

Significance of Trees in the Urban Congglomeration of the Town- Sindri, Jharkhand

Anita Chakraborty¹, Anuradha Das² and Kalpana Prasad³

Article history

Submitted: April, 16, 2022

Accepted: May, 23, 2022

Abstract

Recent trends of human migration, under several scanners indicate that there has been a rapid shift of rural population in the urban areas. This shift is clearly attributed to the poverty and several socio-economic factors prevailing in the rural India. There is also a high assumption that this shift will rapidly accelerate in near future. This inflow results in the rapid expansion of the cities in a very speedy pattern which leads to an unorganized and unplanned land use and subsequently land cover footprints. These footprints and human pressure cumulatively are of potential damaging effect on the existing landscape, natural resources-like forests and the green patches in and around the urban center. Some of the major damages can be listed as increased in level of pollution, chaos with respect to space, food and security. The situation is further intensified in the backdrop of climate change resulting extreme climatic catastrophe. Under this dubious situation urban trees are reported in mitigating the negative impact and consequences of unplanned and unparalleled development indices. The current paper is an effort to present a detail on few distinct species of trees which grows abundantly in the township of Sindri, Jharkhand to highlight their benefits which is often unrecognized. The paper is also an effort to create a database, apart also awareness among the various stakeholder regarding the understated significance of trees in the urban centers.

Key words: migration, natural resources, climate change, database etc.

Corresponding author

¹ Department of Botany, SSLNT M College, BBMK University, Jharkhand
anitagcenator@gmail.com

Authors

² Department of Botany, Sindri College, Sindri, BBMK University, Jharkhand

³ Head, Department of Botany, BBMK University

Introduction

Trees play a vital role in evolving human and its civilization. It plays a critical role for people and the planet. The presence of trees in urban areas or urban nature improve people's mental and physical health, children's attention and test scores, the property values in a neighborhood and beyond (Jessica *et. al.*, 2019). Trees improve the livability of our residence for countless reasons some of which can be illustrated as a) visual appeal, b) air quality, c) health and well-being, d) cost saving, e) managing storm-water, f) property value, g) crime reduction, h) cooling effects and i) adverse wind speed (Blue Green Urban, 2017).

The existence of human beings are primarily governed by three dimensions of its surrounding, the first being its interaction with the environment, second is the health and third the economic framework governing its status quo. Trees are reported to have an immense impact to all the three dimensions governing the existence of human being in its environment and society. Psychology, 2018 claims without trees, we could not live. They can help us think better — Plato and Aristotle did their best thinking in the olive groves around Athens, Buddha found enlightenment beneath a bo tree, and Isaac Newton realised his theory of gravity when an apple fell from the tree under which he was sitting — and they can help us feel better.

The current paper is an effort to present an intensive study on few distinct species of trees namely, be *Alstonia scholaris* (L.) Br., *Azadirachta indica* A. Juss., *Bombax ceiba* L., *Ficus religiosa* L., *Neolamarckia cadamba* (Roxb.) Bosser, *Pithecellobium dulce* (Roxb.) Benth. *Pterospermum acerifolium* (L.) Willd. , *Putranjiva roxburghii* or *Drypetes roxburghii* (Wall.) Hurus., *Terminalia arjuna* (Roxb.)Wight & Arn., and *Trewia nudiflora* (L.) Kulju & Welzen which grow abundantly in the township of Sindri, Jharkhand to highlight their significance and benefits which is often unrecognized. The paper is also an effort to create a database; apart it will also explore the traditional knowledge of the tribal and indigenous communities prevailing in the area which can be utilized for further experiments and researches to explore new drugs for treating various ailments, safeguarding their IPR for the betterment of our future generations and ultimately, the society. The paper also highlights the present status quo of this green standing biomass and the perception of the society towards them.

Material and methods:**Study area:**

The township of Sindri lies within the municipal limits of the District, Dhanbad, in the State of Jharkhand. The town was well acknowledged for Fertilizer Corporation of India Limited (FCIL) which was eventually closed in year 2002. Once regarded as industrial hub adjoining the coal city of Dhanbad, it has rich reserves of flora and fauna. As per the records of the now closed fertilizer plant (FCIL), the name Sindri was evolved form of the word '*Sindoori* (Vermilion)'. In Hindi, it is '*Sundari*'. The name is said to be given by the local tribals because of the vermilion coloured soil of the vicinity. However technically it is due to the presence of laterite soil it appears reddish. The word Sindri is also said to be a part of the *Mundari* glossary. *Mundari* is a language spoken by the indigenous people living in and around this region for a long time. (Dhanbad Municipal Corporation, Jharkhand Govt. 2017). The residents of the place, now adapted to a diverse culture of inhabitants also include the tribal communities like the *Ho*, *Oraons*, *Mundas*, *Santhals* and some of the indigenous communities like *Mahatos*, *Suris*, *Doms* etc.

