LEAFY VEGETABLES IN CHAPAI NAWABGANJ DISTRICT OF BANGLADESH FOCUSING ON MEDICINAL VALUE

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Abstract

Leafy vegetables in Chapai Nawabganj district of Bangladesh was studied from January to December 2019. A total of 111 species belonging to 59 genera under 30 families were recorded, out of which, 52.25% species were wild and 46.84% species were cultivated in this study. Status of occurrence has been recorded for proper conservation management and sustainable utilization of the taxa resulting in 81.98% to be common, 17.11% as rare and 0.90% are found as vulnerable in the study area. A total of 93 medicinal plants have been documented with their uses for the cure of more than 53 diseases. The study showed that the people of Chapai Nawabganj district use leafy vegetables to treat their diseases. Therefore, the documented leafy vegetables should be further investigated for their efficacy and safety to be integrated into conventional medicine. Further more these leafy vegetables need to be conserved for their sustainable utilization.

Introduction

Leafy vegetables, also called potherbs, greens, or leafy greens, are plant leaves eaten as a vegetable, sometimes accompanied by tender petioles and shoots. Nearly one thousand species of plants with edible leaves are known (Rashid, 1999). Leafy vegetables most often come from short-lived herbaceous plants, such as lettuce and spinach. Woody plants of various species (Moringa oleifera, Murraya koinigii, Morus alba, Toona ciliata etc.) also provide edible leaves (NRC, 2015). They constitute a major portion of our diet and play an important part in alleviating malnutrition. FAO (2012) has estimated that about 870 million people are chronically undernourished in the period 2010-12 representing 12.5% of the global population, or one in eight people. In order to arrest the undernourished situation, much attention has been paid on the exploitation and utilization of unusual plant materials for food (Kawatra et al., 2001). Indigenous (traditional) vegetables are best defined as species that are locally important for the sustainability of economics, human nutrition and health, and social systems. Over the last decade, many studies have shown that fresh vegetables constitute important functional food components by contributing vitamins, iron, folic acid, mineral, biologically active compounds and photosysthetic pigments (Kmiecik et al., 2001; Su et al., 2002; Kimura and Rodriguez-Amaya, 2003). Vegetables also contain antioxidants which offer protection against many chronic disease including heart disease and certain types of cancer (Saxena, 1999).

In Bangladesh, people have a long heritage of taking leafy vegetables. However, very little attempt has been made to study the leafy vegetables of Bangladesh although they constitute a large proportion of the daily diet of the rural dweller of the country (Ali et al., 1977; Sarker and

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Hossain, 2009; Hassan, 2010, Rahman et al., 2015; Khatun et al., 2013; Rashid 1999). Despite the importance of leafy vegetables in the present day human lives, no systematic work has been carried out in the study area to identify and document the plant species. In view of potential beneficial attributes of leafy vegetables, there is a need to explore, identify and document the leafy vegetables of Chapai Nawabganj district, Bangladesh.

Materials and methods

Study area

Chapai Nawabganj is located on the north-western part of Bangladesh. It is a part of the Rajshahi Division and known for its special tone of local dialect. The north and west part of Chapai Nawabganj is bounded by Malda and Murshidabad district of India, east is by Naogaon District, and south-east is by Rajshahi District (BPC, 2001).

Data collection

The work is based on fresh materials collected during twenty three visits to Chapai Nawabganj district, Bangladesh from January to December 2019 to cover the seasonal variations as well. The visits covered all types of habitats, particular river bank, slope, village grove, fruit gardens and roadsides of the study area. Medicinal information was obtained through semi-structured interviews with knowledgeable people such as local ‘Kabiraj’ (local herbal doctor) and elderly people. A total of 161 informants having an age ranging from 21 to 69 years were interviewed using semi-structured interviewed method (Alexiades, 1996). Plant parts with either flower of fruits collected using traditional herbarium techniques to make voucher specimens for documentation.

Plant identification

Collected specimens have been critically examined, studied and identified. Identifications have been confirmed by consulting standard literatures (Hooker, 1877; Prain, 1903) and Herbarium of Rajshahi University (HRU). Nomenclature has been updated following recent literature (Ahmed et al., 2008-2009; Huq, 1986, and Pasha and Uddin, 2013).

Results and Discussion

Documentation of leafy vegetable taxa in Chapai Nawabganj district of Bangladesh was investigated. Out of 111 species, 106 belong to angiosperms, and 5 to pteridophytes. Among the angiospermic taxa Magnoliopsida is represented by 96 taxa and Liliopsida is represented by 10 taxa (Table 1). Distribution of leafy vegetables in the families shows variation. Cucurbitaceae is the dominant family represented by 16 species, followed by Amaranthaceae (13 species), Brassicaceae (9 species), Fabaceae (8 species), Araceae (8 species), Solanaceae (7 species), Convolvulaceae (7 species), Malvaceae (4 species) and Polygonaceae (4 species) (Table 1; Fig. 3). A single species is represented by 9 families while 2 to 3 species is represented by 12 families. Out of recorded species, 52.25% species were wild and 46.84% species were cultivated in the study area (Fig. 2). Status of occurrence has been recorded for proper conservation management and sustainable utilization of the taxa resulting in 81.98% to be common, 17.11% as rare and 0.90% are found as vulnerable in the study area (Fig. 1).

