high collared, waist- or knee-length shirts buttoned on the right side. Their pants have roomy legs and a wide belt. Tay women enjoy wearing jewelry, particularly silver necklaces and arm and wrist bracelets. Men's clothing is similar to that of women. Tay include black Tay, white Tay, and Thai-Tay branches. They identify each other mainly by the colour of our costume. The white Tay wear indigo headscarf, shirt, pants and belt. The black Tay wear a black shirt and long dress and all wear silver necklaces. The white Tay make up 80% of the population in Xuan Giang and the black Tay live in Xin Man, Ha Giang province.

#### 1.4. Nung group

Clothing is mainly an indigo colour and Nung women wear five-panel robes with buttons under the right armpit. Men wear shirts with an upright collar open at the breast and belly, but with a row of cloth buttons and four pockets without cover.



*Costumes of Nung people*

### **1.5. Giay ethnic group**

Giay people mainly live on planting wet rice and farming milpa. Every year, they organized the “Roong Poo” ceremony to begin their farming season. The Ray built pigsties and hen-coops far from houses. Their noteworthy handicrafts are weaving and bamboo knitting. The Giay live in stilt houses with the middle compartment reserved for ancestor worship. The altar has three joss-stick bowls for the Land God, Kitchen God and ancestors. When youth attains the age to marry, their horoscope must be taken and only suitable couples can marry. The Giay folkloric culture is rich with poems, proverbs, phrases and parallel sentences. Folkloric songs are famous with three popular forms, songs at wine tables, love proposal songs and goodbye songs.

#### **Costumes of Giay people**

The dress of the Giay people is simple, almost without embroidery and design. Men’s clothing consists of shirts opened at the right armpit with wide sleeves and wide trousers shortened down to the knees. Women’s dress consists of a buttock covering robe, opened at the right arm pit, broad sleeves with a piece of differently coloured cloth.



*Costumes of Giay people*

### **1.6. La Chi ethnic group**

The La Chi are the longest inhabitants of Ha Giang province. They are experts at cultivating land, working on step terrace, and wet rice cultivation. They harvest sticky and regular rice by two kinds of sickles. While still in the field, they pound the rice stalks on wooden pipes to remove the grains which are gathered up and taken home for storage. They have three different kinds of terraced fields, and work them with tools such as the pointed stick, hoe, and plough. Other fields are reserved for planting indigo and cotton.

**Diet:** The La Chi have a unique way to steam rice. First, rice is cooked to boiling in a big wok, and then it is steamed in an earthen pot. When the rice is done, it is not dry and sticky, rather than wet. The La Chi have many ways of storing foods, but drying and salting meat are the most popular ways. Smoked water buffalo's skin is a particular delicacy for the La Chi. They blacken their teeth as a sign of beauty. Young people like to have gold teeth as a kind of decorative accessory, or as a sign of being mature.

**Housing:** The La Chi form villages on hilly areas of Su Phi and Xin Man districts (Ha Giang province). The traditional La Chi house is a unique architectural mix of a stilt

house, ground-level house and a storehouse all built in a relatively small space. This combination of architectural styles is a unique cultural trait of the La Chi. Each house has two parts, a stilt section is the living quarters and the ground-level section is the kitchen. The roof unites both sections.

When moving into a new house, the owner must invite a ritual specialist to frighten away evil spirits. He does this by using three stems of reeds to sweep the four corners of the house, starting from the corner of the parents' area. If the owner already has an altar at the old house, it will be replaced and located where the head of the family would stay in the new house. In the first 13 days of staying in a new house, a La Chi custom is to always have a fire burning in the hearth. This is said to bring good luck.

Transportation: The La Chi use a combination of transportation favoured by the mountainous and valley people. Women use baskets, with a bamboo or cloth tump line wrapped around the forehead, like a girdle, made from bamboo or cloth. Men use tump lines, but they have two strings to carry share the weight across their shoulders similar to the Hmong people. The La Chi also use a shoulder pole to carry two baskets. They also strap babies to their backs during trips or while working in the field. Water pipes are a common way to transport water to a house or residential area. From the water site, water is stored in bamboo cylinders 1.5m long, then carried back to the kitchen for use. Using horses to transfer goods is also popular.