The township is pretty lush with several tree species like *Alangium salviifolium* (L.f.) Wangerin, *Aegle marmelos* (L.) Correa, *Albizia* sp., *Butea monosperma* (Lam.) Taub., *Ficus benghalensis* L., *Ficus racemosa* L., *Haldina cordifolia* (Roxb.) Ridsdale, *Phoenix sylvestris* (L.) Roxb., *Tamarindus indica* L., etc. in a very scattered manner. The major species which is commonly reported and seen frequently standing all along can be claimed to be *Alstonia scholaris* (L.) Br., *Azadirachta indica* A. Juss., *Bombax ceiba* L., *Ficus religiosa* L., *Neolamarckia cadamba* (Roxb.) Bosser, *Pithecellobium dulce* (Roxb.) Benth., *Pterospermum acerifolium* (L.) Willd., *Putranjiva roxburghii* or *Drypetes roxburghii* (Wall.) Hurus., *Terminalia arjuna* (Roxb.) Wight & Arn. And *Trewia nudiflora* (L.) Kulju & Welzen.

Methodology:

Methodology and approach towards the investigation was divided in to two distinct part where the first approach solely concentrated on the field survey for the entire stretch starting from Domgarh, Rohrabandh, Saharpura, Manohartand, Gaushala till Rangamati of the city to register the common tree species standing in the study area. Randomly few representative species were selected to avoid any personal favors. The morphological description and their medicinal importance was collated following several secondary literature.

The second part was the convenience sampling method to conduct the survey, with a single set of questionnaire consisting of 15 questions under five point scale of agreement and disagreement and open ended questions. The survey was conducted aiming to overview the current status quo of these trees and their (interviewer's) perception towards them. The respondents were reached (with questionnaire) via whatsapp application, telephonic interview, personal mails and face to face interviews. Responses were collected within 72 hrs of circulation of the questionnaire and collated further within 48hrs only.

Almost 25 respondents from the students of various faculties and 25 respondents from the academics of various sectors, 25 anonymous respondents living in and around the study area and 25 anonymous respondents including the local vendors, passersby etc were reached out.

Secondary literature, daily newsletters, editorial and reports were referred to describe the general characteristics of the species under investigation and their probable correlation with the study area.

Name of the respondent :

Profession:

Age/Sex:

Contact detail:

Date:

Time:

Questionnaire

Respondent No.:

Answer each of the following statements on the five-point- scale of agreement and disagreement.

A) Strongly Agree B) Agree C) No Opinion D) Disagree E) Strongly Disagree

1. Trees are essential for the environment
A) B) C) D) E)
2. Trees are essential for the Existence of Life
A) B) C) D) E)
3. Trees benefit us with many essential aspects like they provide medicine, timber, fruits, fresh air, shelter etc
A) B) C) D) E)
4. Last few years the cover of trees has reduced in locality
A) B) C) D) E)
5. The abundance of trees has reduced due to developmental activities around the

surrounding

A) B) C) D) E)

6. Abundance of Trees has reduced due to many disease on trees
A) B) C) D) E)
7. State Government should be responsible for the Plantation and Maintenance of these trees
A) B) C) D) E)
8. Last from five years many Plantation work has been promoted in your immediate environment
A) B) C) D) E)
9. Local people should take responsibility to protect the trees in and around their environment
A) B) C) D) E)
10. Local people should participate in watering and manuring trees in and around their surrounding
A) B) C) D) E)
11. Training should be given to Local people for the care and maintenance of the saplingplanted around their surrounding
A) B) C) D) E)
12. Every individual should pay to protect the trees in and around their environment
A) B) C) D) E)
13. I am willing to pay INR 10 rupee/Month for the care and maintenance of these trees present in my surrounding
A) B) C) D) E)
14. Municipal Corporation should take the responsibility to collect the revenue from local for the maintenance of the trees
A) B) C) D) E)
15. Separate State Authority should take responsibility to collect the revenue from local residents for the maintenance of the trees
A) B) C) D) E)

Observation:

Standing biomass of the green vegetation often indicates the prevailing environment of the given area. It indicates the interaction of the vegetation (trees, herbs, shrubs etc) with its natural surroundings to an extent, explicitly human behavior towards them. Furthermore their health and lush growth also referred to their adaptation to the changing environment. Thus it can be said that green vegetation are and can be referred to as health card of an environment at given

point of time. During the field survey along the study area the following trees were reported to be abundantly present and in a fairly good state of condition. However the entire assessment was based on their morphological appearance only. The brief description/synopsis of these trees and their medicinal values are mentioned here under:

1. *Alstonia scholaris* (L.) R.Br. belonging to the family *Apocynaceae* is popularly known as Chatim in Bengali, Chatawan in Santhali, Sapta- parni in Sanskrit and Devil's tree in English.