The collected information is comparable with the result of other studies in Bangladesh and abroad. In Bangladesh, 186 species were recorded as leafy vegetables (Khatun et al, 2013). A total of 24 species belonging to 22 genera and 16 families were collected and identified in Bogra district (Rahman et al, 2015). Narayanan and Kumar (2007) in India recorded a total of 102 wild edible leaves in Paniya, Kattunaikka and Kuruma tribes, but families consume 88, 43 and 21,
Table 1. Diversity of leafy vegetables in Chapai Nawabganj district, Bangladesh.

| Scientific name | Bangla name | Family     | Status of occurrence | Flowering time | Voucher number |
|-----------------|-------------|------------|----------------------|----------------|---------------|
| **Acalypha indica L.** | Muktajhuri | Euphorbiaceae | Common                | Mar-Oct        | MK 91         |
| **Amaranthus blitum L.** | Notiya shak | Amaranthaceae | Common                | Jan-Dec        | MK 29         |
| **Amaranthus gangeticus L.** | Lal shak | Amaranthaceae | Common                | Jun-Aug        | MK 124        |
| **Amaranthus lividus Roxb.** | Gobranotey | Amaranthaceae | Common                | Jan-Dec        | MK 31         |
| **Amaranthus oleracea L.** | Data shak | Amaranthaceae | Common                | Jan-Dec        | MK 122        |
| **Amaranthus polygonoides L.** | Notey shak | Amaranthaceae | Common                | Jan-Dec        | MK 33         |
| **Amaranthus tricolor L.** | Lal shak | Amaranthaceae | Common                | Jan-Dec        | MK 35         |
| **Amaranthus viridis L.** | Notey shak | Amaranthaceae | Common                | Jan-Dec        | MK 118        |
| **Alternanthera sessilis (L.) R. Br.** | Sachishak | Amaranthaceae | Common                | May-Oct        | MK 37         |
| **Alternanthera philoxeroides (Mart.) Griseb.** | Malancha | Amaranthaceae | Common                | Mar-Jun        | MK 116        |
| **Alternanthera bettzickiana L.** | Malancha | Amaranthaceae | Rare                  | Mar-Jun        | MK 39         |
| **Azadirachta indica A. Juss.** | Nimpata | Meliaceae | Common                | Mar-Apr        | MK 93         |
| **Alocasia indica Schott.** | Mankochu | Araceae | Common                | Aug-Oct        | MK 117        |
| **Amorphophalus bulbifer (Roxb.) Blume** | Olkochu pata | Araceae | Common                | Jul-Aug        | MK 36         |
| **Allium cepa L.** | Piaj. | Liliaceae | Common                | Feb-Apr        | MK 125        |
| **Allium sativum L.** | Rasun. | Liliaceae | Common                | Feb-Apr        | MK 28         |
| **Angiopteris evecta (Forst.) Hoffm.** | Dhekishak | Angiopteridaceae | Rare                  | Jan-Dec        | MK 127        |
| **Argemone mexicana L.** | Sialkata | Papaveraceae | Common                | Jan-Dec        | MK 133        |
| **Basella alba L.** | Puishak | Basellaceae | Common                | Nov-Feb        | MK 110        |
| **Benincasa hispida (Thunb.) Cogn.** | Chalkumra. | Cucurbitaceae | Common                | May-Sep        | MK 57         |
| **Boerhavia repens L.** | Punarnava | Nyctaginaceae | Common                | Jan-Dec        | MK 130        |
| **Brassica alba Hook.** | Sada sorisha shak | Brassicaceae | Common                | Mar-May        | MK 80         |
| **Brassica campestris Roxb.** | Sorisha shak | Brassicaceae | Common                | Mar-May        | MK 75         |
| **Brassica juncea L.** | Rai sorisha | Brassicaceae | Common                | Mar-May        | MK 78         |
| **Brassica napus L.** | Kalorishasha | Brassicaceae | Common                | Mar-May        | MK 77         |
| **Brassica oleracea L. var. botrydis** | Fulkopi | Brassicaceae | Common                | Dec-Feb        | MK 76         |
| **Brassica oleracea L. var. capitata** | Badhakopi | Brassicaceae | Common                | Dec-Feb        | MK 79         |
| **Brassica oleracea L. var. gangyloides** | Olkopi | Brassicaceae | Common                | Dec-Feb        | MK 74         |

(Contd.)
Table 1 contd.

