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Initial results from an ethnobotany research into the traditional knowledge of healers from ethnic communities of Northern Vietnam and Laos

Authorship

The traditional knowledge expressed here belongs expressly to the elders and healers from the various ethnic groups who contributed: the Tày healers Mrs Nguyễn Thị Liên and Mr. Hoàng Văn Tài; the Dzao healer Mrs Triệu Thị Khang; the Sách healers Mrs Cao Thị Hậu and Mrs. Cao Thị Trang; the Kinh healer Mr. Nguyễn Viết Khương; the Black Thái healers Mr. Lò Văn Sinh and Mr. Vi Đình Văn; the White Thái healer Mr. Lương Văn Bình; the Mã Liềng healer Mrs Phạm Thị Lâm; the H'mong healer Mr. Ly A Là, and the Xinh Mun healer Mr. Vi Văn Nhạc and the Lư-Lào healer Mr. Viengphet Panoudom.

1. INTRODUCTION

It is an urgent task to find a suitable approach to helping ethnic minority communities in developing countries to aid in the alleviation of poverty while at the same time conserving biodiversity and preserving and respecting traditional cultures. In the Mekong area this is of critical importance. The current situation is bleak. National governments as well as a number of international organizations focusing on rural development and poverty reduction are ineffective in terms of sustainable community development, particularly for ethnic minorities in highland areas. Their approaches are often short-term and largely top-down and based on outsiders' ideas about how to reduce poverty. The consequence is both that the community does not benefit from the efforts and there are unwanted social impacts such as a loss of confidence (as the people are made passive rather than active members of their own development) and loss of cultural values. Natural resources are also further degraded (SPERI[1] & MECO-ECOTRA[2] proposal, 2005-2015).

The indigenous ethnic minority societies have the tools and practices necessary for the conservation of biodiversity as they are the traditional protectors and preservers of biodiversity (SPERI & MECO-ECOTRA proposal, 2005-2015). Specifically their botanical knowledge may hold some of the keys for the sustainable utilization of the ecosystem and its consequent conservation as it remains an important part of their cultures (SPERI & MECO-ECOTRA proposal, 2005-2015).

[1] Social Policy Ecology Research Institute.
[2] Mekong Community for Ecological Trading.

To aid in the process of addressing these issues, research studies are needed which look specifically at the cumulative, collective body of knowledge, experience and values held by these traditional societies (Brahy 2006). Moreover, in order to ensure a collaborative and unbiased process these researches should be undertaken without preconceived judgments, theories, or biases of the investigators (Vayda & Walters 1999; Walters 2008; Hastrup & Walters 2012; Walters 2012), and should be guided by open questions about why events occur rather than confined to possibilities prescribed by any single or simple agenda or theory (Hastrup & Walters 2012). They should aim to analyze connections between human actions and environmental changes in location and time specific contexts, 'following causal influences back in time and, if relevant, outward in space' (Hastrup & Walters 2012), and they should recognize that an adequate understanding of contemporary social-environmental problems can be gained only if they are seen as part of 'a complex of interacting causes and effects' (Vayda 1983). Such studies should also actively look for ideas that were missed when preparing for fieldwork (Vayda 1983).

It is recognized that in order to ensure comparable and reliable results, it is important that research studies have knowledge of the methodologies and designs of previous related ethnobotany studies (Belovsky et al. 2004; de Albuquerque & Hanazaki 2009), but in order not to cloud the research with an extraneous research agenda, the current study has attempted to work with the Tày, Dzao, Sách, Kinh, Thái, Mã Liềng, H'mong, Xinh Mun ethnic communities of Northern Vietnam and Lư ethnic group from Laos to record their traditional cultural practices in the uses and conservation of native plants in a direct and unbiased manner as possible.

1.1. RESEARCH OBJECTIVES

This study attempts to understand and record the methods and modalities of ethnic minority groups' conservation activities and traditional knowledge as it relates to plants and ecosystems in the context of a learning community for Human Ecology and high biodiversity farming practices. It also aims to explore the relationship between the uses of species and the practices related to conservation; in order to determine where there are pressures on the relationship and to seek information about where it functions to protect and preserve biodiversity and where it needs more support. It further identifies the role that indigenous communities currently play in conservation of biodiversity.