It is a large evergreen tree which reaches up to height of about 17 to 20 m and have bitter milky latex. Bark is greyish brown, rough, lenticellate. 4-7 Leaves in a whorl, coriaceous, elliptic-oblong, pale beneath. Flowers are small, greenish white, spice scented. Fruits are follicles, 30 – 60 cm long. Seeds are papillose with brownish hair at each end (Bimbima, 2014). Barks and Latex from the tree are commonly used for medicinal value.

Medicinally the plant has been used in different system of traditional medicine for the treatment of range of diseases. The extract of the plant shows pharmacological activities ranging from anti-malarial to anticancer properties. *Alstonia scholaris* have medicinal activity against many of the ailments. In India, the bark of *Alstonia scholaris* is used solely for medicinal purposes, ranging from malaria and epilepsy to skin conditions and asthma. In Ayurveda, it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite. The Milky juice of the tree is applied to ulcers.

Phytochemical Studies indicates that an ethanol extract of the bark of *Alstonia scholaris* enhanced the anticancer activity of berberine in the carcinoma-bearing mice. This extract also showed cytotoxic activity. It contains echitamine and loganin as major compounds and could potentially be used as an anti-irritation agent. The methanolic extract of the bark has the analgesic activity. The bark extract also exerted a strong inhibitory effect on epididymides, seminal vesicle and prostate gland as evinced by decrease in their weights. The plant is used in traditional, Ayurvedic, Unani, Homoeopathy and Sidhha/Tamil types of alternative medicinal systems against different ailments. (Sharma et.al., 2016).

2. *Azadirachta indica* A. Juss. belonging to the family *Meliaceae* is popularly known as Nim in Bengali and Santhali, Neem in Hindi, Nimbaka in Sanskrit, Indian lilac or Neem tree in English.

Neem is a fast growing tree that can reach upto a height of 15-20m and rarely 35-40m. It is an evergreen tree whose branches are wide and spreading. The leaves are pinnately compound and opposite about 20-40 cm long with 20-30 medium to dark green leaflets of about 3-8 cm long. The terminal leaflet is often missing. The white and fragrant flowers are arranged in more or less drooping axillary panicles. The fruit is a smooth, olive-like drupe. It flowers from March- April and fruits mature from May- August (Haines, 1924). All parts are useful but most often stem bark, leaves and seeds are used.

Medicinally the bark of the plant is used in malaria, intestinal ulcers, skin diseases and fever. The leaves are used in intestinal worms, loss of appetite, as an antiseptic, fever and gum diseases etc. The paste of the leaves is applied directly to the scalp to treat lice. The leaves after drying are place along with the cereals and pulses in storage to repel insects. The decoction of the leaves is sprayed on the crops as an insecticide. The seeds and seed oil are used in leprosy. The oil cakes are used as fertilizers too.

Phytochemical studies on indicates *Azadirachta indica* has complex constituents including nimbin, nimbidin, nimbolide, limonoids and such types of ingredients play significant role in disease management through modulation of various genetic pathways. Quercetin and beta- sitosterol were first polyphenolic flavonoids purified from fresh leaves of neem and were known to have anti fungal and antibacterial activities (Alzohairy, 2016). Neem ingredients are applied in Ayurveda, Unani, Homeopathy and modern medicine for the treatment of many infectious, metabolic or cancerous diseases (Brahmachari, 2004).

3. ***Bombax ceiba* L.** belonging to the family **Malvaceae** is commonly known as Simul in Bengali, Edel in Santhali while Red Silk Cotton in English.

Morphologically it is a deciduous tree grows up to 45m high, bole straight, buttress 1-2 m high, bark 20-30 mm thick, grey mottledwith white color, branches horizontal and more or less whorled. Leaves are digitately-compound, alternate, stipulate, leaflets 5-7, whorled, lamina10-20 x 2-6 cm, elliptic, elliptic- obovate, margin entire and glabrous. Flowers are bisexual, dark crimson, solitary or 2-5 together, calyx campanulate, petals 5, elliptic- obovate, fleshy stamens 65-80, ovary conical, ovules many, fruits are capsules, cylindrical, seeds numerous pyriform, smooth, dark brown, embedded in white cotton (ITIS Report, 2015). The plant is inits full bloom in the month of January- March. Even the timber has a great demand as matchwood in India.

Fruits, heart wood, Stem bark, gum and roots are used for medicinal purposes. Fruits of the plant are used as an expectorant, blood purifier and also used for chronic inflammation of the bladder, kidney and for calculus affections. Edible bitter flowers of the plant are used by the local people in their diet, which in turn are considered good astringent to the bowels, remove bile and phlegm. Stem bark is applied as a paste in water to skin eruptions, boils, acne, pimples etc. Roots of the plant are employed in low vitality and debility (Jain and Verma, 2014).

