Applied Ethnobotany Education and Research in Nepal

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Abstract

The Institute of Agriculture and Animal Science (IAAS), Tribhuvan University has introduced Applied Ethnobotany as one of the courses of postgraduate program in Conservation Ecology since 2004. This paper will highlight the course curriculum development process of Tribhuvan University and course enrollment by the IAAS students. Then, it will discuss on learning approaches and methods followed for this subject. In addition, this paper will attempt to summarize the selected ethnobotanical researches conducted by the faculties and students of the IAAS alone or in partnership with ethnic communities and non-governmental organizations (NGOs); and try to highlight the necessity of developing partnerships and networking with academic and research organizations for promoting ethnobotany education and research of the IAAS for producing high quality human resources in this field. Finally, this paper will highlight some directions to enhance capacity of the teachers and institution for quality and effective teaching and learning processes.

1. Introduction

Many organizations in Nepal are involved in documenting and conserving indigenous knowledge on biodiversity and culture in recent years. The Ministry of Forests and Soil Conservation is the responsible ministry for leading in this direction. The National Adaptation Programme of Action (NAPA) to climate change in Nepal has prioritized local knowledge and innovations as an important autonomous response of local community for planned adaptation actions. Documenting local knowedge and innovations play a vital role to prepare Local Adaptation Plans of Action (LAPAs) to complement implementation of immediate and urgent priorities of NAPA in Nepal (MOE, 2010). International Union for Conservation of Nature and Natural Resources (IUCN) and World Wildlife Fund (WWF) are two leading international organizations involved in the conservation of natural heritages and indigenous knowledge systems. The partners of Promoting Local Innovation (PROLINNOVA) Nepal Program are also contributing to documentation of local innovations of the farmers of Nepal in the field of ecological agriculture and natural resource management. Tribhuvan University (TU) and Kathmandu University (KU) are two leading academic institutions that introduced new courses on ethnobiology, ethnobotany and biodiversity in undergraduate and graduate programs to produce human resources.

The university faculties have realized the necessity of introduction of new academic curriculum to train their students and also identify the new collaborative research areas in different sectors. The faculties are also trying to develop working relationship with the research based organizations to develop capacity of the institute and faculties in teaching and research. Institute of Agriculture and Animal Science (IAAS), TU introduced new course on Applied Ethnobotany. This paper will attempt to share academic achievements of the course development. Specifically, this paper will discuss briefly on course curriculum development process, learning approaches, research and development works, achievements, limitations in teaching Applied Ethnobotany and provide some directions for future.

2. Methodology

2.1. Collection of data on ethnobotany education, research and development

This study is entirely based on secondary data and information collected from published and unpublished literature deposited in the the libraries, Department of Environmental Science and Local Knowledge and Innovation Resource Center of the IAAS. The literature studied included a varity of documents such as course bulletin, unpublished thesis works, journals, newsletters, research projet reports, visit reports, term papers, practical records of the students of different batches, attendance book, project proposals, powerpoint slides, letter of agreements, memorandum of understanding, and so on.

2.2. Limitations and way forward

The faculties and students of the Applied Ethnobotany course of Department of Environmental Science/IAAS were also consulted to record limitationss and solutions to improve the ethnbotany education and research. In order to validate the articulation made, this paper was read by the concerned faculties and students.

3. Ethnobotany Education

3.1. Course curriculum development

The development of course curriculum is the first step of institutionalization process of formal education in the academic institutions. Realizing the significance of Applied Ethnobotany, the authorities of the IAAS made a decision to introduce this course in postgraduate program of Conservation Ecology. Applied Ethnobotany course was drafted, discussed in the series of meetings of the Department of Environmental Science and Agricultural Environmental Science Subject Matter Committee (SMC). The SMC forwarded to the Faculty Board (FB) for the discussion. After thourough discussion in FB, it endorsed in TU Academic Council which finally approved the course for teaching. In this way, IAAS has integrated this course in higher agriculture education to develop high quality human resource required for research and development.

3.2. Students' enrollement

Since the introduction of Conservation Ecology program in 2004, 14 students (8 were the males and 6 the females) enrolled in Applied Ethnobotany course (Table 1).

