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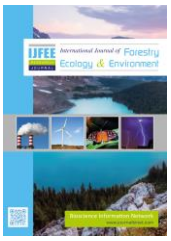

Diversity of minor fruit species in two tribal communities of Sadar upazila, Khagrachari, Bangladesh

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ABSTRACT

Minor fruit species play a vital role in crop diversification and the agroforestry system in hilly areas. It is also considered as a source of food and nutrition and contributes to the income of tribal people. This fruit species face deforestation and genetic erosion due to many reasons. The study was conducted to know the diversity of minor fruit species in two rural tribal villages in Sadar Upazila, Khagrachari during the periods of July, 2018 to April, 2019. All the species identified occur sparingly in the two study areas. A total of twenty five fruit species belonging to twenty genera and fifteen families were found to be consumed by the native inhabitants. Of these, eighty eight percent was grown in wild and only four percent was cultivated. Syzygium and Artocarpus were the top contributing genus (3 species each) followed by Terminalia (2 species) and the rest genus were single species each. Top contributing families were Anacardiaceae, Euphorbiaceae, Moraceae and Myrtaceae (3 species each) followed by Compretaceae (2 species) and rest of family contribute with single species. Considering the conservation status twelve percent vulnerable (VU), four percent Near threatened (NT), four percent not evaluated (NE) and eighty percent species were least concern (LC). Among the species Haematocarpus validus (VU) of Compretaceae, Terminalia chebula (VU) of Compretaceae, Mangifera sylvatica (VU) of Anacardiaceae, rarely found in wild. Due to climate change, the level of poverty, and environmental degradation, there is a high risk of biodiversity loss on a large scale. Hence, research attention is needed to increase awareness of the use and management of wild edible fruits for their conservation.

***Key Words**: Diversity, Minor fruit, Tribal communities and Khagrachari*

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I. Introduction

Minor plants play a very important role in the livelihoods of rural communities as being an integral part of the subsistence strategy of people in many developing countries. Forest related economic activities affect the livelihoods of 1.6 billion people worldwide; they provide sociocultural benefits and the foundation for indigenous knowledge. In many parts of the world, wild plants are obtained from forests or wild areas are designated for extractive resources and managed by local communities. Food plants serve as alternatives to staple food during periods of food deficit and are the valuable supplements for a nutritionally balanced diet one of the primary alternative sources of income for many resource poor communities, and the source of species for domestication (Shrestha and Dhillion, 2006). Although a small country minor fruits floral diversity is high in Bangladesh. Das (1982) mentioned 60 solely wild grown fruits; Roy (2007) recorded 120 both cultivated and wild species; Rahim et al. (2011) identified and characterized 46 underutilized fruit species. Pasha and Uddin (2019) reported 255 species of minor edible fruit yielding plants in Bangladesh. Abdullah et al. (2020) reported 31 underutilized fruit from tribal villages of Rangmati district.

Khagrachhari Sadar Upazila (Khagrachari district) area is one the hilly area of the Chittagong Hill Tracts located in between 23°00' and 23°21' north latitudes and in between 91°55' and 92°00' east longitudes. Indigenous communities such as Chakma, Marma, Tripura and Tanchanga' belong to this Upazila. Agriculture is the main source of income about 42.43% (BBS, 2011). The tribes living in this district have been leading an intricate life depending on wild plants in their daily diet. They consumed these minor fruits without any concern about the nutrition, or food value.Due to the introduction of exotic varieties, the dependence on wild fruits has gradually declined. But many people in tribal areas still use them as a supplement of their food. Some of them are preserved for use in the dry period or sold in the rural market. But the popularity of these wild forms has recently decreased. Wild fruits are generally used as raw or processed, which help to compensate for the day-to-day requirement of calories. Due to demographic pressure these areas loss it plants diversity rapidly within the increase of monoculture plantation. Few available research work that was conducted on minor fruit diversity tin Khagrachari district (Khatun et al., 2015) but not with specific locations. This work aims to create information minor fruits available and consume by the two local tribes which will help in sustainable conservation of these wild genetic resources also fulfill the need for sustainable forest management.

