

## ETHNOBOTANICAL INVESTIGATION INTO THE MANDI ETHNIC COMMUNITY IN BANGLADESH

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### Abstract

The present ethnobotanical investigation has been carried out into the Mandi ethnic communities of 32 villages of seven upazillas of Dhaka and Sylhet Divisions in Bangladesh. A total of 109 plant species belonging to 59 plant families were found to be used by the communities to treat 38 common human diseases, in ethnoveterinary practices, for pest control, as food, and also to perform rituals, taboos and hunting.

### Introduction

In the present world, traditional botanical knowledge and ethnobotanical research are playing an important role in biological investigation, economy and practical uses. In addition, this knowledge and experience of different ethnic groups can play a vital role in the identification, conservation and use of various plant resources including the wild and uncultivated. In Bangladesh, there are many marginalized ethnic communities of different lifestyle and culture. They use surrounding plants for their primary healthcare along with other necessities, which are based on their traditional knowledge and dynamic cultural heritage.

Preliminary work of Hassan and Khan (1986) in ethnobotanical research is regarded as pioneer endeavour in Bangladesh. Since then, Mia and Huq (1988), Alam (1992), Alam *et al.* (1996), Uddin *et al.* (2001), Khan *et al.* (2002), Partha (2002), Partha and Hossain (2002) and Yusuf *et al.* (2006) have also made significant contribution to our understanding of ethnobotany in Bangladesh. Most of these studies, however, focused on tribal communities in the Chittagong Hill Tracts with some surveys on the tribes in the Sylhet region.

An initial survey was conducted by Khan (1998) on Mandi (Garo) tribe inhabiting Madhupur and Haluaghat in the districts of Tangail and Mymensingh, respectively. In the nearby Indian State of Meghalaya, Rao (1981) documented the medicinal plants used by the Khasi and Garo communities. Rao and Shampru (1997) later on listed 78 plant species used by Garos of Meghalaya for food (30), medicine (24), fish poison (5), fiber (6), dye (3), miscellaneous (10) and from magico-religious beliefs.

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Our current understanding of the ethnobotany of Mandi community of Bangladesh is very limited. The present investigation, therefore, gives an opportunity to explore the inter-relationships between plants, human beings, environment, ecology and traditional knowledge and culture of the Mandi ethnic community in 32 villages of two divisions in central-north and north-eastern Bangladesh.

### **Materials and Methods**

*Mandi ethnic community:* Mandi is the largest marginalized ethnic community in the Dhaka Division of Bangladesh. Total Mandi population in Bangladesh is about 64,280 (Bangladesh Population Census of 1991). Mandis are generally known as 'Garo', but they call themselves 'Mandi'. In their 'A`tchik' dialect 'Mandi' means 'human being'.

*Study area:* The present investigation was carried out between December 2000 and May 2002 into the Mandi ethnic communities of 32 different villages of Sunamganj Sadar and Tahirpur Upazillas (Sunamganj District) of Sylhet Division; and Durgapur and Kalmakanda Upazillas (Netrokona District), Nalitabari Upazilla (Sherpur District), Haluaghat and Dhubaura Upazillas (Mymensingh District) and Madhupur Upazilla (Tangail District) of Dhaka Division.

*Information collection:* The ethnobotanical information was collected by 'participant observations', from focus group discussions, and interviewing local people and local medicine men who prescribe their own herbal preparations.

For ethnobotanical research, 'participant observation' is given more preference. For this participant observation, a researcher has to live with the ethnic people for a long time. But owing to limited scope and allocated time for the present ethnobotanical survey, the first author could only spend few trips to the specified areas and stay for a short while with the informants. However, the present endeavour was initiated far back in 1997 through repeated visits to various ethnic areas and making friendship with the ethnic communities. Although visits had been made since 1997, much time was spent from December 2000 to May 2002 for the present ethnobotanical investigation reported in this communication. In their every social and cultural activities and festivals, both physical and mental participation was made during the period of the survey.

The first author also participated in their 'jhumming' (shifting cultivation) and other household works. The women were also interviewed at the time of cooking and collecting vegetables and fruits from the 'jhum-jungle', and the information and processes were documented.

The ethnic medicine men were interviewed individually in the forests where they pointed out the herbs that they use to cure different ailments. Information was also gathered from the medicine men using two separate questionnaires.

*Plant material collection:* A large number of plant materials were collected during the present survey and were preserved as herbarium sheets. During plant collection and making herbarium specimens, unknown, little known and important plants were given more preference. All the herbarium specimens are preserved in the Jahangirnagar University Herbarium (JUH), Department of Botany, Jahangirnagar University, Savar, Dhaka 1342. The JUH allows anybody to use these specimens for academic and research purposes.

### **Results and Discussion**

The plant species documented in the present survey are enumerated in the Table 1 in alphabetic order of their scientific names. These are accompanied by their local names in Mandi language, localities (village and district) and ethnobotanic uses. The medicinal uses of plants listed here are indicative and are not accompanied by doses, therefore the readers are not encouraged to follow them without verification.