| Scientific name | Bangla name | Family | Status of occurrence | Flowering time | Voucher number |
|-----------------|-------------|--------|----------------------|---------------|---------------|
| *Brassica rapa* L. | Shalgam | Brassicaceae | Common | Jan-Mar | MK 81 |
| *Bacopa monnieri* (L.) Pennel. | Brahmkishak | Scrophulariaceae | Rare | Jun-Aug | MK 42 |
| *Chenopodium album* L. | Bathua Shak | Chenopodiaceae | Common | Dec-Feb | MK 128 |
| *Chenopodium ambrosoides* L. | Bonbothua | Chenopodiaceae | Common | Mar-May | MK 27 |
| *Celosia cristata* L. | Moragphul | Amaranthaceae | Common | Jan-Dec | MK 114 |
| *Centella asiatica* (L.) Urb. | Thankuni | Apiaceae | Common | Feb-May | MK 58 |
| *Coriandrum sativum* L. | Dhaniya. | Apiaceae | Common | Dec-Feb | MK 97 |
| *Capsicum frutescens* Duch. | Mistikumra | Solanaceae | Common | Jan-Dec | MK 56 |
| *Cicer arietinum* L. | Boot | Fabaceae | Common | Jan-Dec | MK 70 |
| *Corchorus capsularis* L. | Deshipat | Tiliaceae | Common | Mar-Jun | MK 102 |
| *Corchorus olitorius* L. | Pat shak | Malvaceae | Common | Mar-Jun | MK 98 |
| *Coccinia cordifolia* (L.) Cogn. | Telakucha | Cucurbitaceae | Common | Mar-Dec | MK 96 |
| *Coccinia grandis* (L.) Voigt. | Telakucha | Cucurbitaceae | Common | Mar-Dec | MK 59 |
| *Cucumis melo* L. | Bangi | Cucurbitaceae | Common | Jan-May | MK 94 |
| *Cucumis sativus* L. | Shosha | Cucurbitaceae | Common | Jan-Dec | MK 61 |
| *Cucurbita maxima* Duch. | Mistikumra | Cucurbitaceae | Common | Mar-Aug | MK 92 |
| *Cucurbita sativus* Duch. | Kumra | Cucurbitaceae | Rare | Jan-Dec | MK 63 |
| *Cucurbita pepo* DC. | Mistikadu | Cucurbitaceae | Common | Mar-Aug | MK 90 |
| *Cucurbita moschata* Duch. | Mistikadu | Cucurbitaceae | Common | Mar-Aug | MK 65 |
| *Colocasia esculenta* (L.) Schott | Kachu | Araceae | Common | Dec-Mar | MK 119 |
| *Diplazium esculentum* Retz. | Dhekishak | Athyriaceae | Frequent | Jan-Dec | MK 26 |
| *Diplazium polybothriodes* Bl. | Dhekishak | Athyriaceae | Frequent | Jan-Dec | MK 129 |
| *Digera muricata* (L.) Mart. | Boutibon shak | Amaranthaceae | Vulnerable | Feb-Jul | MK 41 |
| *Enhydra fluctuans* Lour. | Helencha | Asteraceae | Common | Nov-Feb | MK 115 |
| *Glinus oppositifolius* (L.) Aug. DC. | Gima-sak | Molluginaceae | Common | Jan-Dec | MK 45 |
| *Hibiscus cannabinus* L. | Mestapat | Malvaceae | Common | Apr-Aug | MK 53 |
| *Hibiscus sabdariffa* L. | Lalmesta | Malvaceae | Common | Apr-Aug | MK 100 |
| *Hygrophila auriculata* (Schum.) Heyne. | Puninniya shak | Acanthaceae | Rare | Jan-Dec | MK 113 |
| *Ipomoea aquatica* Forssk. | Kalmi Shak | Convolvulaceae | Common | Jan-Oct | MK 105 |
| *Ipomoea batatas* (L.) Lamk. | Misti Alu. | Convolvulaceae | Common | Jan-Dec | MK 48 |
| *Ipomoea cairica* (L.) Sweet | Rail Lata | Convolvulaceae | Common | Jan-Dec | MK 107 |
| *Ipomoea fistulosa* (Mart. ex Choisy) | Dholkolmi | Convolvulaceae | Common | Jan-Dec | MK 46 |

(Contd.)
| Scientific name | Bangla name | Family | Status of occurrence | Flowering time | Voucher number |
|-----------------|-------------|--------|----------------------|----------------|---------------|
| Ipomoea indica (Burm.) Merr. | Kolmi | Convolvulaceae | Rare | Jan-Dec | MK 109 |
| Ipomoea purpurea (L.) Roth. | Beguni Kolmi | Convolvulaceae | Rare | Jul-Sep | MK 44 |
| Ipomoea quamoclit L. | Torulata | Convolvulaceae | Common | Jul-Sep | MK 111 |
| Lasia spinosa (L.) Thw. | Kantakachu | Araceae | Rare | Jan-Dec | MK 34 |
| Lactuca sativa L. | Lettuce | Asteraceae | Common | Jan-Mar | MK 38 |
| Lathyrus sativus L. | Kheshari | Fabaceae | Common | Jan-Mar | MK 23 |
| Lagenaria siceraria (Mol.) Stan. | Lau | Cucurbitaceae | Common | Feb-Apr | MK 88 |
| Luffa cylindrica (L.) Roem. | Dhundol pata | Cucurbitaceae | Common | Jun-Nov | MK 67 |
| Lathyrus hirsutus L. | Bon kheshari | Fabaceae | Common | Jan-Mar | MK 85 |
| Lathyrus sativus L. | Kheshari | Fabaceae | Common | Jan-Mar | MK 68 |
| Lens culinaris Medik. | Musuri | Fabaceae | Common | Jan-Dec | MK 87 |
| Moringa oleifera Lamk. | Sajna | Moringaceae | Common | Jan-Dec | MK 83 |
| Momordica carantia L. | Karolla | Cucurbitaceae | Common | May-Aug | MK 86 |
| Momordica dioica Roxb. | Kakrol | Cucurbitaceae | Common | Jul-Dec | MK 69 |
| Momordica cochinchinensis Roxb. | Kakrol | Cucurbitaceae | Common | Mar-Sep | MK 84 |
| Marsilea minuta (L.) Mant. | Susni shak | Marsileaceae | Common | Jan-Dec | MK 24 |
| Marsilea quadrifolia L. | Susni shak | Marsileaceae | Common | Jan-Dec | MK 131 |
| Malva verticilata L. | Napashak | Malvaceae | Rare | Jul-Sep | MK 55 |
| Mollugo pentaphylla L. | Tita shak | Molluginaceae | Rare | Jan-Dec | MK 108 |
| Mollugo spergula L. | Gima shak | Molluginaceae | Rare | Jan-Dec | MK 47 |
| Oxalis europaea L. | Amrul | Oxalidaceae | Common | Sep-Mar | MK 60 |
| Oxalis corniculata L. | Amrul | Oxalidaceae | Common | Sep-Mar | MK 95 |
| Portulaca oleracea L. | Baranunia | Portulacaceae | Common | May-Jul | MK 112 |
| Portulaca quadrijida L. | Chotonunia | Portulacaceae | Common | Jan-Dec | MK 43 |
| Pisum sativum L. | Matar | Fabaceae | Common | Jan-Dec | MK 64 |
| Phyllanthus niruri L. | Vuiamla | Euphorbiaceae | Common | Apr-Sep | MK 62 |
| Paederia foetida L. | Gandhabhaduli | Rubiaceae | Common | Jan-Dec | MK 40 |
| Raphanus sativus L. | Mula | Brassicaceae | Common | Jan-Mar | MK 72 |
| Rumex vesicarius L. | Takpalong | Polygonaceae | Rare | Jul-Aug | MK 106 |
| Rumex dentatus L. | Bon Palong | Polygonaceae | Common | Jul-Aug | MK 49 |
| Rumex maritimus L. | Bon Palong | Polygonaceae | Common | Jul-Aug | MK 104 |
| Rumex sanguineus L. | Bon Palong | Polygonaceae | Common | Jul-Aug | MK 51 |
| Sesuvium portulacastrum L. | Nuna shak | Aizoaceae | Common | Jan-Dec | MK 25 |
| Solanum americanum L. | Tit Begun | Solanaceae | Common | Jan-Dec | MK 99 |
### Table 1 contd.