In Unani systems of medicine more emphasis is given to the use of gummy exudates known as mochrus obtained from its branches and stems. Tooth powder containing mochrusis beneficial for loosen teeth and bleeding gums (Ghani, 1971).

Various parts of the plants is used as anti-diarrhoeal, blood purifier, anti-asthmatic, to increase consistency of semen, uterine tonic, amenorrhoea, abortifacient, anti-leucorrhoeic etc.

Phytochemical Studies indicates that all parts of the plant gave betasitosterol and its glucosides; seeds, bark and root bark- lupeol; flowers- hentriacontane, hentriacontanol; root bark- hydroxycadalene. The seed oil yields arachidic, linoleic, myristic, oleic and palmitic acids; Seeds contain carotenes, n-hexacosanol, ethylgallate and tocopherols; the gums contain gallic and tannic acids, yields L-arbinose, D-galactose, D-galacturonic acid and D-Galactopyranose. Younger roots contain more mucilage, starch, mineral matter, tannins and non-tannins, along with other constituents (Khare, 2007).

4. ***Ficus religiosa* L.** belonging to the family **Moraceae** is popularly known as Pakur in Bengali, Peepal in Hindi, Hesak Banda in Santhali, Ashwattha in Sanskrit and Sacred Fig in English.

It is large perennial tree and is glabrous when young. This dry season deciduous semi-evergreen tree can reach upto a height of about 30m, with the trunk diameter of about 3m. They shatter bark. The leaves are shiny, thin and bear 5-8 veins. Fruits are small, about ½ inch in diameter. It is Circular in shape and compressed. It is green when raw and turns black after ripening. The fruiting occurs in summer and fruits get ripened in rainy season.

Fruits, Leaves and Stem bark are medicinally active part. The plant is of high religious significance. It is also known as sacred fig and considered to have a religious significance in three major religions of Indian subcontinent i.e. Hinduism, Buddhism and Jainism. This is the tree under which Gautama

Buddha is believed to have attained enlightenment, and is so called the Bodhi tree. The plant is thus largely planted as an avenue tree and especially near temples they are preferred more. The local inhabitants believe the plant is also an abode of Lord Vishnu. Due to this religious significance the species is maintained and secured (Das and Bondya, 2015). Ecologically it is also providing shelter to many other species and thus maintaining the biodiversity therein.

This sacred tree is a storehouse of medicinal value and is used to treat many ailments and diseases. Traditionally, the bark is used as an antibacterial, antiviral, astringent and in the treatment of gonorrhoea. The leaves have been reported anti-venom activity and regulate the menstrual cycle (Chopra and Chopra, 1958). Fruits are used as laxatives and its powder is used to treat asthma.

Phytochemical Studies indicate the stem bark of the plant has phytoconstituents of phenols, tannins, steroids, alkaloids and flavonoids, beta Sitosteroyl-D- glucoside, Vitamin- K, n- octacosanol, methyl oleanolate, stigmasterol etc (Chandrasekar et.al, 2010).

5. ***Neolamarckia cadamba* (Roxb.) Bosser** belonging to the family of **Rubiaceae** is popularly known as Kadamb in Hindi, Burflower tree in English, Kadam in Santhali and Kadamb in Sanskrit.

It is a deciduous tree which grows up to height of 20m. Bark are of 6-8 mm, pale brown in color with distinct vertically shallowly grooved. Leaves are opposite, decussate; stipules interpetiolar, lanceolate, cauducous. Flowers bisexual, yellowish, in globose heads, stamens are 5 in number and 3 mm long, anthers are sagittate, sessile. Ovary are 3-4 mm long, 2-celled at base, 4-celled above, inferior, ovules many; style exserted to 5-6 mm, entire; stigma clavate. Fruit is a capsule on a fleshy globose receptacle, 3.5-5 cm across, orange yellow, capsule membranous; seeds may, angular, minute (India Biodiversity Portal).

Bark, Leaves and Fruits are medicinally active part. From literature survey it was reported that almost all parts of the plant *Neolamarckia cadamba* is used in the treatment of various diseases. Decoction of leaves is used as gargle in aphthae or stomatitis and in the treatment of ulcers, wounds, and menorrhoea. Bark of the plant is used in fever, inflammation, cough, vomiting, diarrhoea, diabetes, burning sensation, diuresis, wounds, ulcers and in the treatment of snake bite (Kumar, 2017).

Warm aqueous extract of *Neolamarckia cadamba* leaves has been used to alleviate the pain, swelling and for better healing of wounds as well as for treatment of menorrhagia. The decoction of bark skin of this plant is effective in diarrhoea, dysentery and colitis. The fruit juice of the plant augments the quantity of breast milk of lactating mothers and also works as a lactodepurant (Ambujakshi, 2009).