Most of the Mandi people rely upon surrounding plant wealth for their health-care, food and other life accessories. Present ethnobotanical investigation generated important information that might be useful for health-care programme, economic and agricultural policy development, alternative food programme, development of essential drugs, and biodiversity conservation action plan for Bangladesh. Since limited work has been done in the field of ethnobotanical research in Bangladesh, information of Mandi botanical knowledge documented in this paper is almost new at academic ethnobotanical paradigm. Some specific suggestions are articulated as below.

- Before entering into 'new technology' and 'modern medicine', ethnobotanical and traditional knowledge of all ethnic groups of Bangladesh are to be documented with a proper 'Free Prior Informed Consent' way.
- The land and natural resource rights of the ethnic people are to be ensured. Anti-ethnic, anti-ecological development processes like large dams, eco-park or any other infrastructural developments should not be undertaken, which destroy life, livelihoods, resources and ethnobotanical practices.
- Ethnic people's traditional knowledge and culture is to be conserved with active help of proper policy framework. Eco-friendly policy and laws are to be formulated for conservation of medicinal and economic plant species. Successful enactment of the draft 'Biodiversity and Community Knowledge Protection Act, 1998' could be a good example in this regard.

**Table 1. Plants used by the Mandi ethnic communities of Dhaka and Sylhet Divisions.**

| Sl. No. | Scientific name  | Family           | Mandi name            | Location (Village, District)       | Use   |
|---------|--|------------------|-----------------------|------------------------------------|---|
| 1.      | <i>Abutilon indicum</i> (L.) Sweet.                    | Malvaceae        | Ha-nijang-zalek       | Thanarbaid, Tangail                | Leaf and root paste is used for migraine pain.  |
| 2.      | <i>Achyranthes aspera</i> L.                           | Amaranthaceae    | Mimang-khachi         | Menkifanda, Netrokona              | Root juice is used treating worms and inflammation in urinary tract.  |
| 3.      | <i>Acorus calamus</i> L.                               | Araceae          | Phachi, Chisik        | Sagordighi, Netrokona              | Leaf juice is used for children in "Baw-batasi" (any physical change caused by evil spirits) disease.   |
| 4.      | <i>Adhatoda vasica</i> Nees                            | Acanthaceae      | Alok-bizak            | Narayantala, Sunamganj             | Decoction of twig is used in cough and cold.  |
| 5.      | <i>Agaricus campestris</i> L.                          | Agaricaceae      | Na-phang              | Sagordighi, Netrokona              | Plant juice and edible mushroom are used to cure menstruation problem.  |
| 6.      | <i>Aloe vera</i> L. (Syn. <i>A. barbadensis</i> Mill.) | Liliaceae        | Dip-thi-kanchon       | Ranikhong, Netrokona               | Leaves are cut into small pieces and soaked in water, the extract mixed with sugar is used for liver complications and to remove tiredness.         |
| 7.      | <i>Amaranthus spinosus</i> L.                          | Amaranthaceae    | Kuriakanta, Kulelhara | Farongpara & Menkifanda, Netrokona | Slightly warm root paste is applied locally on boils. Whole plant paste is used as ointment for rheumatic pain. See also <i>Benincasa hispida</i> . |
| 8.      | <i>Amorphophallus bulbifer</i> (Roxb.) Bl.             | Araceae          | Chung-muru, Baghadumm | Ranikhong, Netrokona               | Used as vegetables.   |
| 9.      | <i>Andrographis paniculata</i> Nees                    | Acanthaceae      | Gumkhah-sum           | Hagurakuri, Tangail                | Leaf juice is used for fever and pain.  |
| 10.     | <i>Aristolochia indica</i> L.                          | Aristolochiaceae | Chong-khengsum        | Thanarbaid, Tangail                | Leaf and tuber paste is used as ointment in burning.  |