The intention is that the results of this research be available for sharing with a wider audience to advance the cause of indigenous people in their role in direct conservation, and be of direct use to the communities, initially through a document describing each elder, community and species that acknowledges each healer and his/her community's practices in using and protecting wild species. The study also aims to demonstrate the mutual relations between the socio-economic, ethical, cultural, political, and environmental aspects of the local systems in order to help convince policy makers that local knowledge and experience is an effective mechanism for the sustainable use and conservation of biodiversity.

2. METHODOLOGY

2.1. Why used human ecology framework and ethnobotany?

Human ecology plays an important and overarching guiding framework for this research study. Human ecology is a sub-discipline of ecology. It is an interdisciplinary study of the relationship between humans and their natural, social, and built environments (Hawley 1986, and works with the broad ambition to understand human behavior (Young 1974). Ethnobotany is the scientific study of the relationships that exist between people and plants (Carlson & Maffi 2004). It seeks to document, describe and explain how plants are used, managed and perceived across human societies and analyzes those phenomena (Alexiades & Sheldon 1996). The terms, materials, and methods of ethnobotany are used to gain a clear picture of human uses of and relationships to plant communities.

Ethnobotanical research often broaches on bioprospecting and biopiracy, and this is a point of serious ethical consideration (Brush 2007)[3]. Therefore, cautionary steps have been taken in the form of community registries to control the access to traditional plant knowledge (Downes & Laird 1999) and 'defensive publishing' with descriptions of plant resources explicitly placed in the public domain (Mgbeoji 2001). This research sought to resolve this issue by focusing upon projects that were of direct interest and benefit to the communities involve, and consistent with their beliefs and values. It obtained their express approval and was based on a relationship of understanding and trust. The results of this respect the origin of the knowledge and the needs and sensitivities of the holders, and should provide valuable results for the community - sharing with them any benefits (cf. Bannister & Barrett 2001).

2.2. Why involved ethnic minority elders and healers?

By approaching minority communities, specifically direct minority elders and healers, within the development context, the research project aims to both help alleviate the systems the perpetuate poverty and to conduct community development work based on local belief systems and respecting the traditional structures of the community

2.3. Methods and materials

An ethnobotany exploration took place in the Social Policy Ecology Research Institute's (SPERI) Human Ecology Practice Area (HEPA) over one month in 2012, involving intensive fieldwork with traditional healers of the Tày, Dzao, Sách, Kinh, Thái, Mã Liềng, H'mong, Xinh Mun ethnic communities of Northern Vietnam and Lư ethnic group from Laos. The work involved the elder healers, engaging with the ethnic minority students of the HEPA community, with the assistance of SPERI staff and specialist researchers.

The research was conducted in a genuine participatory manner involving all of the healers and almost the entire staff and student body of the HEPA Farmer Field School (FFS). It followed a 'bottom-up' approach, aimed directly at sharing and enriching herbal knowledge and wisdom, with research capacity building as one of its primary objectives. HEPA students and staff were there to learn not only the traditional practices of the healers, but also the methods and practices of ethnobotany research. Knowledge transfer and capacity building was also a major aim of the research exploration.

[3] See Also New Zealand's Waitangi 'Wai 262 claim' Ko Aotearoa Tēnei ('This is Aotearoa' or 'This is New Zealand')

2.3.1. SPERI and HEPA

The Social Policy Ecology Research Institute (SPERI) is an Independent Scientific Organization in Vietnam dedicated to the betterment of indigenous peoples in the Mekong region. It aims at influencing government policy and providing (alternative) education in Permaculture and Eco-farming through Farmer Field School (FFS). Its vision is to have a society where indigenous people and ethnic minorities have equal access to social justice, gender equity, natural resources and fair social economic systems in the Mekong region. One major project where this work is being carried out is at the Human Ecology Practice Area (HEPA), a 420-hectare area of protected forest and experimental eco-farms used for training young minority farmers from a number of indigenous groups in Vietnam and Laos.