Table 1. The batch-wise enrollment by M. Sc. Agriculture students in Applied Ethnobotany at IAAS

Batch	Total Number	Human Resource Developed	
		Male	Female
2004-2006	4	3	1
2005-2007	2		2
2006-2008	3	3	
2007-2009	2		2
2008-2010	3	2	1
Total	**14**	**8**	**6**

3.3. Learning approaches

Student centered learning approach was followed in IAAS to help students learn the subject matter in best way. Lectures were delivered in powerpoint slides and guest lectures of the scientists or interactive session with local experts (healers and elders) were also organized. Students were given the opportunity to learn traditional botanical knowledge applying interactive learning approaches. To keep learning process more dynamic and exciting, classes were made more interactive and taken students to outdoors to do the field works. Here are some approaches that were followed:

a. Learning by practicing: Pairwise ranking

In order to teach pairwise ranking in the practical classes, students were taken to an ethnic village, Sisai village of Tharu community and key informants were selected to conduct pairwise ranking exercise to know the people's preference to a crop or food or fodder or fiber plants of the village. They conducted pairwise ranking on rice varieties, fodder plants, wild vegetables, and fiber plants. In this paper, pairwise ranking of wild edible plants used by Tharu people is presented as example (Table 2).

Students listed 8 wild edibles by Tharu (ethnic) language namely Badki bihi (*Solanum torvum*), Dankarait (*Smilax ovalifolia*), Titami (*Diplocyclos palmatus*), Neuro (*Diplanzium esculentum*), Pararko sag (*Trichosanthes cucumerina*), Moraiya (*Lasia spinosa*), Bander (Zingiberaceae) and Larkaiya (*Costus speciosus*) and performed pairwise ranking. The result is presented in Table 2. From this exercise, students came to know that Neuro and Moraiya are two wild vegetables that are highly preferred by the Tharu community of the area. This information may be used to explore market potential/demand for such important species.

Table 2. Pairwise ranking of wild vegetables in Sisai village of Chitwan, Nepal

Bih	**Dan**	**Tit**	**Neu**	**Par**	**Mor**	**Ban**	**Lar**	Wild edibles*	Score	Rank
X	Dan	Tit	Neu	Par	Mor	Ban	Lar	**Bih**i	0	VIII
	X	Dan	Neu	Par	Dan	Ban	Lar	**Dan**karait	3	V
		X	Neu	Par	Mor	Ban	Lar	**Tit**ami	1	VII
			X	Neu	Neu	Ban	Neu	**Neu**ro	6	II
				X	Par	Ban	Par	**Par**arko sag	5	III
					X	Ban	Lar	**Mor**aiya	2	VI
						X	Ban	**Ban**der	7	I
							X	**Lar**kaiya	4	IV

*Bih= Bihi, Dan= Dankarait, Tit= Titami, Neu= Neuro, Par= Pararko sag, Mor= Moraiya, Ban= Bander, Lar= Larkaiya

b. Learning by demonstration

As a practical work, M. Sc. students of Applied Ethnobotany visited Sisai village and observed artifacts and museum specimens displayed in the Tharu Cultural Museum in the village. They requested the villagers to demostrate them how to prepare Mori (a traditional innovation to store paddy seeds to protect from the insect pests). One knowledgeable farmer demonstrated the process of making Mori and students observed the process carefully. Students and course-instructor took the notes on preparation process of the innovation and snapped took series of photographs of preparation process. With the interaction, local community was found to have strong interest in conservation of traditional knowledge and skill and provided opportunities for working together to learn and preserve the indigenous knowledge and technology.

c. Learning how to train local resource persons

In practical exercises, students are expected to learn how to document traditional knowledge, skill and technology (TKST) of local people. To practice what students have learned in the theory classes, they are given opportunities to involve in local resource persons training organized jointly by the Institute for Social and Environmental Research-Nepal (ISER-Nepal) and IUCN, Kathmandu. Some students involved as resource persons for the training events conducted in 2004 and 2007. This is also an innovative learning approach to help students participate in the training programs as resource persons.

d. Learning how to conduct awareness camps

In Applied Ethnobotany course, students have to involve in awareness program especially related to ethnobotany. Students have been involved in ethnobotany awareness conducted two times in Bangain village of Sharadanagar Village Development Committee (VDC) of Chitwan and Bachhauli village of Bachhauli VDC of the same district. Each student took active participation and shared information on social empowerment, farmers' rights, and intellectual property rights. In addition, students also got opportunity to involve in awareness camps conducted in 10 villages by ISER-Nepal for a "participatory community biodiversity and traditional knowledge, skill and technology documentation project". This type of productive education was appreciated by the students and ethnic people of the villages.