II. Materials and Methods

For conducting the study two villages were randomly selected i.e. Panchmile and Monigram from Khagrachori Sadar, Khagrachari situated entirely two different topographic locations. Panchmile village located at a distance of 10 km from center points of Khagrachori Sadar belongs to with high hilly to medium hilly land cover with mostly Teak and other forest species. The village is under Perachora union of Khagrachori Sadar comprises of 3 villages namely 5miles Kalapani, 5-mile Joitho khamar and Kaminipara. While Monigram village is situated about 11 Km from north side of District headquarters Khagrachori beside the Khagrachori-Dighinala highway. The Monigram is blessed by the river Chengi with fertile soil and water also with some places with a low hilly portion with acidic soil. In both villages, two ethic groups found living here. In Panchmile villages people belong Tripura ethnic community believe in Hindu religion, very few of some follow Baptist Church. In Monigram all people belongs to Chakma tribe and they are Buddist.

The study was conducted to know diversity of fruit species in two rural tribal villages/communities in Sadar Upazila, Khagrachari during the periods of July, 2018 to April, 2019. The sample respondents for the study consisted of 60 households, 30 from each village. We selected one knowledgeable person as key informants (KI) from each household. Semi-structured questionnaires and botanical monographs were prepared, pretested and administered to HHs and KIs, respectively. All interviewees were met on a 'one-to-one' basis and asked the same standard (open and closed-ended) questions using the local language (Marma) based on their consent, including expansions or clarifications as needed. Repeated field observations were conducted to obtain actual information of presence, growth habit, habitat characteristics and identification of underutilized fruits species mentioned during the interviews. All encountered plants were identified and recorded by their vernacular names. Later, these were converted to their botanical names using the Encyclopedia of Flora and Fauna of

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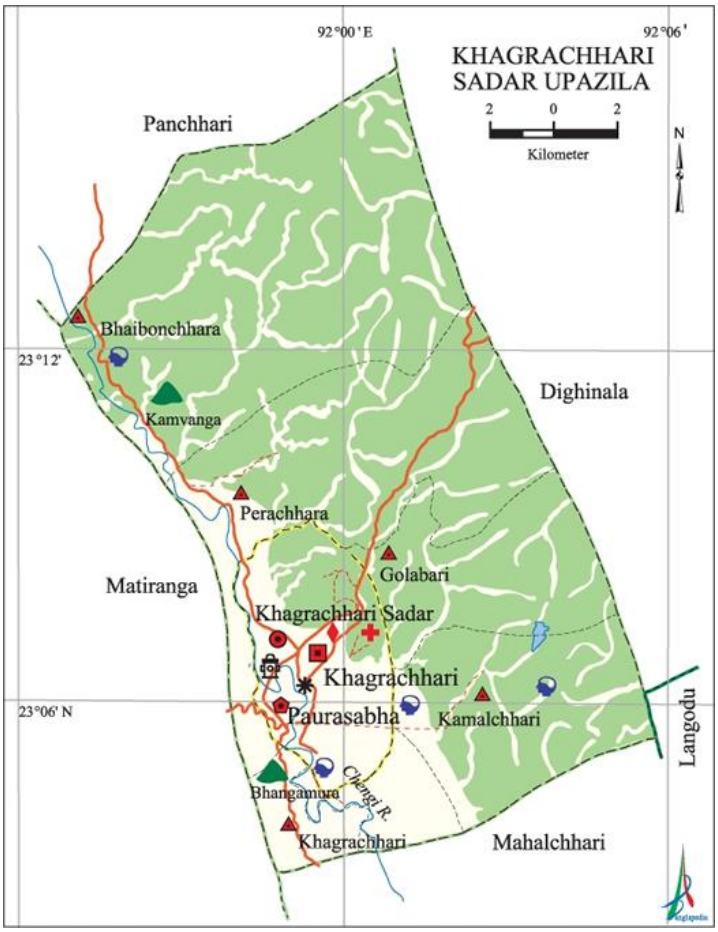
Bangladesh and experience. A list of minor fruits was prepared with their up-to-date nomenclature (Rahim et al., 2011; Pasha and Uddin, 2013; www.theplantlist.org).