The work at HEPA is grounded in Human Ecology applied theory with connections to Permaculture design principles and knowledge, integrated with the local environment. HEPA contains five experimental farms managed by students in a 'learning-by-doing' experiential hands-on environment. Through the support of their experiences at HEPA young indigenous farmers can influence the uptake of ecologically sustainable methods in the wider indigenous communities and ultimately throughout the Mekong region and other parts of Asia.

2.3.2. Methods

The work was based on a careful balance of genuine endogenous participation and scientific rigor and robustness. Based on the objectives defined by elder and young indigenous ethnic minority group members, the exploration followed the broad aims of both allowing for the expression and transfer of traditional knowledge to the young generation and testing a number of variables regarding the traditional uses of plants and the vulnerability and conservation of those plants.

An in-depth questionnaire regarding species uses, conservation practices and several other factors was developed by the HEPA team, and was used in conjunction with participant observation (Prance et al. 1987; Kremen et al. 1998; Reyes-Garcia et al. 2006), walk-in-the-woods (Phillips & Gentry 1993a, b), freelisting (Quinlan 2005), and the 'principle of pursuing the surprising' (Vayda 1983). Elders and youth were encouraged to discuss freely and decide where to go and for how long. Locations to be visited by the group on investigations in the field were described in meetings of the HEPA team and marked on rudimentary maps.

An open-ended questionnaire was designed by HEPA's leadership, a steering committee of young indigenous farmers known as the Ban Điều Hành (coordinating board). One youth was assigned to ask the questions and others were assigned kept track of the answers, take careful notes and asked additional questions. Testable hypothesis were defined based on the objectives defined by the elders and the research team, looking specifically at the relationship between utility, conservation status and the related practices for in-situ and ex-situ conservation. Data collected regarding these objectives was treated with the utmost care and systematic focus. When the weather was uncooperative the team made short trips with the elders to collect species for discussion in an open classroom, out of the rain.

2.3.3. The fieldwork process

Following the preparation of the questionnaire and research schedule, the research team consisting of healers, HEPA students, SPERI staff, botanist and volunteers went to forest together each day over a period of three weeks. In the field, the healer freely chose species as they encountered them and shared their knowledge of them with the rest of the research team. One young member of SPERI staff conducted an on-site interview with the healer following the predesigned questionnaire while other members of the research team listened and recorded the answers on a template. Each member of the research team followed the conversation and recorded whatever information they found interesting. After information on several species had been recorded, the healers felt confident to share information about the plants without waiting to be asked. On days when two or more healers were involved, the other healers were invited to contribute their own knowledge of that species once the first healer had finished. In order to create a comfortable environment for informal conversation between all members of the research team, the healers were encouraged to discuss species freely beyond the scope of the questionnaire.

Following the interview and discussion, each species was photographed, a sample was collected and immediately placed in the herbarium, the position of the species was recorded by GPS device and its Latin name identified and recorded by the botanist. During this process, SPERI staff and senior HEPA students shared the skills involved in each of these tasks with junior HEPA students. Each species was given a code and care was taken to ensure that the same code was recorded correctly on the template, the photograph, the herbarium, the GPS location and the Latin name. Before moving on to another species, all information gathered from the interview and the following discussion was read carefully to ensure that all was recorded sufficiently and correctly.

One of the problems encountered in the field was the different languages of the healers. As they were from different regions of Vietnam, and from different ethnic groups, some of which do not have a written language, it was a challenge to record the names of each species in national language (Vietnamese). Species names had to be listened to very carefully and repeated many times before being written in the template. Equivalent names needed to be chosen in cases where the local name could not be written exactly.

Another difficulty was that the research team members were not very knowledgeable about the particulars of various diseases, and the healers often used the local names for the diseases they treated, or described their symptoms based on their experience. This led to diseases being recorded in only very general terms, such as liver problem, kidney problem, or so forth, and/or with only brief descriptions.