Social organization: It is popular for a family of three generations or for several couples to share a house together. There is a head person in each kin line to take care of all ritual activities. This individual isn't viewed as a leader, only someone who knows how to conduct rituals. Various methods are used to choose this person, including reading the "mystical signs" of a chicken leg.

The La Chi name their children according to their father's name, by following the formula of father's surname, child's name, first name of the person who bears that name. Women with children use the mother, name of oldest child and name of her husband.

The custom of using adopted parents for infants is popular. On the morning of the third day an infant is born, parents put a red string on a bowl filled with water and the first person who comes into their house will be the child's adopted parents and will name the child. If the infant cries too much, it will be considered that the name isn't suitable. In that case, a fortune teller will be called in to find another suitable family to adopt the child again.

Beliefs: The La Chi worship ancestors on holidays and festival occasions. Men worship up to three generations, women two generations. According to customs, children must remember the anniversary day of their parents' death for their whole lives. On such days, they cannot plant anything new, nor borrow nor lend money.

There is an altar for each man in the family and are arranged in the order of father, youngest son, next youngest and lastly the oldest son. Each altar is only considered completed after three worshipping rituals.

Education: General knowledge and popular experience are orally passed down generationally. There is a rich treasure of legends and fairy tales that explain the wonders of natural and cultural phenomena to young people.

### **Costumes of La Chi people**

Men wear long robes, each is made from five pieces of cloth. There is a row of buttons on the right underarm. They have long hair (often beyond shoulder length), wear turbans and carry indigo bags around for tobacco, lighters and other items. Women generally wear pants, only a few wear skirts. Their traditional clothing is comprised of a long dress with four panels, splits in front, and an embroidered bodice with a cloth belt. On festival occasions, La Chi women wear three long dresses, one on top of the other. Women like to wear long scarves 3m long. The favourite color is black indigo. Women wear earrings, and bracelets, men wear only bracelets. The traditional healer uses special clothes when he practices ritual, a long and loose-fitting outfit, split at the front and back, with a silk belt. He also wears a big hat, secured with a string. In some rituals, he carries a big piece of dry water buffalo skin or a straw hat.



### 1.7. Lo Lo group

The Lo Lo ethnic group can be divided into Flower and Black Lo Lo. Living in Lung Cu since ancient times, the Lo Lo have worked hard to develop this northernmost part of the country. Lo Lo folkloric culture is rich and unique, with dances, songs and legends. Decorations on turbans, shirts, skirts and trousers are particularly colourful. The Lo Lo calendar is divided into 11 months, each corresponding to an animal's name. Ancient bronze drums are considered holy by Lo Lo people, buried for protection and sometimes dug out for use. The head of each family is entitled to keep the drums which are used only during funerals or festivals to maintain rhythms for dances. The Lo Lo people are among the few ethnic groups in Viet Nam who still use bronze drums, a traditional musical

instrument closely associated with a legend about a flood. According to the legend, a catastrophic flood took place to raise water up to the sky. God saved a girl and her younger brother by putting the girl in a big bronze drum and the boy in a small bronze drum. When the flood retreated, the sister and brother stayed in the mountains, becoming a couple, the re-creator of mankind. The Lo Lo people's perception on Yin and Yang is still preserved by playing the male and female drums at the same time. The drums hang on a stand at the feet of the dead, facing to each other. The drummer stands between, alternately playing each drum with only one end of the same drumstick. Only single men or married men whose wives are not pregnant can play the drums. The bronze drums are not only a precious asset, but also a holy instrument. Only with the sound of the drums can the soul of the dead find the way to return to the birthplace of his/her ancestors.

### **Costumes of Lo Lo people**

Flower and Black Lo Lo use pieces of coloured fabric to decorate costumes. Black Lo Lo embroiders lively images between the pieces. A set of female clothes consists of a shirt, pants or a skirt, and a headscarf. The round-neck shirt buttons in the front and has long sleeves. They sew on triangular patches to make square patterns on the sleeves, front and back of the shirt and pants. The Lo Lo's clothes are different from other groups, with more sewing and embroidery. They buy coloured fabric and sew harmonious patches on clothes, with their indigo headscarf similar to the Pieu headscarf of the Thai. They wear traditional costumes at festivals, wedding ceremonies, and funerals. Lo Lo men's clothes are simpler than those of the women. They wear a shirt and loose-fitting indigo pants. At festivals, they wear a headscarf decorated with colourful beads, with belts having tassels at both ends, tied in the front.