| Scientific name          | Bangla name | Family         | Status of occurrence | Flowering time | Voucher number |
|--------------------------|-------------|----------------|----------------------|----------------|----------------|
| *Solanum nigrum* L.      | Tit Begun   | Solanaceae     | Common               | Jan-Dec        | MK 54          |
| *Solanum indicum* L.     | Tit Begun   | Solanaceae     | Rare                 | Jan-Dec        | MK 101         |
| *Solanum tuberosum* L.   | Alu         | Solanaceae     | Common               | Oct-Feb        | MK 52          |
| *Solanum villosum* L.    | Titbegun    | Solanaceae     | Common               | Jan-Dec        | MK 103         |
| *Solanum filisifolium* L.| Titbegun    | Solanaceae     | Common               | Jan-Dec        | MK 50          |
| *Spinacea oleracea* L.   | Palong Shak | Chenopodiaceae | Common               | Nov-Feb        | MK 126         |
| *Trichosanthes anguina* L.| Chichinga  | Cucurbitaceae  | Common               | Nov-Apr        | MK 71          |
| *Trichosanthes bracteata* Lam. | Makal.     | Cucurbitaceae  | Rare                 | Jul-Dec        | MK 82          |
| *Trichosanthes dioica* Roxb. | Potol.     | Cucurbitaceae  | Common               | Apr-Aug        | MK 73          |
| *Thyphonium trilobatum* (L.) Schott. | Ghet Kochu | Araceae       | Rare                 | Jan-Dec        | MK 30          |
| *Vigna mungo* (L.) Hepper | Mashkalai   | Fabaceae       | Common               | Nov-Jan        | MK 66          |
| *Vigna sinensis* (L.) Endl. | Borboti    | Fabaceae       | Rare                 | Apr-Jul        | MK 89          |
| *Xanthosoma atrovirens* L. | Moulovikochu | Araceae     | Rare                 | Aug-Oct        | MK 121         |
| *Xanthosoma sagittifolium* L. | Mukhikachu | Araceae       | Rare                 | Aug-Oct        | MK 32          |
| *Xanthosoma violaceum* L. | Dudd kachu  | Araceae       | Rare                 | Aug-Oct        | MK 123         |
| *Xanthium strumarium* L. | Ghagra      | Asteraceae     | Common               | Jan-Dec        | MK 136         |

Jan = January, Feb = February, Mar = March, Apr = April, May = May, Jun = June, Jul = July, Aug = August, Sep = September, Oct = October, Nov = November, Dec = December, C = Common, Vul = Vulnerable, R = Rare.

respectively. In South Africa, Vorster et al. (2007) recorded the following species: *Amaranthus* spp.; *Bidens pilosa*; *Chenopodium album*; *Corchorus* spp.; *Cucurbita* spp.; *Momordica balsamina*; and *Vigna unguiculata* as some of the more popular leafy vegetables in areas where they are widespread. In East and West Usambaras, Tanzania, Vainio-Mattila (2000) documented Acanthaceae, Amaranthaceae, Asteraceae, and Brassicaceae as the most important families of wild green leafy vegetables, among 26 reported families. In Kenya and other parts of East Africa traditional leafy vegetables are used by both rural and urban communities and include several families such as Amaranthaceae, Basellaceae, Brassicaceae, Cucurbitaceae, and Tiliaceae (Abukutsa and Onyango, 2005). Further, in Andhra Pradesh, India; Reddy et al. (2007) report 69 families of wild food plants, where four families: Amaranthaceae (11 species); Rubiaceae (9 species); Euphorbiaceae (8 species) and Papilionaceae (7 species); have a high number of species, with Amaranthaceae family having the highest number of species. Fleuret (1979) recorded more than 15 species of wild leafy vegetables in her study in the Lushoto district, Tanzania. Woodcook's (1995) studied on indigenous knowledge and forest use in the East Usambaras in Tanzania documents 25 wild leafy vegetable species. So far the information available, no published data recorded on the leafy vegetables in Chapai Nawabganj district, Bangladesh. The present study will also help in identifying the important leafy vegetables for future reference.