e. Learning how to write research proposals

Students of different batches were actively participated in the practical classes. They developed proposals as instructed by the course teacher. They wrote and submitted research proposals to the course teacher. The proposals included 2 development projects (Bote Community Development Project, Ethnobotanical Garden Establishment Project) and ethnobotany study projects (Lapcha Ethnobotany Project, Gyaneshwar Ethnobotany Project, Kumal Ethnobotany Project, and Participatory Ethnobotany Project). These project proposals can be refined and submitted to donors for funding.

f. Learning by writing term papers

Students need to write term papers as a requirement of the course. Table 3 shows students and their term paper titles. These term papers vary widely ranging from methodological to educational types. These assignments enriched the information in ethnobotany discipline.

g. Learning by presentation

Students have conducted seminars and presented papers on applied ethnobotany. This exercise helped them learn how to prepare powerpoint presentation and also learned how to deliver/share their ideas and information with local people in more understandable way. Students also organized meetings in the ethnic villages and talked about global perspectives of indigenous knowledge and application of ethnobotany in documenting traditional uses of plants, preparing community biodiversity register, integrating into education and research and linking with tourism.

h. Learning by participating in events

Students participated in the training workshop and project of IUCN Nepal entitled "biodiversity and traditional knowledge documentation". Three M. Sc. Agriculture students of first batch also got opportunity to involve in the research project of Ecological Services Centre's (ECOSCentre) (Table 4) and gained research experiences on the documentation of indigenous information on plant resource uses with the help of 24 informants (community healers and elders). Students also got opportunities to become resource persons in community biodiversity documentation training. Students also participated in National seminars (see Photo 1) and presented papers with teachers (for example Dangol and Karna, 2007; Maharjan and Dangol, 2010).

Table 3. Term papers written by M.Sc. students of IAAS, Rampur, Chitwan

Batches	Term papers	Students	Year
2004-2006	Research methodology and approaches of ethnobotany	S. K. Maharjan	2005
	Indigenous knowledge system and bioprospecting of plant resources	P. Pradhan	2005
	Traditional agriculture and resource conservation	N. K. Gupta	2005
	Development of ethnobotany education and research in Nepal	B. Rana Bhat	2005
2005-2007	A comparative study of ethnobotany of Tharu and Darai ethnic groups	A. Karna	2006
	Comparative study on ethnobotany of Danuwar and Kumal tribes	R. Devkota	2006
2006-2008	Concept, scope and prospect of ethnobotany	A. Poudel	2007
	Application of local innovation/knowledge in community development	K. Thapa	2007
	Ethics and laws on traditional knowledge and local innovation	Y. M. Shrestha	2007
2007-2009	The role of intellectual property rights in protecting traditional knowledge	K. Kharel	2009
	Assessment of traditional knowledge and skill of farming communities of Kirtipur Municipality to develop and promote agritourism	U. Shrestha	2009
2008-2010	Methodology and approaches in ethnobotany education and research in Nepal	P. Joshi	2009
	Ecological ethnobotany: Understanding human-plant relationship and cultural role in plant conservation	U. Joshi	2009

Table 4. The number of students trained in ethnobotany research methodology

Training events	Event organizers*	Year	Number of students trained
Biodiversity and traditional knowledge documentation	ISER-N	2004	4
Indigenous knowledge documentation	ECOSCenter	2004	3
Community biodiversity documentation	NPG/LI-BIRD/ECOSCentre	2005	2
Participatory community biodiversity and traditional knowledge, skill and technology documentation project	ISER-N	2006	2

*Note: ISER-N= Institute for Social and Environmental Research-Nepal; NPG= Nepal Permaculture Group; LI-BIRD= Local Initiatives for Biodiversity Research and Development, ECOSC= Ecological Services Center

i. Learning by publishing articles

Students learned ways of writing popular articles using knowledge and information what the students learn from the classroom or field. Here, the journalists of Samacharpatra and Annapurna Post (national daily newspapers) were requested to help students to write and publish articles related to ethnobotany and agriculture so that knowledge is shared with a wide mass of people. Then, students wrote and sent their articles in local or national printing media for publication. Table 5 shows the publication of four articles on ethnobotany. These articles were written based on class room lectures and literature related to their theory course. They learned that they can make deep understanding of the subject matter by reading, writing and publishing papers. They also learned that they can build capacity of writing articles/papers and need to share with the people through publication.