For every species, a good sample needed to be kept until its Latin name could be identified. However, many our samples which could not been identified directly in the field could not be fully identified later because they did not have flowers, fruits or other special characteristics of plant morphology necessary for their identification. Another problem was that in humid conditions it was very difficult to keep sample species from going mouldy.

One of the research objectives was to learn the richness of the healers' traditional knowledge. To achieve this completely would take a great deal of time in the field, especially with the species were located high in the mountains, or when the weather was uncooperative. With the research being conducted in three weeks with 11 healers this objective was difficult to achieve in full.

3. RESULTS

The following is an analysis of count data from the predetermined variables. 'Uses' refers to the number of uses that a healer mentions for a plant (e.g. 'I use this species to treat a cough' =1). It is also a count of the cultural aspects beyond the physical utility (e.g. poetry, stories, and spiritual practices). 'Conservation' refers to actions in-situ and ex-situ to promote and/or protect the species (e.g. cut away competing herbs and the spreading of seed, or transplanting the species, often in home gardens and/or around the village).

Elder healers of the Tày, Dzao, Sách, Kinh, Thái, Mã Liềng, H'mong, Xinh Mun ethnic communities of Northern Vietnam and Lư ethnic group from Laos identified in total 204 species with 1354 uses (see Table 1).

Table 1. SPECIES AND USES BY ETHNIC GROUP

Ethnic Group	Species	Uses
Tày	55	409
Dao	45	135
Sách	36	269
Kinh	25	165
Thái	14	119
Mã Liềng	12	101
H'mong	10	100
Xinh Mun	6	47
Lư - Lào	1	9
Total	204	1354

The average use of species per person was 18.5 (given the total number of healers were 11). Men used fewer species on average, 7.8 species per person with 7.6 uses per species. Women used far more species 18.3 species per person but fewer uses, 5.7 uses per species.

Test of the variables recorded during observations revealed significant correlations (see Table 2).

Table 2. PEARSON'S PRODUCT-MOMENT CORRELATIONS (p-values < 0.05)

	Use	Conservation
Conservation	0.801	-
Vulnerability	0.530	0.622

The Pearson's product-moment correlation test revealed strong positive correlation for the variables 'Conservation' and 'Use' (p=2.2e-07, 'Vulnerability' and 'Conservation' (p=7.6e-16) and 'Vulnerability' and 'Use' (p=1.8e-09).

3.1. Regression analysis for Use and Conservation

A linear regression model was fit to the two variables 'Use' and 'Conservation' indicating the slope parameter ('Uses' 0.17, p-value <2e-16) and estimated intercept (p-value <5.7e-08)[4].

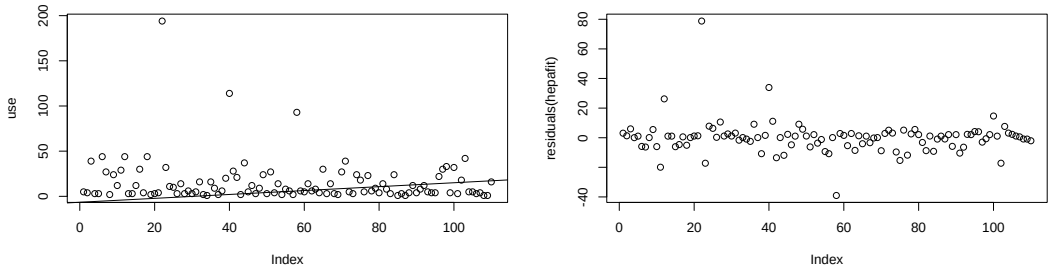

Figure 1. Regression Model for 'Uses'

The left hand model above shows the regression line for plotted values of 'Use' and a line of conservation activities as regression coefficients. The right hand image shows the residuals.

3.2. Most Commonly Cited Species

The second objective of the research was to get to know the diversity of uses for the species.