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**Table 1. (Contd.)**

| Sl. No. | Scientific name  | Family          | Mandi name          | Location (Village, District)           | Use   |
|---------|--|-----------------|---------------------|--|---|
| 11.     | <i>Artemisia nilagirica</i> (Clarke) Pamp                                    | Asteraceae      | Nagdewna, Ramanisam | Sagordighi, Netrokona; Chonia, Tangail | Leaf juice is used to treat leprosy. Young twig is used in preparation of fermenting medium "Chumanti" for traditional liquor "Chu". Fresh leaf juice is used for liver pain and dysentery.   |
| 12.     | <i>Artocarpus heterophyllus</i> Lamk.  | Moraceae        | Thibrong            | Sagordighi, Netrokona; Chonia, Tangail | Stem gall is tied to the affected testis to prevent hernia. Timber is used for "K'ma/Khima" (monument for dead person).   |
| 13.     | <i>Asparagus recemosus</i> L. (Syn. <i>A. officinalis</i> L.)                | Liliaceae       | Mimang-thamachii    | Chonia, Tangail                        | Root juice is used to increase sperm count.   |
| 14.     | <i>Bambusa longispiculata</i> Gamble ex Brandis                              | Poaceae         | Tolah-wah           | Chonia, Tangail                        | Used for making the socio-religious musical instrument "Alongma", "Bangsi" and "Adori".   |
| 15.     | <i>Basella alba</i> L. (Syn. <i>B. rubra</i> L.)                             | Basellaceae     | Puisak              | Sagordighi, Netrokona                  | Leaf and stem paste is used for headache. See also <i>Benincasa hispida</i> .   |
| 16.     | <i>Bauhinia vahlii</i> W. et A.  | Caesalpiniaceae | Lota-kanchan-phang  | Khazai, Tangail                        | Fruits are eaten raw or roasted when mature.  |
| 17.     | <i>Benincasa hispida</i> (Thunb.) Cogn.                                      | Cucurbitaceae   | Ak-kharu            | Sagordighi, Netrokona                  | Paste made of "Ak-kharu" seed, <i>Basella alba</i> leaf, <i>Amaranthus spinosus</i> root and garlic is used to treat "Jal-batasi" (after pregnancy, excess secretion of menstruation blood) disease in women. See also <i>Physalis minima</i> . |
| 18.     | <i>Bixa orellana</i> L.  | Bixaceae        | Ronjak-phang        | Boheratoli, Netrokona                  | Seeds are used to make red dye.   |
| 19.     | <i>Bombax ceiba</i> L. (Syn. <i>Salmalia malabarica</i> (DC.) Sch. & Endle.) | Bombacaceae     | Man-chow            | Bhabanipur (North), Netrokona          | The religious worship "Asong-meddi" is only performed under this tree for preventing pox and cholera.   |

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| Sl. No. | Scientific name  | Family        | Mandi name       | Location (Village, District)          | Use  |
|---------|--|---------------|------------------|---------------------------------------|--|
| 20.     | <i>Borassus flabellifer</i> L.   | Areaceae      | Tal-phang        | Telungia & Utrail, Netrokona          | Fresh flower paste is used to relieve the inflammation of breast. Leaves are used in the religious worship "Jolkuri-Meddi".  |
| 21.     | <i>Bridelia retusa</i> Spreng  | Euphorbiaceae | Heja             | Chonia, Tangail                       | Ripe fruits are edible.  |
| 22.     | <i>Bryophyllum pinnata</i> (Lamk.) Pers. (Syn. <i>Bryophyllum calycinum</i> Salisb.) | Crassulaceae  | Samjangi         | Sagordighi, Netrokona                 | Leaves are wrapped with banana leaf and put in hot ashes until it becomes soft and half-boiled. Then it is squeezed to extract the juice to use for dysentery and improving sexual strength. |
| 23.     | <i>Cajanus cajan</i> (L.) Millsp. (Syn. <i>C. indicus</i> Spreng.)                   | Papilionaceae | Mendu            | Utrail, Netrokona                     | Fresh leaf juice is mixed with sugar and is used in jaundice.  |
| 24.     | <i>Canna indica</i> L. var. <i>speciosa</i>  | Cannaceae     | Diggi-walsun     | Sagordighi, Netrokona                 | Paste made of tuber of "Diggi-walsun" and fruit ash of "Bhoittyakola" ( <i>Musa sapientum</i> L. var. <i>sylvestris</i> ) is used in excess menstruation.                                    |
| 25.     | <i>Cardiospermum halicacabum</i> L.  | Sapindaceae   | Gondoli, Sithapu | Menkifanda, Netrokona; Gaira, Tangail | Young twig juice is applied locally on eyes to prevent inflammation of eyes. Green fruits are edible. Root paste is used for dyspepsia of cattle.  |
| 26.     | <i>Careya arborea</i> Roxb.  | Lecythidaceae | Dombel           | Thanarbaid, Tangail                   | Decoction of stem-bark is used as red dye.   |
| 27.     | <i>Caryota urens</i> (L.) Kirt   | Areaceae      | Souii-phang      | Baragup, Sunamganj                    | Sun-dried seeds are used as a substitute for <i>Areca catechu</i> and used with betel leaf as a chewing material.  |
| 28.     | <i>Celosia cristata</i> L.   | Amaranthaceae | Shibjota         | Monikura, Mymensingh                  | Young leave is cooked with small fish and is used for excess menstruation.   |

