

Educating local people for nature protection especially with reference to endemic plants in Chitral-Pakistan (a case study)

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Abstract. Chitral having unique geographical conditions thus supporting about 173 endemic plant species. These endemic plants are used for various purposes like medicinal, fuel wood, food etc. Apart from the exploitation climate change and other anthropogenic factors like land clearing, construction works etc. also pose serious threats to these plants. Thus conservation program initiated to aware the community as well as young people. The method used basically formation of “Endemic Plants Clubs” of school students and village conservation committees (VCCs) to assess the information through brochures, posters and meetings. The educational program covered 54 schools and a total of about 5000 students. Similarly 32 VCCs of about 67 villages were also taken on platform. Repeated awareness sessions with students and community supporting with multimedia were approached for whole year. The questionnaire survey was carried out randomly with 191 female and 197 male among community and students to analyze the effect of conservational education sessions. The assessment results indicate length of residence and education is more significant. Moreover detail feedback showed that priorities for approach to use natural resources vary among community and students. Most critical issue is fuel wood consumption along with use as vegetable or medicinal plants and needs to be readdressed in further session with alternative approaches.

Keywords: rare plants, plant use, hotspot, questionnaire, local people, creating public awareness, Village Conservation Committees, local ecological impact.

1. Introduction

According to IUCN data assessment, some of the plants species like *Psychrogeton chitralicus*, *Allium barszezewskii*, *Anaphalis chitralensis*, *Malcolmia cabulica* var. *top-pinii*, *Silene pseudo-verticellata*, etc seems to threatened or endangered (Rizwana et al., accepted, 2019). As 173 endemic plants reported from Chitral (Ali, 2008) (mostly herbs, shrubs, one endemic tree *Betula utilis* subsp. *chitralensis* but these valleys have forests of other significant

trees like *Pinus gerardiana*, *Juniperus excelsa*, *Cedrus deodara*, *Quercus baloot*, *Pinus wallichiana*, *Abies pindrow* etc.) (Khan et al., 2012) among the 428 total endemic plants from Pakistan (Ali, 2008). The taxa distribution are like this: 67 plant species are purely restricted to Chitral, 60 taxa endemic to Pakistan but are also found in Chitral and 46 taxa are those restricted to Asian countries but also extend their distribution to Chitral. So far collected and preserved specimens are 56 at Pakistan Museum of Natural History (www.gov.pmnh.pk).

As this valley is joint venture of three mountain ranges thus identical ecosystems would be supporting alike set of species in adjoining areas of other countries. Thus

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conservation efforts of a country could be helpful for goals of conservation to neighboring countries that have same set of plant species (Alvarado-Quesada & Hans-Peter, 2017).

Further main part of conservation is incomplete without the involvement of concerned community (Village Conservation Committees, VCCs) and students. The CGNP's (Chitral Gol National Park) VCCs have historical background from early 1900s when self initiated conservation and management in form of Park committee (PC) and then after many decades comes in shape of eleven native committees in 1994. Formally CGNP and Conservation association was founded in 2005 and established 23 VCCs. Each village is represented by individual Village Conservation Committee (VCC) for male and female (Report, 1973, 2007). Taking this as model further few VCCs also founded in rich biodiversity areas like Laspur, Mastuj apart from CGNP in 2016 with administrative help of forest department and financial aid by *Rufford*. Thus working of these VCCs (having traditional information) with students (who have more updated knowledge) is in real need for the restoration of rare plants, as these are in more contacts with rarity of nature.

Thus, the main objective of the study was to answer the following questions:

- Which factor is mainly related to raising awareness and educating the local community about the nature conservation?
- What is the difference in the approach between students and the community?

- What is the major issue that needs to be readdressed in future sessions?

2. Study site

Chitral is lying near the junction of three mountain ranges i.e Hindu Kush, Himalayan and Karakorum. In west lies with Nooristan of Afghanistan and North-west lies with Wakhan corridor that separates Tajikistan and Pakistan.

It is narrow valley having high mountains covered with permanent snow ranging from Arandu (1070 m) to Terichmir (7690 m). High mountain and rough topography of the area have given rise to lot of side vallies like Mastuj, Yarkhun, Laspur. Most of the vallies have fresh water springs, lakes (e.g Qaramber An Chat) and rivers (Lotku, Torkhu), hence supporting unique floral diversity. Thus focusing on most of the areas having active VCCs of Chitral including CGNP, Mastuj, Laspur, etc. (Fig. 1).