4. Ethnobotanical Research and Development

4.1. Conducting research projects

Two faculties of IAAS initiated first ethnobotanical study on medicinal plants used by the Tharu healers of Chitwan district (Dangol and Gurung, 1987) and published their findings (Dangol and Gurung, 1991). Later, many works such as Adhikari et al. (1995), Bhattarai (1995), Dangol and Gurung (1995, 2000), Dangol (2001), Dangol et al. (1995), Pant et al. (1995), Shakya et al. (1995) enriched the literature on the ethnobotany of this district. These works covered many aspects of plant resource uses by people of different ethnic groups and castes of this district. A review paper was published indicating the status of ethnobotanical research and education which suggested some important thematic areas for the further research (Dangol, 2002). Tharu ethnobotany project was also launched in the district with active participation of a Tharu healer to, a) document indigenous knowledge of Tharu community, b) conserve plant resources with ethnobotanical value, c) collect plant-based artifacts, d) prepare herbarium specimens, and (e) review of literature on Chitwan ethnobotany (Dangol, 2003). During the study, a list of 179 Tharu healers was also prepared (Dangol, 2003). An ethnobotanical study of ethnoveterinary medicinal plants was also carried out recently with the financial support of WWF Nepal (Maharjan, 2010). Thus, IAAS faculties and students have contributed to ethnobotanical studies and they are giving continuity to it by D.R. Dangol (Table 6). To initiate collaborative research works, IAAS has explored potential organizations for partnership development. Recently, IAAS identified many organizations as research partners. This organization is currently working with Ecological Services Centre to contribute in the documentation works with the objective of training students and community people.

Table 5. Popular articles published by Applied Ethnobotany students in print media

Titles of articles	Writers	Print Media
Sthaniya botbiruwasko upayogdwara sthathiya prabidhiko prabardhan ra jaibik bibithatako samrakcchhwan [Local technology promotion and biodiversity conservation through plant utilization]	P. Joshi	Dhanagadhi Post*, 2065 Mansir 24, Mangalbar, 2 page. (Tuesday, December 9, 2008)
Ajako sandarvama lok banaspati shastra addhyanko awashyakta [Significance of ethnobotanical studies in today's context]	U. Joshi	Chitwan Post* 2065 Falgun 24, 2 page (March 7, 2009)
Krishi gyan ra krishak adhikar [Agricultural knowledge and farmers' rights]	U. Shrestha	Chitwan Post*, 14 Chaitra 2065, 2 page (March 27, 2009)
Lok banaspati shastra: Raithane Nepali bigyan [Ethnobotany: An indigenous Nepalese science]	K. Kharel	Nawayuba**, 2065 Chaitra, 14 (136): 7-9 (March-April, 2009)

*Dhangadhi Post and Chitwan Post are vernacular daily newspapers; **Nawayuba is monthly magazine for youth.

4.2. Capacity building by doing consultancy works

Teaching faculties need to build their research capacities for teaching Applied Ethnobotany. They require to know recent advancement in the subject matter. The faculty members of IAAS have been offered consultancy works in the organizations like National Trust for Nature Conservation (NTNC), IUCN, and USC Nepal (Unitarian Service Committee of Nepal). These kinds of consultancy works helped them build their research capacities and accumulate literature on ethnobotany thus enchanching capacity of faculties in teaching and research.

Table 6. Contributions of IAAS faculties and students to the ethnobotany research

Year	Research project titles	Principal investigators	Donor organizations
2010	Documentation of ethnoveterinary knowledge on medicinal plant of Darai community in Chitwan	P. Maharjan/Student	WWF Nepal
2010	PROLINNOVA Nepal Program	D. R. Dangol/Faculty	DGIS
2009	PROLINNOVA Nepal Program	D. R. Dangol/Faculty	DGIS
2008	PROLINNOVA Nepal Program	D. R. Dangol/Faculty	DGIS
2007	PROLINNOVA Nepal Program	D. R. Dangol/Faculty	DGIS
2006	PROLINNOVA Nepal Program	D. R. Dangol/Faculty	DGIS
2006	Participatory communinty biodiversity and TKST documentation project	D. R. Dangol/Faculty	NEFIN
2005	Biodiversity & TK documentation	D. R. Dangol/Faculty	USC Nepal
2004	Biodiversity & TK documentation	D. R. Dangol/Faculty	IUCN
2004	Indigenous knowledge documentation	D. R. Dangol/Faculty	ECOSC
2001	Kumal ethnobotany project	D. R. Dangol/Faculty	IAAS
2001	Tharu ethnobotany project	D. R. Dangol/Faculty	ESF/NEFEJ
1999	Weed ethnobotany project	D. R. Dangol/Faculty	IAAS
1995	Farming system research: Ethnobotany of Kabilash VDC	I. D. Bhattarai/ Faculty	Ford Foundation/IAAS
1993	Exploration of underexploited vegetables	A. Srivastava/S. M. Shakya/Faculties	IUCN
1993	Ethnobotanical studies of Darai community	D. R. Dangol/Faculty	IUCN
1993	Vegetation studies	D. R. Dangol/Faculty	IUCN
1993	Studies on Chepang livestock system	S. S. Pant/Faculty	IUCN
1992	Wild ethno-vegetables used by Chepangs and Tharus	G. Adhikari/Student	IAAS
1987	Medicinal plants used by Tharu	D. R. Dangol/Faculty	Winrock International