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| Sl. No. | Scientific name  | Family        | Mandi name                     | Location (Village, District)               | Use  |
|---------|--|---------------|--------------------------------|--|--|
| 29.     | <i>Centella asiatica</i> (L.) Urban.   | Apiaceae      | Misi-nachil, Thorkuri          | Menkifanda, Netrokona; Kakorkandi, Sherpur | Leaf paste is used for rheumatic pain. Paste made of leaves of "Misi-nachil" and "Jhinga" ( <i>Luffa acutangula</i> ) seeds is used internally for dog bites. Roasted leaf juice is used in jaundice.                            |
| 30.     | <i>Chrysopogon aciculatus</i> (Retz.) Trin. (Syn. <i>Andropogon aciculatus</i> Retz.)          | Poaceae       | Nengra-bon                     | Lengooro & Menkifanda, Netrokona           | Root juice is used in liver pain. Inflorescence paste is applied on scabies after slight scrapping.  |
| 31.     | <i>Cinnamomum tamala</i> (Buch.-Ham.) Nees & Eberm.  | Lauraceae     | Tejpata                        | Sagordighi, Netrokona                      | Juice made of fresh young leaf of "Tejpata" and whole plant of "Sarnalot" ( <i>Cuscuta reflexa</i> ) is used to treat jaundice.  |
| 32.     | <i>Cissus quadrangularis</i> L. (Syn. <i>Vittis quadrangularis</i> )                           | Vitaceae      | Moi-bhanga lot, Diggi-therengi | Berui, Mymensingh                          | Plant paste is used in the treatment of fractured bones.   |
| 33.     | <i>Cleistocalyx operaculatus</i> (Roxb.) Merr. & Perry. (Syn. <i>Eugenia operculata</i> Roxb.) | Myrtaceae     | Bol-rujol-phang                | Chonia, Tangail                            | Ripe fruits are edible.  |
| 34.     | <i>Clerodendrum viscosum</i> Vent.   | Verbenaceae   | Samkhu-khuku-phang, Samakhsi   | Baromari, Sherpur; Thanarbaid, Tangail     | Young twig is used in preparation of fermenting medium "Chumanti" for traditional liquor "Chu". Young leaf juice is mixed with sugar and used for ascaris and liver pain.  |
| 35.     | <i>Coix lachryma-jobi</i> L.   | Poaceae       | Riksiri, Simpuli               | Sagordighi, Netrokona; Thanarbaid, Tangail | Root paste is used for treating leprosy. Paste made of "Riksiri" tuber, "Tulsi phang" ( <i>Ocimum sanctum</i> ) leaf, and "Belathiphang" ( <i>Aegle marmelos</i> ) leaf is used as female oral contraceptive after menstruation. |
| 36.     | <i>Commelina benghalensis</i> L.   | Commelinaceae | Ankhi-zachi, Hanki-zachi       | Chonia, Tangail                            | Whole plant juice is used for children's late-walking.   |

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|---------|---|----------------|----------------------|-----------------------------------|--|
| 37.     | <i>Crinum defixum</i> Ker.  | Amaryllidaceae | Dukkhanu-sheng       | Gaira, Tangail                    | Tuber paste is mixed with table salt and is used for flatulence of cattle.   |
| 38.     | <i>Curcuma amada</i> Roxb.  | Zingiberaceae  | Diggi, Diggi-thegacu | Ranikhong & Sagordighi, Netrokona | Tuber paste is used against evil spirits. Root juice is used to treat impotency.   |
| 39.     | <i>Curcuma caesia</i> Roxb.   | Zingiberaceae  | Sammi-seng           | Chonia & Pirgacha, Tangail        | Fresh tuber juice is used as an antidote after poisoning. Tuber paste is used for liver pain.  |
| 40.     | <i>Dendrophthoe falcata</i> (L. f.) Etting. (Syn. <i>Loranthus longiflorus</i> Desr.) | Loranthaceae   | Dorangsi-phang       | Sagordighi, Netrokona             | Leaf paste is mixed with ginger ( <i>Zingiber officinale</i> ) and used to treat fractured bones.  |
| 41.     | <i>Dillenia indica</i> L.   | Dilleniaceae   | Thigi                | Valukapara, Mymensingh            | Decoction of fruit mixed with table salt is used for dyspepsia of domestic pig.  |
| 42.     | <i>Dioscorea alata</i> L. var. <i>globosa</i>   | Dioscoreaceae  | Tha-mandi            | Madhupur, Tangail                 | One of the main homestead crops of Mandi in Madhupur <i>sal</i> ( <i>Shorea robusta</i> ) forest areas. Tuber and bulbil of this plant used in the main jhum festival 'wann.a (wangala)'.<br>Tuber paste is used as poison in hunting. |
| 43.     | <i>Dioscorea</i> sp.  | Dioscoreaceae  | Tha-ak               | Sainnamari & Thanarbaid, Tangail  |  |
| 44.     | <i>Drynaria quercifolia</i> (L.) J. Smith   | Polypodiaceae  | Doreng-jasi          | Monsapara, Mymensingh             | Rhizome paste is used to protect children from evil spirit.  |
| 45.     | <i>Elentherine plicata</i> Hub  | Liliaceae      | Chinisum             | Pirgacha, Tangail                 | Bulb paste is used for dysentery and liver pain.   |
| 46.     | <i>Eleusine indica</i> (L.) Gaerten   | Poaceae        | Gang-ring-phang      | Sagordighi, Netrokona             | Whole plant juice is used in wounds and cuts.  |