3. Method

Awareness includes community discussions in 32 VCCs (village conservation committees/67 villages) 5000 students in 54 elementary and primary schools through lectures on threats to these plants as well as basic threats and info through brochures. Most of discussions conducted in local languages. These sessions include brochures, pamphlets, banners, posters and question/answer sessions

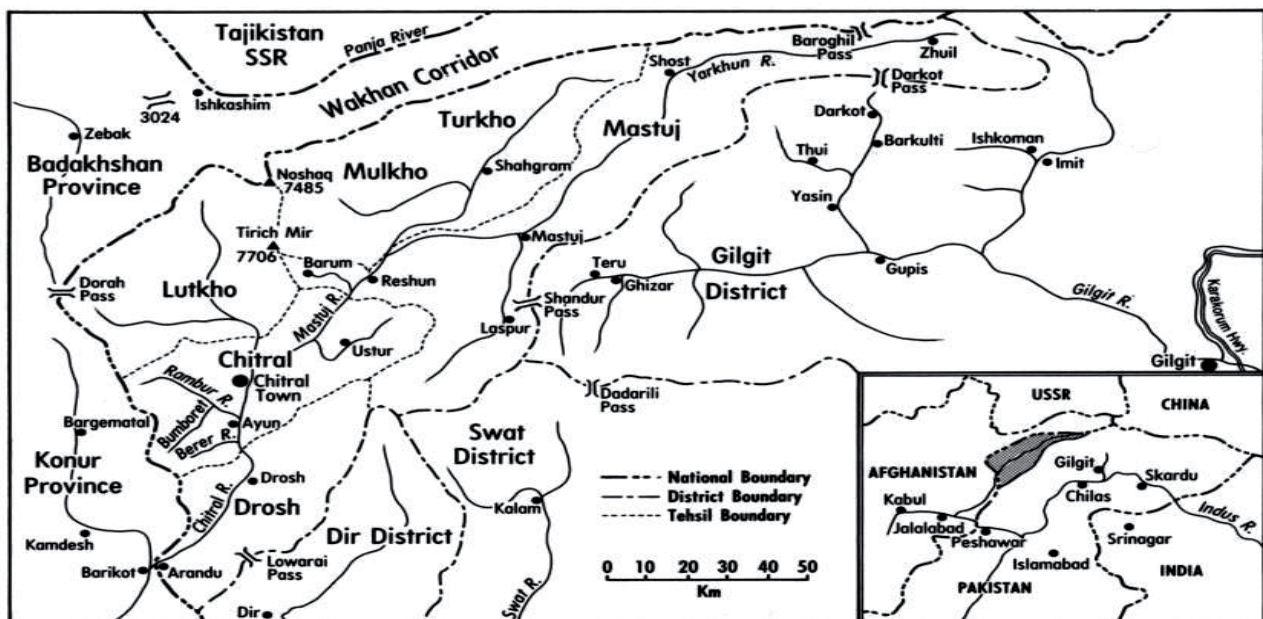


Figure 1. Study area of research (source: <http://www.iranicaonline.org/articles/chitral-citral-river-valley-in-the-upper-indus-system>)

to clear their ambiguities. These gathering facilitated by various means of information including presentation on multimedia in native language, live demonstration of specimens accompanying their pictures, sustainable methods by pictures etc. (current assessment fifteen plants were presented which were proved to be at risk in either way, Rizwana et al, accepted, 2019). Since people of this area are naturally possessive about their related nature so same scenario used for their motivation to save their identity and give options to chose alternatives which are wide spread species for fuel or use discarded/fallen/dried part if mandatory etc. similarly women are encouraged for kitchen gardening of all such medicinal or vegetable plants for their better conservation. The awareness campaign is basically for educating the protection of natural resources by locals.

The sustainability of the project is maintained by handling over the next responsibility to concerned VCCs and selected schools (Endemic plants club). These kinds of sessions are of unique in its pattern as well as applications and till yet not applied elsewhere in country.

Participants were chosen from schools and community randomly having almost equal number of male/female or boys/girls. But willingness to participate and active involvement in awareness session is key factor.