Note: WWF= World Wildlife Fund, DGIS= Netherlands Directorate-General International Cooperation, NEFIN= Nepal Federation for Indigenous Nationalities, USC Nepal= Unitarian Services Committee of Nepal, ESF=Environmental Support Fund, NEFEJ= Nepal Forum for Environmental Journalists, IAAS= Institute of Agriculture and Animal Science, IUCN= International Union for Conservation of Nature and Natural Resources

4.3. Carrying out M. Sc. thesis research

Two students conducted thesis research on ethnobotany.. The ethnobotany of Bote was conducted with the objective of exploring ethnobotanical knowledge (Pradhan, 2006) and of Tharu people for documenting and testing knowledge on pesticidal plants (Rana Bhat, 2006).

Table 7. List of the M.Sc. thesis of the IAAS students on ethnobotany

SN	Thesis Title	Year of completion	Name of the students	Advisory Committee
1	Documentation of ethnobotanical knowledge of Bote people of Chitwan	2006	P. Pradhan	S. B. Gurung, D. R. Dangol and S. K. Sah
2	Tharu ethnobotanical knowledge on pesticidal plants for organic insect pest management of *Cucurbita pepo* L. cv. *Zucchini**	2006	B. Rana Bhat	D. R. Dangol, K. K. Shrestha and T. B. Nepali.

**Cucurbita pepo* L. cv. *Zucchini*: Zucchini squash

4.4. Participating in research projects

Students participated in training to build capacity (see Photo 2) and involved in Ethnobotany Research Projects and documented traditional information on medicinal uses, wild edible plants, fodder and forages, fuelwood, and so on. The traditional knowledge of the indigenous people on the use of plant resources can be very good clue for bioprospecting, especially for traditional food and income generation. This knowledge may be the base for leading to the discovery of new crops or medicinal drugs.

4.5. Collecting artifacts used by ethnic people

During the project period of Tharu Ethnobotany Research, Tharu elders were involved in making artifacts for the project. Some were made in their own villages (Bangain and Haraiya) of Sharadanagar VDC and some were made by the skilled Tharus in the campus vicinity. Some artifacts were purchased from the Tharu community of Bachhauli, a touristic place close to Chitwan National Park. All the artifacts, more than 90 items, were displayed in a room of the Department of Environmental Science, IAAS (Photo 3). Now, this collection became one of the attractions for visitors and as teaching materials for the Applied Ethnobotany.

4.6. Preparing herbarium specimens

Herbarium specimens were prepared for each project on ethnobotany conducted by IAAS faculties. These specimens are now one of important resources for teaching and research in IAAS. To prepare the specimens, indigenous people, especially Tharus, students, and others were involved in the plant collections and herbarium preparation (see Photo 4).

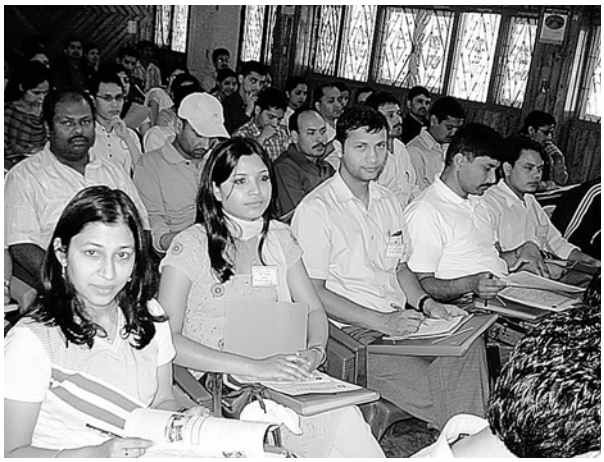

Photo 1. Students participating in a National Seminar in 2007

Photo 2. Training on Biodiversity and Traditional Knowledge Documentation in 2004