6. *Pithecellobium dulce* (Roxb.) Benth. belonging to the pea family, **Fabaceae** is known as Ban-Jilipi in Bengali, Janglijilebi in Hindi, Jilpidarei in Santhali and Manila Tamarind in English

The tree reaches a height of about 10-15 m. Its trunk is spiny and its leaves are bipinnate. Each pinna has a single pair of ovate-oblong leaflets that are about 2-4 cm long. The flowers are greenish white, fragrant, sessile and reach about 12cm in length, though appear shorter due to coiling. The flowers produce a pod, which turns pink when ripe and opens to expose the seed arils, a pink or white, edible pulp. The pulp contains black shiny seeds that are circular and flat. Pollen is a polyad of many pollen stitched together.

Bark, Leaves and Fruits are used medicinally. The bark and pulp of the plant is used traditionally as a remedy against gum ailments and toothache. Bark extract is also used against dysentery, diarrhea and constipation. The plant also provides relief from pain, eczema, fever, cold, sore throat, pigmentation, acne and pimples.

Phytochemical studies evaluated that the fruits of the plant contains a number of vitamins and minerals like Vitamin E, B1, B2, B3, Calcium, Phosphorous and Iron. The leaves of the plant contain Quercetin, Kaempferol, Dulcitol and Afezilin. Ethanolic extract of the fruits yielded ten compounds viz, 2,5,6-trimethyl, 1,3- oxathiane, trans- 3-methyl-2-N- propylthiophane, 2-furan carboxaldehyde-5-hydroxymethyl, D- pinitol, hepatocosanoic acid, tetracosanol, 22- tricosenoic acid, methyl-2-hydroxy icosante and stigmaserol. (Kumar and Nehara, 2013).

7. *Pterospermum acerifolium* (L.) Willd. belongs to the family of **Malvaceae**. Vernacularly it is accepted as Muchukund in Hindi, Maple-leaved Byur in English, Machkunda in Santhali, and Muchukund in Sanskrit.

The tree is a medium sized flowering tree grows up to 30m tall. The leaves of the Bayur Tree are palmately ribbed and have stipules. The leaves grow in an alternate insertion arrangement. Leaf shape can range from oblong, broadly obovate to ovate. Leaf edges are commonly dentate (toothed) or irregularly

lobed. (shodhganga.inflibnet.ac.in/bitstream). Flowers are mostly solitary, 10-15 cm long and across, white, fragrant. Sepals linear-lanceolate, united at the base into short tube. Petals are linear, oblong or obovate, Fertile stamens 5-9 cm long, staminodesequalling the petals; anthers 1-1.5 cm long. Carpels 5; ovary oblong, pentagonal, 5-loculed, densely rusty tomentose. Seed are capsule 5-10 cm long, 5-valved, rusty brown-glabrescent. Seeds compressed, obliquely oval, wings brown, membranous (Kirtikar and Basu, 1984; Anonymous, 2005).

Roots, Bark, Leaves and Flowers are medicinally used. Bark are useful in intestinal complaints, anemia, headache and pains. Bark and leaves are used in smallpox. The indumentum from the lower side of leaf is said to be used to prevent bleeding from wounds; leaf paste applied on headache. Flowers and bark charred and mixed with kamala (*Mallotus philippensis*) applied on suppurating smallpox. A tonic from the flowers is a cure for inflammation, ulcers, tumours, headache, abdominal pain, indigestion, dehydration, blood troubles and leprosy; calyx made into a paste and applied on glandular swellings around neck. The flowers kept among cloths impart a pleasant perfume and keep away insects. Roots juice given as antidote in poisoning; roots applied as a paste on wounds (Medicinal Plants 2015).

Phytosociological studies indicates flowers contain kaempferol-3-O-galactoside, luteolin-7-O-glucoside, luteolin-7-O-glucuronide, kaempferol, kaempferide-7-O-beta-D-glucopyranoside (Gunasegaran and Subramanian, 1979), 24-beta ethylcholest-5-in-3-beta-O-alpha-cellobioside, 3,7-dimethyl-7-methyl-11:5pentacosanolide, n-hexacosan-1, 26-diol-dilignoserate, beta-amyrine, betasitosterol and a mixture of acids and saturated hydrocarbon (Rizvi and Sultana, 1972) Acid polysaccharide as D-galactouronic acid D-galactose and L-rhamnose were isolated from bark (Gupta and Bishnoi, 1979; Rastogio and Mehotra, 1970-1979 and 1990-1994).

8. ***Putranjiva roxburghii* or *Drypetes roxburghii* (Wall.) Hurus.** belonging to the family **Euphorbiaceae** is commonly known as Putrnjiva; Jia-puta in Bengali, Putijia in Hindi, Pitonj in Santhali, Putrajivah in Sanskrit and Lucky bean tree in English.