*Costumes of Lo Lo people*

### **1.8. Bo Y group**

The first Bo Y people traveled south from China to Viet Nam 150 years ago. The Bo Y people were originally experienced in wet rice cultivation. However, since settling in the northern mountainous regions of Viet Nam, they have had to rely on slash-and-burn agriculture-primarily growing corn, their main crop. In addition, each family usually has a vegetable garden. Apart from raising livestock and poultry, local people are involved in crafts such as cloth weaving, black-smithing, pottery-making, stone carving, silver engraving and woodwork.

Bo Y live in Quan Ba, Ha Giang province, in houses built on the ground with a thatched, wooden or tiled roof and clay walls. Houses usually have three sections, with an extra bay for unmarried boys or for use as a rice granary. Society's social classes are clearly defined. Upper classes consist of the village chief (*Pin Thau*) and its assistant (*Xeo Phai*).

Three incense bowls are placed on the altar, dedicated to heaven, to the spirit of the heart and ancestors. Under the altar, the incense bowls are dedicated to worship the land god. If the wife's parents died without a son, the son-in-law is responsible for setting up a small altar in the doorway.

There are many Tet occasions celebrated by the Bo Y, such as Nguyen Dan (Lunar New Year), Ram Thang Gieng (mid-lunar-January festival), 30th of Lunar January festival, Han Thuc, Doan Ngo, 6th of Lunar June, mid-Lunar-July and New Rice festival, in particular, is held on the 8th or 9th day of Lunar September, featuring the square sticky rice cake, *chay* cake and coloured steamed rice.

#### **Costume of Bo Y people**

Formerly, Bo Y women wore full skirts like those worn by Hmong, or ornamented with batik bee's wax designs and dyed indigo. The blouse is short, often having five panels with a bodice covering the chest and abdomen. Silver ornaments are popular, such as necklaces, wrist chains and ear-rings. Women wear their hair in a chignon at the top of the head. Headgear is traditionally an indigo turban or ornamented with colourful embroidery. Nowadays, some Bo Y people have adopted the neighbouring Nung's way of dressing. Some also wear shirts like the Han, but with removable sleeves.



*Costume of Bo Y people*



## ***2. Some archaeological sites and historical monuments, culturally representative of Dong Van, Meo Vac district***

### ***2.1. Lung Cu flagpole at the top of Dragon Mountain, Lung Cu Commune, Dong Van district, Ha Giang province***

The 1,468m high Lung Cu flagpole is located at longitude 105° 58', 21'' west and latitude of 23° 21'48, 76'' north. For a long time, it has been a destination for tourists who must brave challenging roads from Ha Giang-Lung Cu. The site is 24km from the centre of Dong Van to Lung Cu. On one side of the narrow road is a high mountain and in winter fog covers the roads, with terraced fields having been harvested.

The road to Lung Cu is beautiful like a watercolor painting. Houses bashfully lie next to the row of trees. At dusk, Lung Cu village is peaceful with smoke from roofs and children drive herds of buffalos to houses. The cold weather covers children's faces and hair. They are bareheaded, barefooted with reddening cheek because of cold weather and use their transparent eyes to see strange guests and willing to break into a broad grin and wave their hands when tourists take photographs. On the fields, workers improve the soil to prepare for the next crop. The road to Lung Cu flagpole has been rebuilt with a stair structure to help travelers.

There are 283 rock steps from the foot of the Rong (Dragon) Mountain to the flag tower. The flag tower is 33.15m in height, 3.8m in diameter; the tower body is decorated relief of Dong Son bronze drum surface, the tower sole is stuck relieves describing the daily life of ethnic minority people in the karst plateau. Plug in the 12.9m flagstaff is a national flag with an area of 54m<sup>2</sup>, representing for 54 ethnic groups of Viet Nam. At the foot tower, there is a commemorative house, where displays production tools, costumes and cultural products of the ethnic groups in Ha Giang.