The method was divided into two parts; initial part includes simple question (Annex A. Questionnaire) addressing “Yes” “No” of question “do you now know conservation of plants?” based on their gender, race, education etc. Than observe the association based on “Chi-Square” of each variable like gender, race to the respondents replies (either yes or no) < 0.05 probabilities.

While the last part is somewhat detail assessment of conservation level of female and male respondents from same group of community and students. The scores were calculated base on questionnaire’s response and were used for comparisons on through graphs.

4. Results

4.1. Relation of variables with conservation

The variables gender, age, race, education and length of residence with the participation included for Chi-square test with reference to their replies. The results showed that <0.0001 highly significant value for length of residence to be most associated. Similarly education and race also proved to be significant (0.00020, 0.00271). Rest of variables like gender and age have no significant association with outcome (Table 1) (Annex B. Respondent frequency).

4.2. Detail evaluation of respondent

The assessment data shows that the response of both participants from community and students are quite different (Fig. 2). For e.g. the response of questions usage of any plant shows good response from students with less score (i.e. 22) in comparison to community members having high score for usage of plant reply (i.e. 58). Likewise willingness to work as nature guard is better reflect with students then with community with scores of 68 and 12 respectively. But usage for fuel wood is somehow similar for both groups (scores 60, 76) (Fig. 2).

5. Discussion

The survey has been done after various awareness sessions with community as well as in schools for complete year (Fig. 3). The first part of research addressing only core question i.e knowing of conservation after educational sessions (As the session would elaborated this concept in various ways and some of the members already knew it but not in scientific way). The highly significant result associated with the length of residence (Table 1). It means that people/families living in any locality permanently

Table 1. Chi-square test of association of respondents and their participation

S.No	Variable	Chi square value	Df	P-value <0.05
1	Gender	0.583	1	0.44431
2	Age	7.44	4	0.11401
3	Race	11.82	2	0.00271*
4	Education	21.88	4	0.00020*
5	Length of residence	55.81	4	<0.0001 *

*Showing significant values after analysis.