Source: http://en.banglapedia.org/images/f/f4/KhagrachhariSadarUpazila.jpg

Figure 01. Khagrachari Sadar Upazila showing the study locations

III. Results and Discussion

Species diversity of underutilized fruits in the surveyed area

Results of the survey from two different tribal communities indicate that the area has well diverse with minor fruits. We recorded 25 species of minor fruit species belonging to twenty genera and fifteen families (Table 02). The most dominant genera were *Terminalia* and *Syzygium* representing 3 species each followed by *Artocarpus* represented by 2 species and the rest of the genera were represented by single species each. Identified, species belonged to Anacardiaceae, Euphorbiaceae, Moraceae and Myrtaceae (3 species) followed by Combretaceae and Rutaceae (2 species) and rest of the families were represented by each species (Table 01). Out of 25 plants recorded, 92% are trees and 8% are climbers (Figure 02). Considering the number of species we can conclude that this area one of the promising hotspots of minor fruit. Whereas Abdullah et al. (2020) recorded 35 minor fruits from the Kaptai Reserve forest and Rahim et al. (2011) recorded 46 underutilized fruits from different parts of Bangladesh. This is a substantial number and comparable to the documented from Tripura (Sankaran et al., 2006).

In the study area, the collected minor fruits mostly grow in wild (84%), only 4% cultivated by local inhabitant and rest 12% grown by tribal villagers or grown in wild (Figure 02). The minor fruits consumed by local inhabitants without considering the conservation point of view Abdullah et al. (2017; 2018). They collect without following any scientific way or kind of any conservation measure.

Table 01. Families and corresponding number of species of fruit plants identified

Sl No	Family	No of species	% proportion (N = 25)
1.	Anacardiaceae	3	12.0
2.	Arecaceae	1	4.0
3.	Bignoniaceae	1	4.0
4.	Burseraceae	1	4.0
5.	Clusiaceae	1	4.0
6.	Combretaceae	2	8.0
7.	Dilleniaceae	1	4.0
8.	Elaeocarpaceae	1	4.0
9.	Euphorbiaceae	3	12.0
10.	Fabaceae	1	4.0
11.	Flacourtiaceae	1	4.0
12.	Menispermaceae	1	4.0
13.	Moraceae	3	12.0
14.	Myrtaceae	3	12.0
15.	Rutaceae	2	8.0