*Lung Cu flagpole*

From Lung Cu Flag Tower, tourists can view a wide border area of Viet Nam, there are Nho Que River winding through the high mountain ranges, the terraced fields stretching along the mountainsides, the villages of Mong, Lo Lo, Tay and Pu Peo.

## 2.2. Vuong Palace

The Vuong Palace is where the king of the Mong ethnic minority group lived in Dong Van Plateau and is a symbol of the past glory of the Mong people, called the Palace of Vua Meo. It has since become a well-known tourist destination in Viet Nam.

The palace is located on a valley carefully selected according to *feng shui*. This is a national monument, recognized by the MoCST in 1993. Vuong Palace is home to Vuong Duc Chinh and his son Vuong Chi Sinh. Vuong Duc Chinh was a mandarin under the Nguyen Dynasty. He worked for Hoang Tu Binh, a land lord in the area. Vuong Chinh Duc succeeded Tu Hoang Binh.

Vuong Chinh Duc became rich from dealing goods, especially opium. Sa Phin is the middle point of opium from the Golden Triangle region of Myanmar Yunnan China to Indochina. Duc set up his own army unit of loyal Hmong people and equipped them with weapons. When building a mansion for his clan, Duc invited a geomancy reader from China to survey the region and throughout the Sa Phin valley. The area was chosen because the terrain emerged as a turtle shell, which represents long life and wealth.

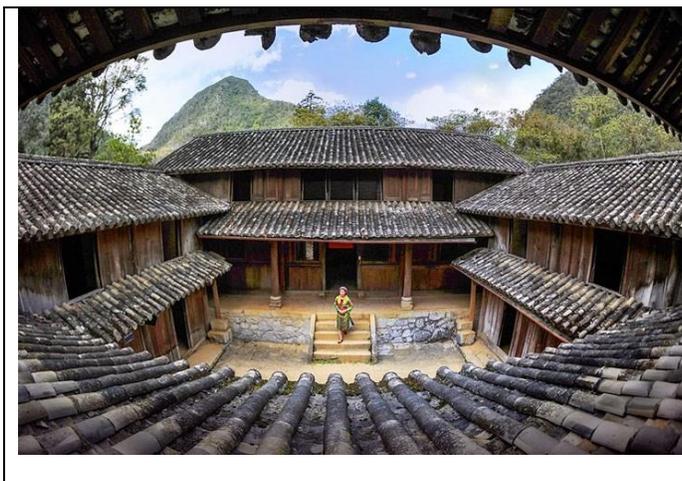
Over a long time of wars, much architecture was destroyed, but the King survived.

After selecting the land, Vuong Chinh Duc spent eight years and about 150,000 coins of silver constructing it with workers largely from China and skillful Hmong craftsmen. The wooden parts were sophisticatedly engraved which represented his wealth and prosperity. Through the lines of ancient Sa Moc trees which stand pensively in front of the main gate, the palace were built with four horizontal and six vertical rows, two stories and 64 rooms. Over a long period of time, the building has partly been spoiled but still remains in its original figure.

The building is surrounded by a moat and an outer wall with a thickness of up to 1m and height of up to 3m with cherry trees and bamboo between the two protective walls. Both the surrounding moats are facilitated with many loopholes. The palace has 10 houses with the main house opposite the gate. All of these houses are made of precious wood with yin-yang tiled roofs, and the entrance to the palace is made of red laquer Khai Dinh, one of Viet Nam's Nguyen Dynasty rulers at the beginning of the 18th century. Inside, a picture of Vua Meo in feudal mandarin attire is on display.

Built from stone, pine and terracotta tiles, Vuong Place resembles structures found in China during the Qing Dynasty three or four centuries ago, due to its curving tiled roofs. Both the outer and cross-sectional walls or the building are made of brick, but within that basic framework is the principal wooden construction material. The palace is also decorated with poppies reflecting the Vuong family 's interest in the opium trade and Vua Chinh Duc was believed to have been an opium addict. The structure has areas for the storage of food, opium and weapons, as well as a European-style fireplace and a stone bathtub where the family bathed in goat milk. The Vuong residence comprises four, two-storey sections linked by three courtyards.