Present study demonstrated that there is an urgent need for documentation of traditional knowledge related to the intangible cultural heritage concerning wild vegetables are utilized. The
utilization and cultivation of these vegetables should be promoted to maintain the dietary needs of the household in Chapai Nawabganj district. The study can provide a baseline data that may be helpful for prioritization of conservation through sustainable use and management of the resources.

Medicinally Important Leafy Vegetables

Out of 111 species, 93 medicinal plants have been documented with their uses for the cure of more than 53 diseases. The medicinal plants are used by the local people to cure many of the diseases, especially for anemia, asthma, burning sensation, blood diseases, bronchitis, cough, chicken pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, headache, itches, jaundice, menstrual disease, paralysis, piles, sex problems, skin diseases, snake-bite, toothache, worm, wound etc. Different plant parts of different species are used as medicine for treating various diseases where; leaf of 65.76%, fruit of 17.11%, root of 9.90%, stem of 1.80%, seed of 19.81%, bulb of 1.80%, Corm of 2.70%, Flower of 2.70% and whole plant of 18.01% species were used as medicine (Fig. 4). The survey recorded 53 categories of uses of 93 medicinal leafy vegetables (Table 2). Out of 53 categories of ailments, Dysentery, fever, skin disease, cough, inflammation,
Table 2. Medicinal leafy vegetables are used by local people in Chapai Nawabganj, Bangladesh.

| Scientific name | Family | Bangla name | Parts used | Diseases treated | Formulations |
|-----------------|--------|-------------|------------|-----------------|--------------|
| *Acalypha indica* L. | Euphorbiaceae | Mukta jhuri | Leaf | Skin disease, asthma, wound, pneumonia, bronchitis | Leaf paste is applied externally; Leaf juice taken orally |
| *Amaranthus oleracea* L. | Amaranthaceae | Data shak | Leaf | Fever, anemia, kidney disease | Leaf juice taken orally |
| *Amaranthus polygonoides* L. | Amaranthaceae | Notey shak | Whole plant | Inflammation, gonorrhea, dysentery | Whole plant juice taken orally |
| *Amaranthus spinosus* L. | Amaranthaceae | Kanta notey | Leaf, Root | Burning sensation, eczema, leprosy, piles, bronchitis, leucorrhoea, constipation | Root paste taken externally; Leaf juice taken orally |
| *Amaranthus tricolor* L. | Amaranthaceae | Lalshak | Leaf | Cough, dysentery, cholera, wound | Leaf juice taken orally |
| *Amaranthus viridis* L. | Amaranthaceae | Noteyshak | Leaf, Root | Burning sensation, leprosy, bronchitis, piles, leucorrhoea | Root paste taken externally; Leaf juice taken orally |
| *Alternanthera sessilis* (L.) R. Br. | Amaranthaceae | Sachi Shank | Whole plant | Night blindness, malaria, diarrheaa, dysentery | Whole plant juice taken orally |
| *Alternanthera philoxeroides* (Mart.) Griseb. | Amaranthaceae | Malancha | Whole plant | Vomiting, constipation, night blindness, malaria | Whole plant juice taken orally |
| *Alternanthera bettzickiana* L. | Amaranthaceae | Malancha | Leaf | Anemia | Leaf juice taken orally |
| *Azadirachta indica* A. Juss. | Meliaceae | Neem | Leaf, Fruit | Skin diseases, itches, lice killer worm, ringworm | Leaf paste taken externally; ripe fruit is eaten |
| *Alocasia indica* Schott. | Araceae | Manchu | Whole plant | Influenza, diarrheaa, tuberculosis | Whole plant juice taken orally |
| *Amorphophalus bulbifer* (Roxb.) Blume | Araceae | Olkochu | Corm | Piles, gonorrhea | Corm juice taken internally |
| *Allium cepa* L. | Liliaceae | Phai | Bulb | Cough, asthma, rheumatism, colic, insect bites | Bulb juice taken internally |

(Contd.)
Table 2 contd.