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| Sl. No. | Scientific name  | Family          | Mandi name             | Location (Village, District)          | Use  |
|---------|--|-----------------|------------------------|---------------------------------------|--|
| 47.     | <i>Erythrina variegata</i> L.  | Papilionaceae   | Mandar-phang, Kantab   | Birishiri, Netrokona; Chonia, Tangail | Stem and shoot are used in "Ramachittya" (funeral procession). Stem-gum is used for dysentery.   |
| 48.     | <i>Euphorbia antiquorum</i> L.   | Euphorbiaceae   | A-rong-jora            | Menkifanda, Netrokona                 | Whole plant paste is used in treating fractured bones.   |
| 49.     | <i>Euphorbia hirta</i> L.  | Euphorbiaceae   | Khatri-bi-phang        | Hagurakuri, Tangail                   | Leaf paste is used in skin diseases.   |
| 50.     | <i>Ficus benghalensis</i> L.   | Moraceae        | Prup-phang             | Menkifanda, Netrokona                 | Dried aerial root burnt and the "Khar" (ash) is used in vegetable preparation instead of oil. This tree has a sacred value also.                             |
| 51.     | <i>Ficus racemosa</i> L. (Syn. <i>F. glomerata</i> Roxb.)                                | Moraceae        | Koudra-phang, Twe-aek  | Sagordighi, Netrokona                 | Seed paste is used in piles. Young twig juice is used for diabetes.  |
| 52.     | <i>Ficus religiosa</i> L.  | Moraceae        | Gitingbel              | Telungia, Netrokona                   | Dried aerial root burnt and the "Khar" (ash) is used in vegetable preparation in place of oil. This tree is sacred.  |
| 53.     | <i>Flacourtia jangomas</i> (Lour.) Raeusch. (Syn. <i>F. cataphracta</i> Roxb. ex Willd.) | Flacourtiaceae  | Che-marang, Dari-chick | Menkifanda, Netrokona                 | Paste of 7 young twigs of "Che-marang" and "Nailla" ( <i>Corchorus copsisularis</i> ) seeds is used in infertility of women after four days of menstruation. |
| 54.     | <i>Flemingia semialata</i> Roxb. ex. Ait. (Syn. <i>F. congesta</i> Roxb. ex. Ait.)       | Papilionaceae   | Do-fatchi              | Thanarbaid, Tangail                   | Root and young twig juice is used for gastric problem.   |
| 55.     | <i>Ganoderma</i> sp.   | Ganodermataceae | Kanchata, Kanchara     | Sagordighi, Netrokona                 | Sun-dried fruit body burnt and the ash is soaked in water and used for children's "Dudsari" (diarrhoea of children after breastfeeding).                     |

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| Sl. No. | Scientific name  | Family        | Mandi name              | Location (Village, District)                 | Use   |
|---------|--|---------------|-------------------------|--|---|
| 56.     | <i>Gmelina arborea</i> Roxb.                               | Verbenaceae   | Gambari-phang           | Chonia, Tangail                              | Timber is used for making the socio-religious musical instrument "Dama", and also to make "K'ma/Khima" (monument for dead person).  |
| 57.     | <i>Gossypium arboreum</i> L. (Syn. <i>G. herbaceum</i> L.) | Malvaceae     | Chon-na-khel            | Achkipara, Mymensingh; Boheratoli, Netrokona | Oil extracted from the seeds is used in lamps. The plant is the main source of cotton fibre for Mandi clothes.  |
| 58.     | <i>Hibiscus sabdariffa</i> L.                              | Malvaceae     | Menda-guru              | Pirgacha, Tangail                            | Young twig and fruit are used as vegetables.  |
| 59.     | <i>Hyptis suaveolens</i> (L.) Poir.                        | Lamiaceae     | Do-ju                   | Menkifanda, Netrokona                        | Sun-dried seeds are soaked in water for 12 hrs. The mucilaginous extract is used for constipation.  |
| 60.     | <i>Imperata cylindrica</i> (L.) P. Beauv                   | Poaceae       | Gong-chamri             | Rajai, Sunamganj                             | 'Sanksarek Mandi' (animist) believes that, creator "Bagoba-borombi" first created this plant in this world. This plant is the main thatching material in the areas.   |
| 61.     | <i>Jatropha gossipifolia</i> L.                            | Euphorbiaceae | Krendagichha, Balgechak | Sagordighi, Netrokona                        | Paste made of young twig of "Krendagichha" and <i>Tamarindus indica</i> seed is used to relieve piles pain.   |
| 62.     | <i>Justicia gendarusa</i> L.                               | Acanthaceae   | Dojagappi               | Menkifanda, Netrokona                        | Paste made of "Dojagappi" leaf and "Nisinda" ( <i>Vitex negundo</i> ) leaf is used in the wounds.   |
| 63.     | <i>Kaempferia pulchra</i> (Syn. <i>K. marginata</i> )      | Zingiberaceae | Wak-fatra               | Sagordighi, Netrokona                        | Tuber paste is used in the treatment of pneumonia and bronchial complaints.   |
| 64.     | <i>Lagenaria siceria</i> Standl.                           | Cucurbitaceae | Fong                    | Chonia, Tangail                              | Sun-dried fruit shell is used as "Fong-reng", "Fong-shen" and "Fong-saljong" (utensils used for drink traditional liquor "Chu" and sometimes women conserve different types of crop seeds in this natural shell-pot). |