The building was constructed principally out of jade stone, fir or Fokienia wood. Vuong palace has 64 rooms, all decorated with carvings of dragons, phonixes and bats - symbols of royalty and prosperity.



*Vuong Palace*

At the back of the building are two horizontal rows on two sides, linked by doors. To protect his mansion, Vuong Chinh Duc built stone walls with holes and a post for his men to guard day and night. There was also a food store, underground room to keep opium, weapons and living materials. Especially, the semicircular swimming bath is chiseled from a giant block of stone for the King to have his bath in goat's milk.

When the Japanese came to Viet Nam to overthrow the French, Vuong Chinh Duc and Vuong Chi Sinh helped the Viet Nam communists drive the French away from Ha Giang.

After the success of the August Revolution, President Ho Chi Minh invited Vang Chi Sinh to take part in the first parliament.

### 2.3. Dong Van old quarter

Located in the heart of Dong Van Rock Plateau, recognized as part of the Global Geo-Park Network last year, the Dong Van old quarter is home to age old and unique architecture near Ha Giang province's border with China. The quarter, built more than a century ago by ethnic Chinese migrants, is now home to historic houses and a commercial quarter. Stone slabs were used to construct the quarter's commercial buildings. Opposite to the market are homes that mimic the sky and its horizon on Dong Van plateau.

Other unique architectural features in the quarter include double walls and yin and yang tiles that decorate most roofs. The Dong Van old quarter is in Dong Van, in Ha Giang province, 146km from China. Previously, the town was part of Dong Quan district, Tuong Yen district capital, Tuyen Quang province, but the municipality was absorbed by Bao Lac district and was governed by a mandarin belonging to the Nong clan of the Tay ethnic group. In 1887, when Ha Giang province was occupied by the French colonialists, Dong Van was placed under French rule. It was divided into four zones and governed by four district chiefs.

A unique and indispensable cultural feature in Dong Van Plateau is the Kermis – a place for locals, particularly ethnic minorities, that doubles as a site to exchange goods and to socialize. On market days, young Mong and Pu Peo women dress in their Sunday best and go to the market.



Dong Van old quarter



Back in time: Dong Van quarter  
Photos Truong Vi

Adding to the unique feature of the market is the hybrid of traditional Vietnamese culture and Chinese feng shui, which is reflected in the stone sculptures and engravings of the wind and water on columns in the market. These stone columns are big enough for three or four people to encircle. Looking at the Dong Van old quarter from higher ground, the distinct identities of the historic houses built by Chinese labourers from Sichuan province is evident. Some of the houses are more than 200 years old and the oldest has been standing for nearly 300 years. As time goes by, many of the house have begun to crumble and decay. Although they have been renovated several times, part of the structure's original parts have been lost. The only original, intact structures are a three-step staircase, the stone paved yard, the stone columns and a collapsed wall at the back of the house.

#### 2.4. Khau Vai love market

A yearly ‘love market’ of sorts is held in the hillside village of Khau Vai, 500km north of Ha Noi, near the border with China. It takes place each year, on the 26th and the 27<sup>th</sup> of the third month of the lunar calendar. During these two days, hundreds of ex-lovers from various hill tribes like Nung, Tay, San Chi, Lo Lo, Dzao, Giay and Hmong are reunited. They trek in from various mountainous districts nearby to be able to spend two days with the ones they could not spend their lives with.

This event has been a tradition for centuries, originating from a local legend. Once an ethnic Giay girl from Ha Giang fell for a Nung boy from Cao Bang, but she was said to have been so beautiful that her tribe did not want her to marry a man from another community. What followed was a bloody war between the two tribes. As the lovers witnessed the tragedy that surrounded their lives, they decided to part ways in the greater interests of peace. But their

love did not die there. A secret pact was made between the lovers to meet each other once a year in Khau Vai, on the 27th day of the third Lunar month. The tradition is still carried out today. On the designated days of the festival, local artists decked up in colourful clothes reenact this tale of forbidden love.