It is a dioecious tree with distinct pendent like branches raise up to the height of 12 meters. It is a moderately sized ever green tree where the leaves are simple, alternately arranged, shiny dark green, distantly serrated. In flowers male parts are found with short rounded axillary clusters while the female are in 1-3 in leaf axil. The plant flowers and fruits during March-August every

year. Fruits are ellipsoid to rounded drupes, white velvety; seed normally one, very hard.

Leaves, Fruits and Seeds are medicinally active parts of the tree. Leaves of the plant are refrigerant, analgesic, antipyretic and anti-inflammatory and used to treat fever, catarrh and sterility. Leaves are also used to treat allergic pimples. Decoction of the leaves is used for treating cold, fever and rheumatism. Crushed leaves are applied to swollen throat of animals. The seeds are sweet, acrid, refrigerant, laxative, anti-inflammatory, aphrodisiac, and diuretic. Seed paste is useful against headache and powdered seed used for knee pain. These are also used to treat sterility, azoospermia, and habitual abortions (Bimbima, 2015).

Phytochemical studies reveals seeds contain fatty oil and kernel contains an essential oil with mustard smell, isothiocyanate yielding glycosides, glucoputranjivin, glucocochlearin, glucojiaputin and glucocleomin. The essential oil contains isopropyl and 2-butyliothiocyanates as the main constituents and 2-methylbutyl isothiocyanate as a minor component (Bimbima, 2015).

9. *Terminalia arjuna* (Roxb.) Wight & Arn. belonging to the family **Combretaceae** is called Arjun in Bengali, Kahua, Kharw, Arjun in Hindi, Kahua in Santhali, Arjuna in Sanskrit and Arjun Tree in English.

The plant grows to about 20-25 meters tall; usually has a buttressed trunk and forms a wide canopy at the crown from which branches drop downwards. It has oblong, conical leaves which are green on the top and brown below. The plant has a smooth, grey bark. The bark get flaked off itself in the month of April-May. The plant flowers between March and June with yellow flowers. It has glabrous, 2-2.5 to 4.5-5cm fibrous woody fruit, divided into five wings which appears between September and November (Biswas et. al. 2011)

Parts used for the medicinal purpose is Bark. The plant is a well known heart tonic and treated as a remedy for various cardiac problems like heart failure, cardiomyopathy, atherosclerosis, myocardium necrosis etc. It has also been used for different other human diseases like blood diseases, anaemia, venereal and viral disease. It is used in the treatment of fractures, ulcers etc. when the paste of the bark is applied over the fractures it promotes early healing.

Phytochemically various extracts of the stem bark of arjuna have shown to possess many pharmacological properties including inotropic, anti- ischemic,

antioxidant, blood pressure lowering, hypolipidemic etc. in isoprenaline-induced myocardial ischemia (MI), arjuna has been found to possess prostaglandin E₂-like activity with coronary vasodilation and hypotension. Arjunolic acid has been found to prevent the decrease in the levels of superoxide dismutase, catalase, GPO, ceruloplasmin, α-tocopherol, reduced glutathione, ascorbic acid, lipid peroxide and myeloperoxidase (Sumitra et. al. 2001).

10. ***Trewia nudiflora* (L.) Kulju & Welzen** of family **Euphorbiaceae** is called Pithali in Bengali, Bhillaura, Pindalu in Hindi, Gada Lopong in Santhali and Pindarad in Sanskrit.

It is a deciduous tree, branchless wood and leaves opposite, ovate 11-20 cm by 7-12 cm, long pointed, hairy beneath when young, glabrous later, stalks 2-7.5 cm long. Male and female flowers on separate trees, males yellow in long lax drooping inflorescences, females green, solitary or 2-3 together in the leaf axis. Fruits fleshy, depressed globose, grayish green, 3.5 cm by 3 cm (Jakson. 1994).

Roots, Leaves, Fruits and Seeds are medicinally of immense significance. However all parts of the plant are used as traditional medicine in India for the removal of Phlegm. Leaves and its decoction are also applied to swellings and in healing of wounds and injuries. Bark is used for treatment of enlarged thyroid gland. Decoction of the root is stomachic and used in flatulence, gout and rheumatism (Begum, 2016).

Plant contains a pyridine alkaloid, N-methyl-5-carboxamide-2-pyridone. Leaves contain an alkaloid, nudiflorine. Bark yields taraxerone and betasitosterol. Seeds contain an alkaloid ricinidine. The seeds also contain a maytansinoid compound, trewiasine (Jamil et. al., 2010). It exhibited significant cytotoxic activity against various human cell lines in vitro (Powell et al., 1982).