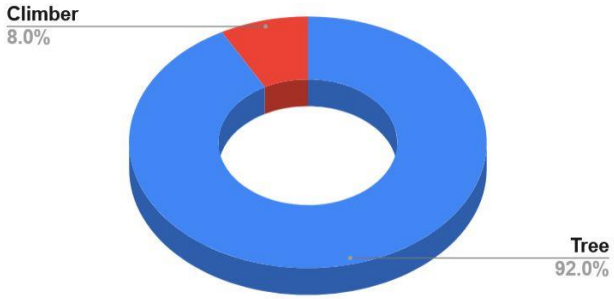


Figure 02. Life forms of minor fruits used by two tribal communities

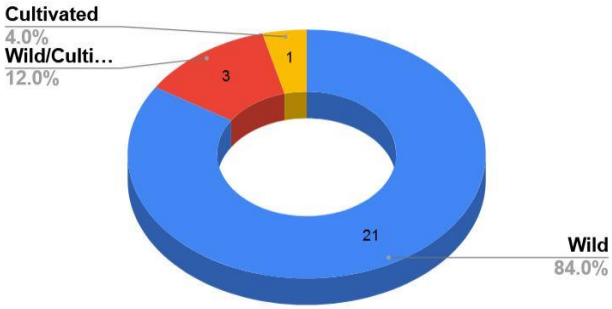


Figure 03. Percentages of fruit collected from wild and cultivated

Conservation status

Considering the conservation status of the collected underutilized fruit, most of them are the least concern (80%). About 12 percent of the collected fruits were vulnerable and 4 % were Near-threatened and rest are not under any evaluation (Figure 02). Among these fruits, *Mangifera sylvatica* of Anacardiaceae *Terminalia chebula of* Compretaceae are vulnerable (Ahmed et al., 2008). Though *Haematocarpus validus* enlisted as least concern (Ahmed et al., 2009) in our study and local inhabitant mentioned that it is rarely collected from wild (Rahim et al., 2015; Abdullah et al. 2020). *Pajanelia longifolia* (Wild.) K. Schum. of Bignoniaceae is near-threatened species NT (Ahmed et al., 2008) but according to local knowledgeable persons, this species is also in vulnerable condition due to over exploration and cutting of trees abruptly.

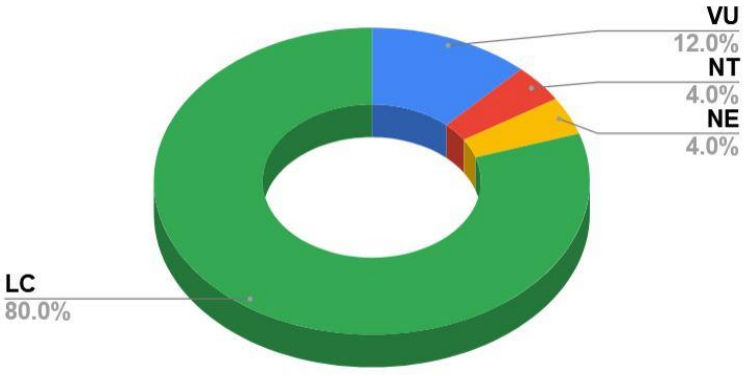


Figure 04. Conservation status of minor fruits in two tribal villages of Khagrachari Sadar, Khagrachari

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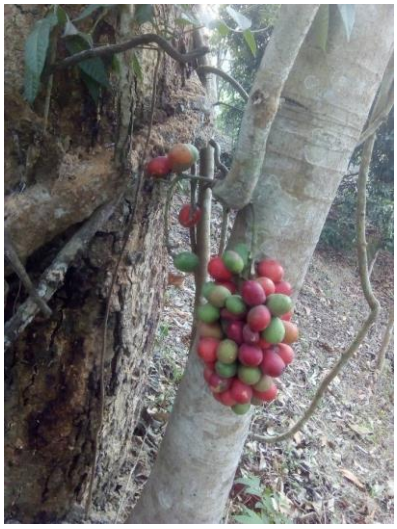
Table 02. Minor fruits recorded from two tribal villages of Khagrachari Sadar, Khagrachari