The 21 most commonly used species in the data collection is shown below (see Table 3)

Table 3. 21 SPECIES WITH THE MOST USES

Latin Name	Uses	Conservation
Blumea balsamifera (L.) DC., *Compositae*	194	30
Dioscorea crirrhosa Lour., *Dioscoreaceae*	114	12
Homalomena occulta (Lour.) Schott,. *Araceae*	93	38
Alpinia Globosa Zingiberaceae	44	8
Aralia armata (Wall. ex G. Don) Seem., *Araliaceae*	44	6
Bauhinia Leguminosae (Caesalpinioideae)	44	8
Sterculia lanceolata Cav., *Sterculiaceae*	42	6
Aglaonema Araceae	39	6
Momordica cochinchinensis (Lour.) Spreng., *Cucurbitaceae*	39	18
Ficus hirta var. roxburghii (Miq.) King, *Moraceae*	37	8
Smilax glabra Wall. ex Roxb., *Smilacaceae*	33	9
Bowringia callicarpa Champ. ex Benth., *Leguminosae (Papilionoideae)*	32	8
Solanum torvum Swartz, Solanaceae	32	4
Arenga westerhoutii Griff., *Palmae*	30	6
Maesa membranacea A. DC., Ardisiaceae	30	6
Schefflera heptaphylla (L.) Frodin, Araliaceae	30	6

[4] T-statistic: 13.9, Residual standard error: 3.1 on 108 degrees of freedom (DF), Multiple R-squared: 0.641, Adjusted R-squared: 0.638, F-statistic: 193.1 on 1 DF (p-value: 2.2e-16).

Antidesma bunius (L.) Spreng., Euphorbiaceae	29	8
Dioscorea persimilis Prain et Burkill,. Dioscoreaceae	28	4
Amomum cf. ovoideum Pierre ex Gagnep., Zingiberaceae	27	6
Glochidion eriocarpum Champ., Euphorbiaceae	27	6
Millettia cf. lasiopetala (Hayata) Merr. Leguminosae (Papilionoideae)	27	18

The table above shows the 21 most commonly mentioned species or the species with the greatest diversity of uses. Each of the species in this list had over 24 different uses and attracted on average 10.5 different conservation practices.

The table below shows some of the basic statistics for the 21 most common plant species mentioned by the healers.

Table 4. BASIC STATISTICS FOR 21 MOST COMMON SPECIES

	Uses	Conservation	Vulnerability
Mean	50.578	10.368	1.736
SD	41.398	8.988	3.015
CV	0.818	0.866	1.736

Coefficient of variation (CV or *relative variability*) shows the dispersion of utility, conservation practices, and perceived vulnerabilities independent of the variable's measurement unit.

4. DISCUSSION

The research covered species uses by elders of the Tày, Dzao, Sách, Kinh, Thái, Mã Liềng, H'mong, Xinh Mun, and Lư-Lào ethnic communities and was carried out by Hmong, Khmu, Kinh and Tày, ethnic minority students, along with SPERI staff and volunteers from Australia, India, Myanmar and The Netherlands, and one Vietnamese botanist.

Actual uses are much more evenly spread between all communities though data seems to suggest Tày and Dao elders use a greater portion of the species described, followed by the Sách, Kinh, Thái, Mã Liềng, Mông, Xinh Mun, with the Lư-Lào using only one of the species but for nine different uses.

Evidence for a statistically significant relationship between 'Use' and 'Conservation' fitted with the implicit hypothesis: "The cultural use of a species leads to the conservation of that species". The Pearson's product-moment correlation test revealed strong positive correlation for the variables 'Conservation' and 'Use' ($p=2.2e-07$). It also showed strong correlation for 'Vulnerability' and 'Conservation' ($p=7.6e-16$). This meant that the more a species was perceived as being vulnerable in the community, the more likely they were to have practices to promote the species and to take action for the preservation of the species, both in-situ (clearing of competing vegetation, taking action to leave a viable population in the forest) and ex-situ (propagation in homegardens or planting nearer to homes).

'Vulnerability' and 'Use' also had a strong positive correlation (p=1.8e-09) indicating that as the number of uses for a plant increases so do the perceived pressures on the plant population. This is a point of concern that healers and communities are well aware of and respond to it with appropriate conservation activities including customary laws that govern the community actions related to the plant.