Ethanol extract of the pericarp of *T. nudiflora* showed significant antifungal bioactivity against *Penicillium avellaneum* UC-4376 (Du et. al., 2004). The ethanol extract of the leaves of *Trewia nudiflora* showed significant anti-ulcerogenic effect against ulcers induced by Indomethacin in a dose-dependent manner had been reported (Prakash et. al., 2007).

Under the second broad objective of the investigation, the participation in the survey with set of questionnaire was almost 100%. All the respondent attempted all the questions and give a strong opinion on the option they had opted for.

50% of the respondent strongly agree that trees are essential for environment while 48% agreed and 2% have no opinion on the statement. Strikingly 20% of the

respondent have no opinion on the correlation of the trees and the existence of human life while 50% agree and 20% strongly agree with the facts that Trees are essential for the Existence of Life. 50% of respondent strongly agree and 30% agreed that trees benefits us with many essential aspect like they provide medicine, timber, fruits, fresh air, shelter etc while rest 20% have absolutely no opinion on the same.

The response itself indicates that majority of the communities strongly believe that the trees are essential and are integral part of human evolution and their environment. They provide many ecosystem services which are well established from ages. The co-existence of both the life form structured the progress of many races in the biosphere.

Almost 95% of the respondent attributed to the statement that last from few years the cover of trees has been reduced and the reason behind was mainly pointed on the developmental activities around the surrounding in a speedy manner. 5% respondent do not respond on any of the statements. Only 25 % of respondent had agreed on the prevalence of disease on trees while 25% do not agree and 50% were not respondent to the statement. The investigation on the statement indicates that the unplanned and unorganized developmental activities can be attributed as key reason behind the reduction in the green cover of the study area. While it is the lack of proper knowledge and attention that majority of the respondent were unable to trace any diseases. However many respondent experiences a thick cast of coal dust on the trees sticking permanently which can be attributed to the heavy coal activity near the township.

100% respondent strongly agree that State Government should be the responsible authority for the plantation and maintenance of the trees. 80% respondent agrees that Last from five years many Plantation work has been promoted in your immediate environment but most of them lacks after maintenance and usually die after few days 20% however disagree with the fact that plantation work has been promoted in their locality. The data further indicates that the State Authority concerned had taken the initiatives in plantation work seriously in recent couple of years.

Only 50% of the respondent, strongly agrees that local people should take responsibilities to protect the trees in and around their environment. While 50% disagree that they should be the sole holdings to take responsibilities. Strikingly only 40% of the respondent agrees that they will and should whole heartedly participate in watering and manuring the trees in and around their surroundings. 60% of the respondent agrees that training should be given to local people to come forward and initiate with the responsibilities to take care and maintenance of the sapling planted around their surroundings. 10% strongly agreed on the point while

30% have absolutely no opinion on the statement.

The strange response on the statement indicates that despite of the fact that trees are an integral part of the human existence and human being a vital custodian of the nature, there lies a huge lack of awareness and sense of moral responsibility towards the trees present in the surrounding. However they also shows strong willingness to change and know the possible way forward to take up such initiatives and protect the nature for the coming generation.

Only 40% percent of the respondent strongly agrees and 10% agrees that every individual should pay to protect the trees while rest 40% remains non responsive while 10% disagree that societies should pay to protect these trees. 50% of respondent agree to pay a minimum of rupees 10/month while rest don't prefer to respond for the care and maintenance of the trees. This further indicate that we had realized that it is a high time and soon each and every one of us have to come forward and take up the provital role in the maintenance of the trees of our surrounding and ensure a healthy environment.

25% strongly agrees and 20% agrees that State Municipal Corporation should take up the responsibilities to collect the revenue while 40% also strongly recommend that separate State Authority should be constituted and given the responsibilities to collect the revenue and also trains the local to make aware about the protocol to maintain the tree species of the surrounding. While rest of the respondent were unable to respond to the statement. This also infer that the concerned authority should came up strongly in advocating the current conservation status of trees constituting the green patches of the urban center with the participation and advocacy of the local inhabitants for better results.

Conclusion:

Trees play a vital role in enhancing the quality of life in the urban environment and the fact should be recognized, acknowledge and valued by all the stakeholders directly and indirectly being benefitted by them. In fast growing urban setting their place should be integrated with all major and minor developmental interventions. Their ecosystem services and their economic evaluation needs to be addressed and recognized.

Acknowledgment:

The authors are grateful to Late Dr B. C Jha, Former Head, Reservoir and Wetland Fisheries Division CIFRI, Barrackpore for her valuable suggestions to draft the manuscripts. The authors are also thankful to the Dr Sharmila Rani, Principal, SSLNT Mahila Mahavidlaya and Dr. Ajit Kumar, Principal Sindri College, Sindri for their kind support and constant encouragement. The authors are also thankful

to the respondents who were generous enough to spare their valuable time and honest response towards the questionnaire and the survey conducted.