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**Table 1. (Contd.)**

| Sl. No. | Scientific name   | Family        | Mandi name               | Location (Village, District)                      | Use   |
|---------|---|---------------|--------------------------|---|---|
| 65.     | <i>Lannea coromandelica</i> (Houtt.) Merr. (Syn. <i>L. grandis</i> (Dennst.) Eng.)              | Anacardiaceae | Gika-phang               | Utrail, Netrokona; Bheduria & Thanarbaid, Tangail | Green fruit is used in chicken pox. Decoction of stem-bark is used as red dye. Stem and shoot are used in "Ramachittya" (funeral procession).   |
| 66.     | <i>Lasia spinosa</i> (L.) Thw. (Syn. <i>L. heterophylla</i> Schoott., <i>L. aculeata</i> Lour.) | Araceae       | Chongi-bret, Gong-mentre | Rajai, Sunamganj                                  | Used as vegetables.   |
| 67.     | <i>Leea macrophylla</i> Roxb.   | Leeaceae      | Udum-sam, Athi-nachel    | Chonia & Jolchotra, Tangail                       | Leaf and root cut into small pieces and soaked in water for 4-5 hrs. The mucilaginous extract is used for increasing sperm count. Leaf paste is used for treating fractured bones.  |
| 68.     | <i>Leucas indica</i> (L.) R. Br. ex Vatke   | Lamiaceae     | Domkolos, Korponath      | Menkifanda, Netrokona                             | Inflorescence and root paste is used in insect and snake bites.   |
| 69.     | <i>Lygodium</i> sp.   | Lygodiaceae   | Royatoop                 | Menkifanda, Netrokona                             | Rhizome stalk paste is mixed with sugar and used in gonorrhoea.   |
| 70.     | <i>Mangifera indica</i> L.  | Anacardiaceae | Thegachu                 | Birishiri, Netrokona; Narayantala, Sunamganj      | Fresh stem-bark juice is mixed with sugar and is used for dysentery. Leaf is used in the ritual "Reen-chottya". Timber is used to make "K'ma/Khima" (monument for dead person).   |
| 71.     | <i>Manihot esculenta</i> Crantz.  | Euphorbiaceae | Tha-bol-chu              | Sagordighi, Netrokona; Thanarbaid, Tangail        | One of the main crops in Mandi areas. Tuber paste is used in preparation of fermenting medium "Chumanti" (traditional yeast cake) for traditional liquor "Chu". Dried leaf and stem are burnt and the ash ("Khar") is used in cooking instead of oil. |
| 72.     | <i>Marsilea quadrifoliata</i> L.  | Marsileaceae  | Mikhampret, Sampret      | Menkifanda, Netrokona                             | Whole plant paste is soaked in hot water and is used for treating toothache.  |

(Contd.)

**Table 1. (Contd.)**

| Sl. No. | Scientific name   | Family        | Mandi name                 | Location (Village, District)                    | Use  |
|---------|---|---------------|----------------------------|---|--|
| 73.     | <i>Melastoma malabathrica</i> L   | Melastomaceae | Kakku-phang                | Rajai, Sunamganj                                | Stem is used as toothbrush.  |
| 74.     | <i>Microcos paniculata</i> L. ex W. & A. (Syn. <i>Grewia microcos</i> Wall. ex Mast.) | Tiliaceae     | Dhamsi-bret, Datoi-phang   | Rajai, Sunamganj                                | Ripe fruits are edible.  |
| 75.     | <i>Mikania cordata</i> (Burm. f.) Roxb.   | Asteraceae    | Athisaheph                 | Chonia, Tangail                                 | Young leaf are fried in oil and eaten by persons suffering from gastric pain.  |
| 76.     | <i>Mimosa pudica</i> L.   | Mimosaceae    | Ambi-michhum, Sammachup    | Baragup, Sunamganj                              | Dried root tied to the arm in the treatment of women's infertility. Root paste is applied locally for alleviating inflammation of breast.  |
| 77.     | <i>Moringa oleifera</i> Lamk. (Syn. <i>M. peterygosperma</i> Gaertn.)                 | Moringaceae   | Sajna-phang                | Sainnanaari, Tangail                            | Fresh stem bark paste is used in the treatment of fractured bones.   |
| 78.     | <i>Musa ornata</i> Roxb   | Musaceae      | Thirik-phang, Echim-chimri | Bhabanipur & Utrail, Netrokona; Khazai, Tangail | "Sanksarek Mandi" (animist) believes that, the creator "Bagoba-borombi" first created this plant in this world. Dried inflorescence axis with sheaths is burnt and the "Khar" (ash) is used in vegetable preparation instead of oil. Pseudostem is used in the religious worship "Bidaw-E-Chibal" for edema during and after pregnancy of women. Whole plant is used in the religious worship "Ronsri-meddi" for good health and wealth. |
| 79.     | <i>Nymphaea nouchali</i> Burm. f.   | Nymphaeaceae  | Bibalchak, Gechhak-afluk   | Sagordighi, Netrokona                           | Rhizome paste is used to treat menstruation problem.   |
| 80.     | <i>Opuntia dilenii</i> Haw.   | Cactaceae     | Narpanda-siju              | Sagordighi, Netrokona                           | Stem latex is used in eye diseases of cattle.  |