| Scientific name                  | Family          | Bangla name | Parts used | Diseases treated                                      | Formulations                          |
|----------------------------------|-----------------|-------------|------------|-------------------------------------------------------|---------------------------------------|
| *Allium sativum* L.              | Liliaceae       | Rosun       | Bulb       | Fever, cough, bronchitis, rheumatism, indigestion, heart diseases | Bulb juice taken internally          |
| *Angiopteris evecta* (Forst.) Hoffm. | Angiopteridaceae | Dheki shak  | Bulb       | Constipation                                          | Bulb juice taken internally          |
| *Brassica juncea* L.             | Brassicaceae    | Rai sorisha  | Seed       | Arthritis, foot ache, tumor                           | Seed paste is taken externally       |
| *Brassica napus* L.              | Brassicaceae    | Kalo sorisha | Seed       | Gout, sciatica                                       | Seed paste is taken externally       |
| *Brassica oleracea* L. var. botrydis | Brassicaceae | Fulkopi     | Leaf       | Cancer                                                | Leaf juice taken internally          |
| *Brassica rapa* L.               | Brassicaceae    | Shalgam      | Leaf       | Cancer, chronic cough, bronchial catarrh              | Leaf juice taken internally          |
| *Basella alba* L.                | Basellaceae     | Puishak      | Root       | Gonorhrea, catarrhal affections                       | Root juice taken internally          |
| *Boerhaavia repens* L.           | Nyctaginaceae   | Punarnava    | Leaf, Root | Dysentry, jaundice, anemia, gonorhrea                 | Leaf and root juice taken internally |
| *Brassica alba* Hook.            | Brassicaceae    | Sada sorisha shak | Leaf | Inflamatory symptoms, rheumatic affections           | Leaf juice taken internally          |
| *Brassica campestris* Roxb.      | Brassicaceae    | Sorisha shak | Leaf       | Inflamatory symptoms, rheumatic affections           | Leaf juice taken internally          |
| *Benincasa hispida* (Thunb.) Cogn. | Cucurbitaceae | Chal kunra   | Fruit      | Epilepsy, heart diseases, tuberculosis, colic pain    | Fruit juice taken internally         |
| *Bacopa monnieri* (L.) Pennel.   | Scrophulariaceae | Brammi Shak  | Whole plant | Indigestion, diarrhoea, epilepsy                     | Whole plant juice taken internally   |
| *Coccinia cordifolia* (L.) Cogn  | Cucurbitaceae   | Telakucha    | Whole plant | Diabetes, epilepsy, asthma, fever, dropsy, gonorhrea  | Whole plant juice taken internally   |
| *Coccinia grandis* (L.) Voigt.   | Cucurbitaceae   | Telucha      | Leaf       | Diabetes, fever, gonorhrea                            | Leaf juice taken internally          |
| Scientific name               | Family                | Bangla name | Parts used | Diseases treated                                                                 | Formulations                  |
|------------------------------|-----------------------|-------------|------------|----------------------------------------------------------------------------------|-------------------------------|
| *Cucumis melo* L.            | Cucurbitaceae         | Bangi       | Fruit      | Liver and kidney troubles, fever, bronchitis                                       | Ripe fruit is taken           |
| *Cucumis sativus* L.         | Cucurbitaceae         | Sosha       | Leaf       | Throat affection                                                                   | Leaf juice taken internally   |
| *Cucurbita maxima* Duch.     | Cucurbitaceae         | Misti kumra | Leaf       | Burns, boils, inflammation                                                         | Leaf paste taken externally   |
| *Cucurbita sativus* Duch.    | Cucurbitaceae         | Kumra       | Leaf       | Throat affection                                                                   | Leaf juice taken internally   |
| *Cucurbita pepo* DC.         | Cucurbitaceae         | Mistikodu   | Seed       | Biliousness and burning sensation                                                  | Seed paste taken externally   |
| *Cucurbita moschata* Duch.   | Cucurbitaceae         | Mistikodu   | Seed       | Biliousness and burning sensation                                                  | Seed paste taken externally   |
| *Chenopodium album* L.       | Chenopodiaceae        | Botua shak  | Leaf       | Piles, dysentery, anorexia hiccup and intestinal ulcers                            | Leaf juice is taken internally|
| *Chenopodium ambrosioides* L.| Chenopodiaceae        | Banbatua    | Whole plant| Cholera ulcers, nervous affections                                                | Decoction of whole plant is taken internally |
| *Celosia cristata* L.        | Amaranthaceae         | Morog phul  | Flower     | Dysentery, cough, diarrhea, excessive menstrual discharges,                       | Flower juice is taken internally|
| *Corchorus capsularis* L.    | Tiliaceae             | Deshpai     | Leaf, Root | Dysentery, tonic, dyspepsia, liver disorders, gonorrhrea                            | Leaf and root juice is taken internally |
| *Corchorus olitorius* L.     | Tiliaceae             | Patshak     | Leaf       | Dyspepsia, liver disorders                                                         | Leaf juice is taken internally |
| *Cicer arietinum* L.         | Fabaceae              | Chola, boot | Seed       | Skin disease                                                                       | Seed paste taken externally   |
| *Centella asiatica* (L.) Urb.| Apiaceae              | Thankuni    | Whole plant| Eczema, leprosy, bronchitis, inflammations, fevers                              | Whole plant juice taken internally |
| *Coriandrum sativum* L.      | Apiaceae              | Doniya      | Leaf, fruit| Hiccup, piles, inflammation, jaundice                                             | Leaf juice is taken internally |
| *Capsicum frutescens* L.     | Solanaceae            | Morich      | Leaf       | Headache, night blindness, bronchitis, cough                                       | Leaf juice is taken internally |