Sl No	Sceintific name	Local name	Family	Habit	CS	Wild/Cultivated
1.	*Aegle marmelos* (L.) Corrêa	Bel (B), Belgulu (C), Shephalbupaong (T)	Rutaceae	Tree	LC[1]	W
2.	*Antidesma ghaesembilla* Gaertn.	Khudijam (B), Litoma (C),	Euphorbiaceae	tree	LC[1]	W
3.	*Artocarpus chama* Roxb	Chapalish (B), Chameli Kattol (C), Chabam (T)	Moraceae	Tree	NE[1]	W
4.	*Artocarpus lacucha* Buch.-Ham.	Dewa (B), Bhirta gula (C),Taini jamu (T)	Moraceae	Tree	LC[1]	W
5.	*Baccaurea ramiflora* Lour.	Lotkon (B), Kusumgula (C) Kushumai (T)	Euphorbiaceae	Tree	LC[1]	W
6.	*Calamus viminalis* Willd.	Bet (B), Karath (C), Hrbichuk (T)	Arecaceae	Climber	LC[1]	W
7.	*Citrus grandis* (L.) Osbeck	Jambura (B), Kondal pada (C), Turung jha (T)	Rutaceae	Tree	LC[1]	W/C
8.	*Dillenia indica* Linn.	Chalta (B), Ulu (C), Thaipolok (T)	Dilleniaceae	Tree	LC[1]	W
9.	*Elaeocarpus floribundus* Blume	Jalpai (B), Eehongchae (C)	Elaeocarpaceae	Tree	LC[1]	W/C
10.	*Ficus racemosa* Linn.	Jogdumur (B), Zoigga Dumur (C)	Moraceae	Tree	LC[1]	W
11.	*Flacourtia jangomas* (Lour.) Raeusch.	Lukluki (B), Painnya gula (C), Painnya mola (T)	Flacourtiaceae	Tree	LC[1]	W
12.	*Garcinia cowa* Roxb.	Kaophal (B), Kao gula (C), Kok-phang (T)	Clusiaceae	Tree	LC[1]	W
13.	*Haematocarpus validus* (Miers.) Bakh. f. ex Forman)	Raktogota (B), Rak Sho (C), Thai chak (T)	Menispermaceae	Climber	VU[2]	W
14.	*Holigarna caustica* (Dennst.) Oken	Boiragula (B), Aamberella (C), Alom-chatra (T)	Anacardiaceae	Tree	LC[1]	W
15.	*Mangifera sylvatica* Roxb.	Uri am (B), Garey aam (C), Balong pri thaijok (T)	Anacardiaceae	Tree	VU[1]	W
16.	*Pajanelia longifolia* (Wild.) K. Schum.	Hona (B), Hona gula (C), Korongkhia (T)	Bignoniaceae	tree	NT[1]	W
17.	*Phyllanthus emblica* L.	Amloki (B), Hadamola (C), Omloki (T)	Euphorbiaceae	Tree	LC[1]	W/C
18.	*Protium serratum* (Wall. ex Colebr.) Engl.	Neul (B), Gutguitttiya (C), Thai cherem (T)	Burseraceae	Tree	LC[1]	W
19.	*Spondias pinnata* (Linn. f.) Kurz.	Amra (B), Amra gula (B), Raisoingsing (T)	Anacardiaceae	Tree	LC[1]	W
20.	*Syzygium fruticosum* (L.) Skeels	Ban jam (B), Potti jam (C)	Myrtaceae	Tree	LC[1]	W
21.	*Syzygium jambos* (Linn.) Alston.	Gulapjam (B), Golab jam (C),	Myrtaceae	Tree	LC[1]	W
22.	*Syzygium samarangense* Merr. & Perry	Jamrul (B)	Myrtaceae	tree	LC[1]	C
23.	*Tamarindus indica* L.	Tentul (B), Tedoy (C), Aungthorai (C)	Fabaceae	Tree	LC[1]	W
24.	*Terminalia bellirica* (Gaertn.) Roxb.	Bahera (B), Bura gula (C), Boyra-phang (T)	Combretaceae	Tree	LC[1]	W
25.	*Terminalia chebula* Retz.	Haritoki (B), Horrtal (C), Bakhra-phang(T)	Combretaceae	Tree	VU[1]	W

B-Bangla, C-Marma language, T-Tripura [1]Ahmed et al., 2008; [2]Rahim et al., 2011


Haematocarpus validus


Pajanelia longifolia


Terminalia chebula

Plate 01. Picture of some threatened minor fruits of two tribal villages, Khagrachari Sadar, Khagrachari

IV. Conclusion

The two tribal communities of Khagrachari Sadar comprise a good number of minor fruits from their traditional practices, playing an important role to play in supporting the social diversity of ethnic people of Bangladesh. But deforestation, habitat destruction and more land under mono-cropping plantation causes threats and accelerate the disappearing from natural habitats. A strategy to promote commercial production to boost the local economy would depend not only on increasing the volume of production but with initiating processing and value addition for raw fruit.

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