(Contd.)

**Table 1. (Contd.)**

| Sl. No. | Scientific name  | Family           | Mandi name              | Location (Village, District)       | Use  |
|---------|--|------------------|-------------------------|------------------------------------|--|
| 81.     | <i>Peperomia pellucida</i> Kunth.  | Piperaceae       | Samol-phang, Phannachii | Taltala, Tangail                   | Whole plant juice is used in wounds. Sun-dried plant pieces is tied with a piece of black thread to the hip of women in edema.                       |
| 82.     | <i>Persicaria lanatum</i> Roxb.  | Polygonaceae     | Hagra                   | Menkifanda, Netrokona              | Root mixed with "Gomenda" ( <i>Cucurbita maxima</i> ) fruit-bark and table salt and made into paste. This paste is also used to relieve finger pain. |
| 83.     | <i>Phyllanthus emblica</i> L. (Syn. <i>Emblia officinalis</i> Gaertn. )            | Euphorbiaceae    | Ambori-phang            | Chonia, Tangail                    | Fruits are edible.   |
| 84.     | <i>Physalis minima</i> L.  | Solanaceae       | Ambichok                | Sagordighi, Netrokona              | Leaf juice is mixed with "Ak-kharu" ( <i>Benincasa hispida</i> ) seed juice and is used locally in eye diseases.                                     |
| 85.     | <i>Poinciana pulcherrima</i> L. (Syn. <i>Caesalpinia pulcherrima</i> Swartz.)      | Caesalpinaceae   | Rummoth-phang           | Birishiri, Netrokona               | Young twig juice is used in abortion at 3 months of pregnancy. Fresh flower juice is used for cough and cold.  |
| 86.     | <i>Polycarpon prostratum</i> Forsk. (Syn. <i>P. loeflineae</i> Benth. et Hook. f.) | Caryophyllaceae  | Beng-bong-jathong       | Chonia, Tangail                    | Leaves are used as vegetables.   |
| 87.     | <i>Punica granatum</i> L.  | Punicaceae       | Dalim-phang             | Boheratoli & Menkifanda, Netrokona | Young twig paste is used for ascar of domestic pig. Decoction of root bark with table salt for expelling human worms.                                |
| 88.     | <i>Rauwolfia serpentina</i> Benth.   | Apocynaceae      | Do-grek-mi              | Thanarbaid, Tangail                | Root and leaf paste is made into pill, sun-dried and used in malarial fever.   |
| 89.     | <i>Saccharum spontaneum</i> L.   | Poaceae          | Kash                    | Utrail, Netrokona                  | Stem is used in worship of "Bagoba-borombi".   |
| 90.     | <i>Scoparia dulcis</i> L.  | Scrophulariaceae | Sam-khucuk              | Khazai, Tangail                    | Young twig and leaf are used as vegetables.  |
| 91.     | <i>Semecarpus anacardium</i> L. f.   | Anacardiaceae    | Baula, Bhewla-phang     | Pirgacha, Tangail                  | Seed kernel is edible.   |

(Contd.)