| Scientific name                      | Family            | Bangla name | Parts used | Diseases treated                                      | Formulations                              |
|-------------------------------------|-------------------|-------------|------------|-------------------------------------------------------|-------------------------------------------|
| *Colocasia esculenta* (L.) Schott. | Araceae           | Kochu       | Leaf       | Tumors, ulcerated polyp, cancer of nose and warts      | Curry made from leaf is taken internally  |
| *Digera muricata* (L.) Mart.        | Amaranthaceae     | Boutibon shak | Leaf      | Biliousness, urinary discharges                        | Leaf juice is taken internally            |
| *Diplazium esculentum* Retz.        | Athyriaceae       | Dhekishak   | Frond     | Urinary problems and skin diseases                     | Frond juice is taken internally           |
| *Enhydra fluctuans* Lour.           | Asteraceae        | Helencha    | Leaf       | Skin and nervous affections                            | Leaf juice is taken internally            |
| *Glinus oppositifolius* (L.) Aug. DC.| Molluginaceae    | Gimashak    | Leaf       | Diabetes                                               | Leaf juice is taken internally            |
| *Hibiscus cannabinus* L.            | Malvaceae         | Mestapat    | Leaf       | Pains, earache, dysentery, biliousness                 | Leaf juice is taken internally            |
| *Hibiscus sabdariffa* L.            | Malvaceae         | Lalmesta    | Leaf       | Dysentery and diarrhea                                 | Leaf juice is taken internally            |
| *Hygrophila auriculata* (Schum.) Heyne. | Acanthaceae    | Punimnya shak | Leaf     | Diarrhea, dysentery, urinary discharges, inflammation, biliousness, anemia, constipation, cough | Leaf juice is taken internally            |
| *Ipomoea aquatica* Forssk.          | Convolvulaceae    | Kalmi Shak  | Flower     | Leucoderma, leprosy, fever, jaundice, biliousness, bronchitis and liver complaints | Flower juice is taken internally          |
| *Ipomoea batatas* (L.) Lamk.        | Convolvulaceae    | Misti Alu   | Whole plant| Fever, diarrhea                                        | Whole plant juice is taken internally     |
| *Ipomoea cairica* (L.) Sweet        | Convolvulaceae    | Rail Lata   | Leaf       | Rheumatism, inflammation                               | Leaf juice is taken internally            |
| *Ipomoea indica* (Burm.) Merr.      | Convolvulaceae    | Kolmi       | Leaf       | Broken bones                                           | Leaf paste taken externally              |
| *Ipomoea purpurea* (L.) Roth.       | Convolvulaceae    | Beguni kolmi | Leaf       | Hemorrhage, syphilis                                   | Leaf juice is taken internally            |
| Scientific name              | Family          | Bangla name | Parts used | Diseases treated                               | Formulations                        |
|-----------------------------|-----------------|-------------|------------|------------------------------------------------|--------------------------------------|
| *Ipomoea quamoclit* L.      | Convolvulaceae  | Torulata    | Whole plant| Bleeding piles                                  | Whole plant juice is taken internally|
| *Lagenaria sicera* (Mol.) Stan. | Cucurbitaceae  | Panilau     | Fruit      | Muscular pain, dry cough, piles, cholera        | Fruit juice is taken internally      |
| *Luffa cylindrica* (L.) Roem. | Cucurbitaceae  | Dhundol pata| Leaf       | Skin problems                                   | Leaf paste taken externally          |
| *Lens culinaris* Medik.     | Fabaceae        | Mosur       | Leaf, Seed | Constipation, intestinal affections.            | Leaf juice is taken internally       |
| *Lactuca sativa* L.         | Asteraceae      | Lettuce     | Leaf       | Headache, ophthalmia, prevents fall of hairs, inflammation | Leaf juice is taken internally       |
| *Lasia spinosa* (L.) Thw.   | Araceae         | Kanta kachu | Leaf       | Throat affections, piles                        | Leaf juice is taken internally       |
| *Momordica charantia* L.    | Cucurbitaceae   | Korola      | Fruit, Leaf| Body pain, diabetes, urinary disorder, fever, Jaundice | Leaf juice is taken internally       |
| *Momordica dioica* Roxb.    | Cucurbitaceae   | Kakrol shak | Leaf       | Bleeding piles, urinary complaints, hypertension, Diabetes | Leaf juice is taken internally       |
| *Mollugo pentaphylla* L.    | Molluginaceae   | Tita shak   | Leaf       | Asthma, mouth infections, eye diseases          | Leaf juice is taken internally       |
| *Mollugo spergula* L.       | Molluginaceae   | Gima shak   | Whole plant| Sore legs, menstrual discharge                  | Whole plant juice is taken internally|
| *Malva verticilata* L.      | Malvaceae       | Napashak    | Leaf       | Disorders of the skin, gastrointestinal tract, respiratory tract | Leaf juice taken internally          |
| *Moringa oleifera* Lamk.    | Moringaceae     | Sajna       | Leaf, fruit| General weakness, blindness, headache, paralysis and gastric problem | Leaf juice taken internally; fruit curry is taken internally |
| Scientific name                  | Family              | Bangla name     | Parts used | Diseases treated                                      | Formulations                          |
|---------------------------------|---------------------|-----------------|------------|-------------------------------------------------------|---------------------------------------|
| *Momordica cochinchinensis*     | Cucurbitaceae       | Kakrol          | Leaf       | Heart disease, ulceration                             | Leaf juice taken internally           |
| Roxb.                           |                     |                 |            |                                                       |                                       |
| *Marsilea minuta* (L.) Mant.    | Marsileaceae        | Susnishak       | Whole plant| Cough, respiratory troubles, hypertension, sleeping disorders, headache | Whole plant juice taken internally   |
| *Marsilea quadrifolia* L.       | Marsileaceae        | Susnishak       | Whole plant| Snakebite, abscesses                                  | Whole plant paste taken externally    |