This is one of the reasons why publishing the actual uses of a species is of ethical concern – the more that a species is known to have a use and hence a potential market value, the more that species becomes rare in the ecosystem. Elders mentioned market pressures from neighboring Vietnamese Kinh people and Chinese traders.

Healers all had a tradition of being guarded about the usefulness of species. Generally healers will keep species identities from the patients and other community members except in special cases where the patient wishes to learn, is perceived to be a good person who will use the plants wisely, and is willing to make an extra payment for the transfer of the knowledge.

Knowledge transfer is also a guarded practice among the healers, for example, a healer will teach his or her children only when they are sure that the knowledge will be used well. The research team was exceedingly fortunate to have the chance to learn from these healers and this was due to the relationship of trust developed over a long period of time between SPERI and the indigenous networks that this research took place to serve.

4.1. Lesson learned

Objectives were at first defined by the HEPA community and later open for changes by the ethnic minority healers. HEPA leaders and farm managers came up with three main objectives, two of which (training in ethnobotany methods and recording the richness of healer's knowledge) were followed while the other (analyze biodiversity) was changed during the research. All objectives fell within the broader context of the various ethnic minority groups' cultures and customary practices of conservation.

Some of the more important lessons learned were: (1) the objectives need to be revisited as often as possible, especially with a constantly changing research team. (2) Rather than stick strictly to the objectives and questions that the group has decided on, those who participate in the work should keep their eyes open for any new information that they encounter in the field and recorded it.

It is important to note that ethnobotany data collection and the whole process of research is a slow one, and one that is educational and collaborative by nature. The successes in capacity building and in learning about traditional practices of the species are immeasurable. The SPERI and HEPA staff and the students of HEPA who participated learned a lot from the elders, and the elders exchanged knowledge with each other. For example, when one elder mentioned the use of a species many others agreed that the same species was also used in their community for the same or some other purposes.

"This research made a great change in my knowledge, my awareness, and my skills. Before the research I knew very few plants in the forest, but now the number of plants that I know has increased significantly. Not only plant morphology, but also I learned how to use them in daily life, and the cultural aspects of different indigenous ethnic groups behind the plants. I understand more the livelihood of indigenous peoples whose lives are based on forest resources.

I noticed the importance of the transfer of traditional knowledge among generations in order to maintain their livelihood and preserve their cultures, as well as conserve natural resources. Knowing the utility of different plants is less meaningful without understanding the values and belief of the indigenous people. In addition, I deeply understand the appropriate way that people in ethnic communities shared traditional knowledge – 'learning by observing, practicing and sharing'.

A healer said that the value of forests is not only in timber production, it is also contained on the forest ground in non-timber forest production (NTFP) for physical and spiritual uses. This was demonstrated in the richness of knowledge on botany of indigenous people. We should look at forests in the same way.

Research skills are the integration of many specific skills. For beginner researchers like me, or other young SPERI staff or students, this research is very helpful for learning various research skills in both hard skills and soft methods. These skills are not yet enough to implement the similar researches, but they provided a fundamental foundation for us to continuously learn ethnobotanical knowledge, as well as support certain activities in rural development and natural resource conservation" (research team member).

5. CONCLUSIONS

Based on the data gathered through interviews and fieldwork with elders of the Tày, Dzao, Sách, Kinh, Thái, Mã Liềng, H'mong, Xinh Mun, and Lự-Lào ethnic communities, significant indications were found that there are cultural mechanisms for conservation implicit in the cultural uses of plant species.

Endogenous research processes yield greater and more reliable results. The design and implementation of the described research shows the way for locally based research that yields some kind of useful results for the community. Each minority group has a unique set of cultural values. These are deeply connected to the natural environment around the community and have been established over a long period of time. They should form the basis for projects and work that involves the community and this was the foundation for the current study.

5.1. Suggestions for Future Research

More follow-up research is necessary to make this a robust and useful collection.

Replication of the research process and methodology conducted in HEPA should be undertaken in other ethnic communities in order to pass on the many specific skills and new forms of knowledge that were developed there so that each community can conduct its own ethnobotanical research.

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