*Early morning at Khau Vai love market  
Photographer: Giang Cong Vinh*

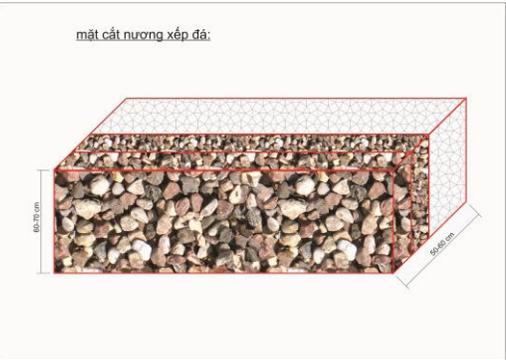
## ANNEX 7. PICTURES OF DAILY LIFE IN DEMONSTRATIVE SITES FOR GIAHS AT DVKPGG

### Crop systems

+ Intercropping (“3 sisters” or “4 sisters”) and rotation



+ Cultivation on arranging stone fields rock baskets



+ Storing on the garret above stove



+ Raising cows on stables (“raising cows on back”)



+ Water well and small reservoir for domestic uses



+ Agricultural tools



Hoes



Plough



Harrow



Plow



Grass-cutting knife



Harrow

+ Stone shore



**- Traditional villages**

+ Wine cooking



+ Brocade weaving



+ Forging and casting trade



+ Herbal medicine



- Festivals related to agricultural activities



Raining pray of Lo Lo group



Good season festival of Dao group



Forest god worship of Pu Peo group



Long Tong festival

+ Local market



Dong Van market



Commune market



Agricultural products



Drinking wine

- Landscapes



Quan Ba double mountain



Nho Que river



“Dragon eye” at Lung Cu commune



Terraced fields at Lung Cu commune



Lung Tao commune



Lung Pu commune

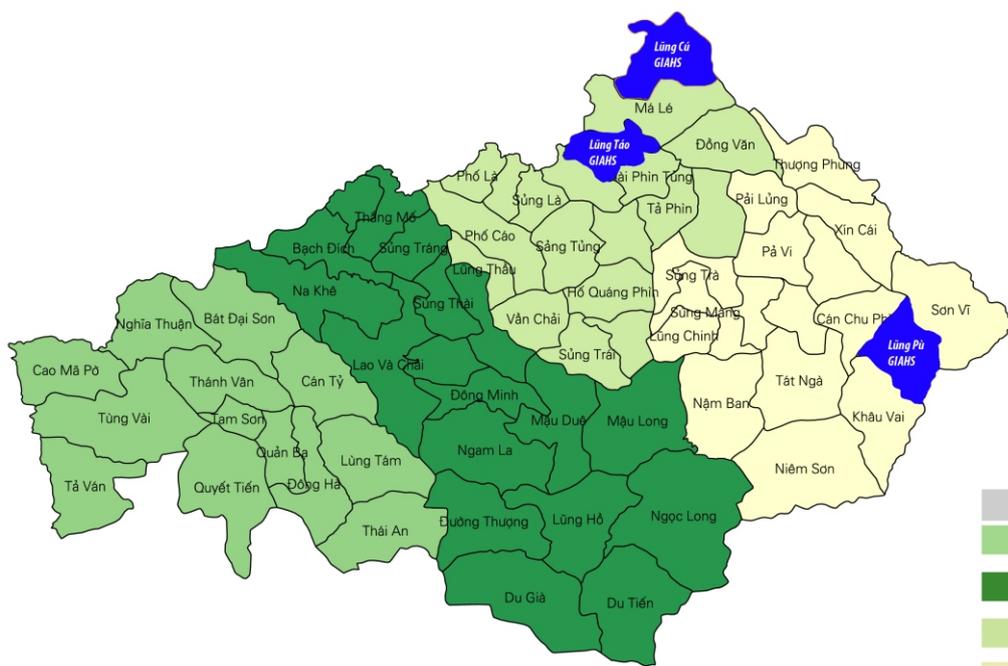
+ Paleontological heritages



Trilobites



Crinoid



GEOGRAPHY AREAS	
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<span style="display: inline-block; width: 15px; height: 10px; background-color: #43a047; border: 1px solid black;"></span>	YEN MINH
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<span style="display: inline-block; width: 15px; height: 10px; background-color: #fff9c4; border: 1px solid black;"></span>	MEO VAC
<span style="display: inline-block; width: 15px; height: 10px; background-color: #000080; border: 1px solid black;"></span>	PLACE OF SELECT