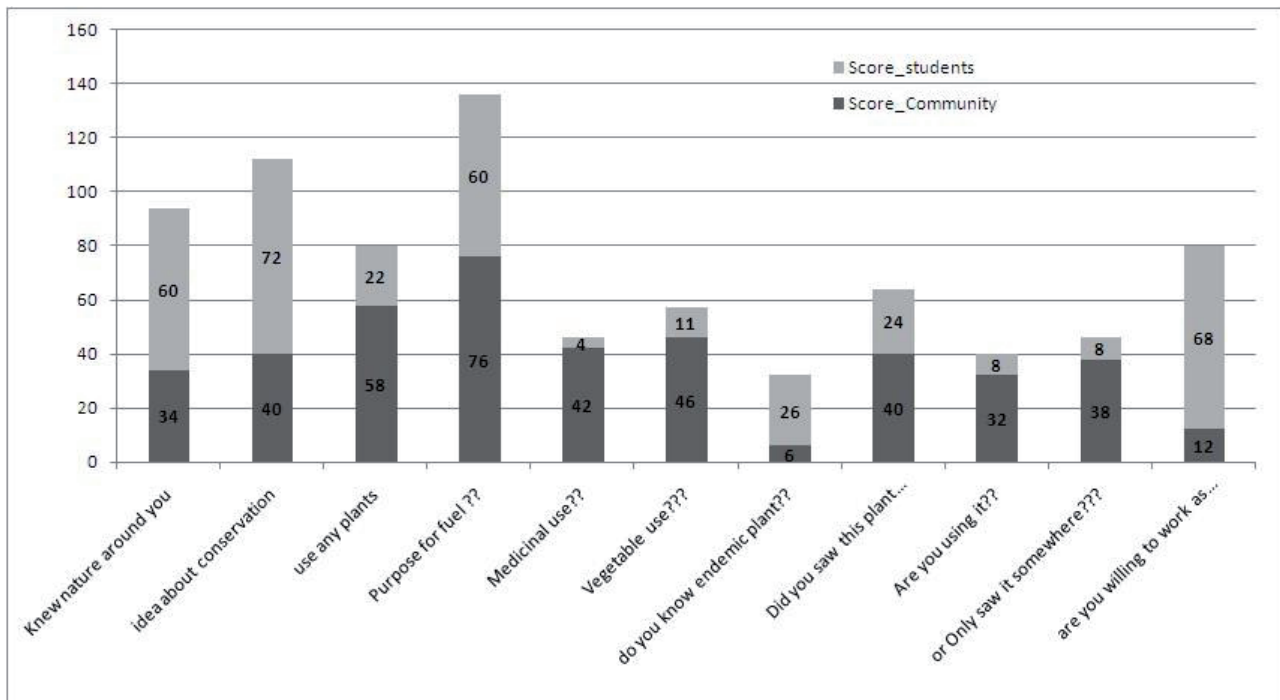


Figure 2. Comparative response of community and students to the detail questionnaire

since their forefathers having more indigenous knowledge and related nature and hence understands in better way. Likewise education and race also play significant role as per existing analysis for example if someone is settled in allied villages of CGNP since ages, have educational and economical sound background of race like “*Chitrali*” have sustainable approach or thinking to utilize natural resources irrespective of their age or gender (Table 1).

While detail assessment elaborate any change of mind or further improvement in existing knowledge through these sessions (Fig. 2). Since community persons are more interest-oriented as showed from usage of plants as medicine and vegetables questions (Fig. 4).

But the fuel wood consumption for both groups is somehow similar as in these areas young people also involved in wood collection accompanying with elders or sometime independently go to forest. Thus further sessions should incorporate alternative to fuel wood, more highlighting of importance of conservation. As observed by Feka and Manzano (2008) that local people were unaware of the need to maintain ecosystem functions despite the close relationship between wood and in ensuring the livelihood for local population in South West Cameroon. Thus the development of adaptive management strategies aimed at improving policy, creating public awareness, and integrating local communities in the development of

a sustainable management plan for the natural resources (Feka & Manzano, 2008; Du Plessis, 1995).

It is recommended that there is need for the introduction of an acceptable and accessible alternative technology for the preservation of natural resources (Ikurekong et al., 2009; Specht et al., 2015) to prevent the ecological impact of fuel wood exploitation (Fig. 4). Moreover the educational sessions were proved to be helpful as student’s shows immensely good response especially for act a nature guard (Fig. 2). The issues could be highlight further in detail about endemic plants supported by latest multimedia (Lutfi-Bin-Dolhalit et al., 2016).

5. Conclusion

These concerns could be incorporated in curriculum of students. Thus some serious work needs to address in policy of basic text books. Exposure visits to Natural History Museum and other such organization would also be beneficial for young people. The students violently offer themselves to act as „Nature’s Guard” while persons from community try to convince the questionnaire team on their utmost usage by them. While VCCs should play further active role to emphasis the importance of natural resources. Alternative fuel wood resources approach needs financial



Figure 3. Awareness sessions with students and community



Figure 4. Anthropogenic factors of valley

assistance. The students could actively play role without any financial assistance to act as ambassadors to their home as well as related community (just for information about eight students voluntarily present themselves for other fellows during their daily free time, our team also do appreciate the step by giving some books and covering their storey in local newspaper). We found immense improvement in their attitude/behavior as per current survey of both mature people from community as well as young students. More updated and vigorous sessions targeting selected audience would be the possible aims in future research.

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Annex A. Questionnaire

No	Score Somewhat	Yes	Questions
0	1	2	Knew nature everything around you??
0	1	2	Idea about conservation?
0	1	2	Use any plants?
0	1	2	Fuel wood purpose?
0	1	2	Medicinal purpose?
0	1	2	Vegetable use?
0	1	2	Do you know endemic plant?
0	1	2	Did you saw this plant (supported by pics of endemic plants)
0	1	2	Are you using it
0	1	2	Or saw it somewhere?
0	1	2	Are you willing to work as nature guard/protector

Annex B. Respondent's frequency

Demography	Frequency
<i>sex</i>	
Male	197
Female	191
total	388
<i>Age</i>	
>45	12
36-45	98
26-35	114
16-25	164
<i>Race</i>	
Chitralli	188
Kalashi	124
Ismaili	76
<i>Education status</i>	
Non	98
Primary	23
Secondary	59
College	123
University	85
<i>Length of residence</i>	
>30 years	118
25-29	65
20-24	107
15-19	54
Less than 14	44