| *Oxalis europea* L.             | Oxalidaceae         | Amrul           | Leaf       | Boils, abscess                                        | Leaf paste taken externally          |
| *Oxalis corniculata* L.         | Oxalidaceae         | Amrul           | Leaf       | Cough, dysentery, anemia, piles, dyspepsia, fever      | Leaf juice taken internally          |
| *Portulaca oleracea* L.         | Portulacaceae       | Borononia shak  | Whole plant| Scurvy, diseases of the liver, spleen, kidney gonorrhea, dysentery | Whole plant juice taken internally   |
| *Portulaca quadrifida* L.       | Portulacaceae       | Chotoniashek    | Whole plant| Piles, swellings, rheumatism                          | Whole plant juice taken internally   |
| *Pisum sativum* L.              | Fabaceae            | Motor           | Seed       | Burning of the skin                                   | Seed paste taken externally          |
| *Phyllanthus niruri* L.         | Euphorbiaceae       | Vuiamla         | Whole plant| Liver disease, kidney troubles, spleen disorder        | Whole plant juice taken internally   |
| *Paederia foetida* L.           | Rubiaceae           | Gondho Vaduli   | Leaf       | Liver, stomach troubles, diarrhea, dysentery          | Leaf juice taken internally          |
| *Rumex vesicarius* L.           | Polygonaceae        | Chuka palong    | Leaf       | Heart troubles, constipation, hiccup, asthma, bronchitis, piles | Leaf juice is taken internally       |
| *Rumex dentatus* L.             | Polygonaceae        | Bon Palong      | Root       | Coetaneous disorders                                  | Root juice is taken internally       |
| *Rumex maritimus* L.            | Polygonaceae        | Bon Palong      | Leaf, Seed | Ringworms, skin diseases                              | Fruit juice is taken internally; Seed paste taken externally |
| Scientific name                      | Family            | Bangla name | Parts used | Diseases treated                                                                 | Formulations                       |
|-------------------------------------|-------------------|-------------|------------|----------------------------------------------------------------------------------|------------------------------------|
| *Rumex sanguineus* L.               | Polygonaceae      | Bon Palong  | Seed       | Pain of back and lumber region, cures gleetes                                    | Seed paste is taken externally     |
| *Solanum americanum* L.             | Solanaceae        | Tit Begun   | Fruit      | Hepatitis B                                                                      | Fruit juice is taken internally    |
| *Solanum nigrum* L.                 | Solanaceae        | Tit Begun   | Leaf fruit | Liver disease, piles, dysentery, fever, diarrhea, bronchitis                      | Fruit juice is taken internally    |
| *Solanum indicum* L.                | Solanaceae        | Tit Begun   | Leaf       | Diabetes, asthma, dry cough, worms, fever                                         | Leaf juice is taken internally     |
| *Solanum villosum* L.               | Solanaceae        | Tit Begun   | Leaf       | Stomachache, fever, hypertension                                                  | Leaf juice is taken internally     |
| *Solanum filifolium* L.             | Solanaceae        | Tit Begun   | Whole plant| Spleen diseases, cough                                                           | Whole plant juice is taken internally |
| *Spinacea oleracea* L.              | Amaranthaceae     | Palong shak | Whole plant| Fevers, joint pain, inflammations of the lungs and bowels                        | Whole plant juice is taken internally |
| *Trichosanthus anguina* L.          | Cuzurbitaceae     | Chichinga   | Whole plant| Boils, skin diseases                                                             | Whole plant paste is taken externally |
| *Trichosanthus bracteata* Lam.      | Cuzurbitaceae     | Makal       | Leaf       | Ophthalmia, leprosy                                                              | Leaf juice is taken internally     |
| *Trichosanthus dioica* Roxb.        | Cuzurbitaceae     | Potol       | Fruit      | Dysentery, diarrhea, bronchitis                                                   | Fruit juice is taken internally    |
| *Thyphonium trilobatum* (L.) Schott | Araceae           | Bhot kochu  | Corn       | Tumors, haemorrhoids, piles                                                       | Corn juice is taken internally     |
| *Vigna mungo* (L.) Hepper           | Fabaceae          | Mash kalai  | Leaf       | Piles, asthma, leucoderma, paralysis, rheumatism, cough                          | Leaf juice is taken internally     |
| *Vigna sinensis* (L.) Endl.         | Fabaceae          | Borboti     | Leaf       | Jaundice                                                                         | Leaf juice is taken internally     |
| *Xanthosoma atrovirens* L.          | Araceae           | Moulovi kochu| Leaf      | Food allergies                                                                    | Leaf curry is taken                |
| *Xanthium strumarium* L.            | Asteraceae        | Ghagra      | Young stem | Diabetes                                                                         | Young stem curry is taken internally |
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constipation, gonorrhea, piles and rheumatism was dominant diseases in the study area (Fig. 5). This finding suggests that the leafy vegetables may possibly contain other phytochemical constituents which need to be investigated in future studies. This finding of common medicinal plant families in this study is in agreement with Anisuzzaman et al (2007); Ghani (2003); Khan (1998), Choudhury and Rahmatullah (2012), Faruque and Uddin (2014), Uddin and Hassan (2014), Uddin et al., (2015), and Yusuf et.al (2006). The present study revealed that medicinal plants still play an important in the primary health care of the rural communities. The information gathered from the local traditional healers are useful for further researchers in the field of ethno-botany, taxonomy and development of new drug from natural resources.

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