Photo 3. Some artifacts displayed in the Department of Environmental Science (DES), IAAS

Photo 4. Preparation of herbarium specimens by a student in the laboratory of DES, IAAS

4.7. Establishment of demonstration plots

One of the objectives of the Tharu Ethnobotany Project was to cultivate and conserve local medicinal and wild edible plants in the demonstration plots at IAAS. These demonstration plots are important for teaching different subjects including ethnobotany, medicinal and aromatic plants and cultural studies. These plots can be good asset to develop and promote agrotourism at IAAS. In addition, these plots will be learning center for studensts, farmers, and other interested persons who like to understand the relation of plant-people-enrironment.

5. Developing links and partnership

IAAS has established links with governmental organizations (such as Department of Agriculture), universities (such as Hiroshima University) and research organizations (such as National Research Council, International Rice Research Institute). Recently, it has established linkages with non-governmental organizations like Local Initiative for Biodiversity Research and Development (LI-BIRD), Forum for Rural Welfare and Agricultural Reforme for Development (FORWARD), Namsaling Community Development Centre (NCDC), Nepal Institute for Development Studies (NIDS), Small Earth Nepal (SEN), and so on. The ex-students of the Department of Environmental Science/IAAS are also contributing to the course by strengthening and establishing linkage with their organizations.

6. Achievements

As a result of ethnobotany teaching and research at IAAS, contributions were made in the field of human resource development, indigenous knowledge documentation, artifacts collection and display, demonstration plots established, and herbarium sheets prepared. Papers based on research findings have been published. A documentory film on Tharu Healers (called “The Jungle Shamans”) was also made by Nepal Forum of Environmental Journalists (NEFEJ) as per the suggestion made in Tharu Ethnobotany Project report.

7. Limitations

Applied Ethnobotany course was developed in 2003 to implement from 2004 academic session. Now, it is the time to revise to incorporate new development in this course in consultation with national and intenational experts. It is revealed from earlier sessions that this course was regularly offered from 2005-2008, but stopped to offer 2009 onwards. In the earlier phase of course offering, teaching faculties had some projects directly related to ethnobotany. Later, they had no projects on this discipline. Activities on artifact collection, herbarium preparation and maintaining live collections of medicinal and wild edible plants were stopped due to the lack of fund. When we look the links and partnership developed by IAAS, there is lack of relation with the national and international organizations devoted to ethnobotany education and research.

8. Future Directions

Since the course was designed long before (in 2003), this course is now needed to revise to incorporate new development in ethnobotany research. It is necessary to offer the course in each academic year. Long term, multidisciplinary research projects on Applied Ethnobotany are required to be developed and fund should be raised to gather ethnobotanical data that can be utilized in teaching and research. Research findings of the projects should be published in national and international journals. It is also necessary to develop capacity of students to conduct thesis research in this field. Scientific events (symposiums, workshops, seminars) are necessary to organize to share ethnobotanical education and development and to build national and international collaboration and cooperation in this field. Further building partnership and networks with academic and research organizations devoted to ethnobotany education and research is necessary for providing quality education and research. A resource centre with literature, equipments, artifacts, herbarium and computer facilities is required to be establish to create assets for ethnobotany education and research development.

9. Conclusion

IAAS has introduced Applied Ethnobotany course for master level students of agriculture. This course has been studied by 14 (8 male and 6 female) students of the institute. Students learned this subject by doing different activities, such as writing and

publishing articles, preparing research proposals, participating in trainings and seminars, and so on.

Faculties and students of the IAAS also conducted ethnobotanical researches. As the completion of research projects, plant specimens and plant-based artifacts were collected and deposited in the departmental laboratory. The research reports, articles and thesis documents were accumulated. These documents are the assets for teaching the Applied Ethnobotany.

IAAS has some limitations in teaching Applied Ethnobotany course. Lack of regular projects is identified as a limitation. Another limitation identified is no link with the organizations that carry research and education on ethnobotany. To overcome these limitations, authors suggested the need of regular offering of this course and fund for multidisciplinary projects.

We conclude that the course of Applied Ethnobotany is necessary to be offered regularly to the students in each academic year. Innovative teaching methods with standardized curriculum are also important to maintain the quality of the teaching materials. Further, supports to the faculties and the students with proper research fund are necessary to update teaching materials through the research findings and sustain the quality eduation.

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