**Table 1. (Contd.)**

| Sl. No. | Scientific name   | Family           | Mandi name           | Location (Village, District)                 | Use  |
|---------|---|------------------|----------------------|--|--|
| 92.     | <i>Shorea robusta</i> Gaertn.   | Dipterocarpaceae | Bolsal, Bor-shalphan | Chonia, Gaira, Khazai & Thanarbaid, Tangail  | Stem-bark juice is used to treat ulceration of mouth. Stem resin is used as insect/mosquito repellent. Stem-bark is used to make red dye. Seed can be eaten after roasted. Timber is used to make "K'ma/Khima" (monument for dead person). |
| 93.     | <i>Sida cordata</i> (Burm.f.) Borssum. (Syn. <i>S. veronicaefolia</i> Lam.) | Malvaceae        | Sam-fathal           | Menkifanda, Netrokona                        | Paste made of "Sam-fathal" root and "Gokkared" ( <i>Costus speciosus</i> ) rhizome is used in gonorrhoea.  |
| 94.     | <i>Sida</i> sp.   | Malvaceae        | Sam-fathal           | Birishiri, Netrokona                         | Whole plant paste is used for rheumatic pain. Decoction of seed is used to increase sperm count.   |
| 95.     | <i>Smilax zeylanica</i> L. (Syn. <i>S. macrophylla</i> Roxb.)               | Smilacaceae      | Sam-refu             | Chonia, Tangail                              | Decoction of leaf mixed in warm water and is used in bath for children with "Pesera" (measles).  |
| 96.     | <i>Solanum melongena</i> Wall.  | Solanaceae       | Misinachole          | Birishiri, Netrokona; Narayantala, Sunamganj | Leaf juice is mixed with sugar and is used in dysentery. Leaf juice is mixed with mother's milk and is used in diarrhoea in infants.   |
| 97.     | <i>Solanum xanthocarpum</i> L.  | Solanaceae       | Khuka, Bekaigota     | Bhabanipur (North) & Lengoora, Netrokona     | Dried fruit is used in preparation of "Chumanti" (preparation medium of traditional liquor "Chu"). Fruits fried in oil and is used for scabies.  |
| 98.     | <i>Sterblus asper</i> Lour.   | Moraceae         | Shawla               | Songra, Mymensingh; Menkifanda, Netrokona    | It is locally believed that, evil spirit live in this tree. So it is not planted in homesteads. Ripe fruits are eaten by children. Paste of root-bark is used in dysentery.  |

(Contd.)

**Table 1. (Contd.)**

| Sl. No. | Scientific name  | Family           | Mandi name               | Location (Village, District) | Use   |
|---------|--|------------------|--------------------------|------------------------------|---|
| 99.     | <i>Tamarindus indica</i> L.  | Caesalpiniaceae  | Amlichuka, Tintili-phang | Menkifanda, Netrokona        | Decoction of ripe fruit pulp is used for dyspepsia of domestic pig.   |
| 100.    | <i>Thysanolaena maxima</i> (Roxb.) Kuntze. (Syn. <i>Agrostis maxima</i> Roxb.)             | Poaceae          | Sarla-phang              | Rajai, Sunamganj             | Used for making broom and thatching material.   |
| 101.    | <i>Trichosanthes bracteata</i> (Lamk.) Voigt. (Syn. <i>Modecca bracteata</i> Lamk.)        | Cucurbitaceae    | Mamalaru                 | Sainnamari, Tangail          | Dried fruit pulp soaked in water and the extract is used to alleviate liver complaints.                         |
| 102.    | <i>Utricularia flexuosa</i> Vahl.  | Lentibulariaceae | Joler-satmul             | Sagordighi, Netrokona        | Dried plant is used for menstruation problem.   |
| 103.    | <i>Vetiveria zizanioides</i> (L.) Nash   | Poaceae          | Bimachuba                | Sagordighi, Netrokona        | Paste of 7 young leaf-twigs is used in "Dudsari" (diarrhoea of children after breastfeeding).                   |
| 104.    | <i>Vigna sinensis</i> Endl. ex Hassk. (Syn. <i>V. catjang</i> var. <i>sinensis</i> Prain.) | Papilionaceae    | Kharek                   | Hagurakuri, Tangail          | This plant is the clan totem of "Nokrek" clan in Mandi society.   |
| 105.    | <i>Vitis latifolia</i> Roxb.   | Vitaceae         | Bon angur                | Pirgacha, Tangail            | Young leaf and stem are used as vegetables.   |
| 106.    | <i>Wedelia chinensis</i> (Osb.) Merrill. (Syn. <i>W. calendulaceae</i> Less.)              | Capparidaceae    | Baw-batasi               | Sagordighi, Netrokona        | Leaf juice is used for children in any physical change caused by supernatural power called "Kharap batas laga". |
| 107.    | <i>Withania somnifera</i> (L.) Dunal.  | Solanaceae       | Achothra                 | Thanarbaid, Tangail          | Root juice is mixed with lime water and used in diarrhoea.  |
| 108.    | <i>Zanthoxylum budrunga</i> (Roxb.) DC   | Rutaceae         | Kankoi, Khankoi          | Khazai, Tangail              | Young twig and leaf are used as vegetables.   |
| 109.    | <i>Zanthoxylum rhetsa</i> (Roxb.) DC.  | Rutaceae         | Sumu-cheng               | Chonia, Tangail              | Timber is used for making the religious musical instrument "Ambangii".  |

- Rights of every ethnic group (including the Intellectual Property Rights) to use traditionally used plant species for their own usage is to be ensured under the Convention on Biological Diversity (CBD).
- Active participation of the ethnic people in making decisions and formulating laws and state policies for ethnic people is to be ensured.
- All the medicinal, edible, economic and other threatened plants mentioned in this investigation can only be conserved through traditional knowledge and culture, which stated community-based conservation. All plant species are to be protected *in situ* with the co-operation of the ethnic and local people and of the Forest Department of the country.

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