Declaration of Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

Reference:

1. India Biodiversity Portal Neolamarckia cadamba (Roxb.) Bosser <https://indiabiodiversity.org/biodiv/species/show/244698> (Accessed date Aug 28, 2020)
2. Alzohairy MA (2016) Therapeutics role of Azadirachta indica (Neem) and their active constituents in diseases prevention and treatment Evid based complement Alternat Med. *Hindawi Ltd.* doi: 10.1155/20167382506
3. Ambujakshi HR, Antony ST, Kanchana Y, Patel R, Thakkar H and Shyamnanda. (2009) Analgesic activity of Anthocephalus cadamba leaf extract. *J. Pharmacy Research* 2 1279-1280
4. Anonymous (2005) The Wealth of India a Dictionary of Indian Raw Materials and Industrial Products, Council of Scientific and Industrial Research, New Delhi VIII 308-312
5. Begum Y (2016) Antibacterial, Antioxidant and Cytotoxic activities of Trewia nudiflora *Pharma Tutor* 4(1) 37-41
6. Bimbima (2014) <https://www.bimbima.com/ayurveda/medicinal-use-of-devils-tree-or-saptaparna/935/>
7. Bimbima (2015) <https://www.bimbima.com/ayurveda/putrajiva-treeputranjiva-roxburghii-medicinal-uses/263/>
8. Bishnoi, P, Gupta PC (1979) Structure of new acid polysaccharide from the bark of Pterospermum acerifolium *Journal of Chemical Society* 1680-1683
9. Biswas M, Biswas K, Bhattacharya K, Ghosh TK, Ashoke, S, Haldar K, Pallab K (2011) Evaluation of analgesic and anti-inflammatory activities of Terminalia arjuna leaf *Journal of Phytology* 3(1) 8-33
10. Blue Green Urban (2017) <https://www.smartcitiesdive.com/ex/sustainablecitiescollective/why-we-need-trees-our-cities/1100050/>

11. Brahmachari, G (2004) Neem an omnipotent plant: a retrospection. *Chem Bio Chem* 5(4) 408-421
12. Chandrasekar, SB, Bhanumathy M, Pawar AT, Somasundaram (2010) Phytopharmacology of *Ficus religiosa* *Pharmacogn Rev* 4(8) 195-199
13. Chopra RN, Chopra S (1958) *Indigenous Drugs of India*. Dhar and sons
14. Das A, Bondya SL (2015) Tribal communities as the conservator of traditional medicinal knowledge in Dumka District Jharkhand India 'Biodiversity conservation and sustainable development' Vol.1 6 New Academic Publishers New Delhi 70-76,
15. Dhanbad Municipal Corporation (2017) Jharkhand Government Archived from the original on 28 October 2017 Retrieved 19 October 2017.
16. Du ZZ, He HP, Wu B, Shen YM, Hao, X J (2004). Chemical constituents from the pericarp of *Trewia nudiflora* *Helvetica chimica acta* 87(3) 758-763
17. Dwivedi S, Chopra D (2014) Revisiting Terminalia Arjuna - an ancient cardiovascular drug *Journal of Traditional and Complementary Medicine Elsevier* 4(4) 224-231
18. Ghani NK (1971) *Advia* Vol. 1. New Delhi, India: Idara Kitabus Shifa
19. Gunasegaran R, Subramanian SS, (1979) Flavonoids of three Pterospermum species. *Indian J.Pharm.Sci.* 41(2) 72-73
20. Gupta PC, Suresh C, Rizvi SAI (1972) Chemical examination of the flower of *Pterospermum acerifolium*. *Planta Med.* 21(4) 358-363
21. Haines, HH (1924) The Botany of Bihar and Orissa Botanical Survey of India, Calcutta) Vol. 1-3 1-1372
22. India Biodiversity Portal, Species Page <https://indiabiodiversity.org/biodiv/species/show/230914> (Accessed on 27 August 2020)
23. Jackson, JK (1994) Manual of afforestation in Nepal *Forest Research and Survey Center, Kathmandu*.
24. Jain V, Verma SK (2014) Assessment of Credibility of some folk medicinal claim on *Bombax ceiba* L. *India Journal Traditional Knowledge* 13 87-94
25. Jamil AS, Alexander IG, Veronique S (2010) New cardenolides from the stem bark of *Trewia nudiflora*, *Fitoterapia* 81 536-539
26. Jessica B, Skoff T and Cavender N (2019) The benefits of trees for livable and sustainable communities. *Plants People Planet* 1(4) 1-13
27. Khare CP (2007) Indian Medicinal Plant. An illustrated Dictionary Verlag, Berlin. *Springer*
28. Kirtikar KR, Basu BD (1984) *In Indian Medicinal plants*, Vol. I, IInd Edn., Sri Satguru Publications, Delhi, 372-375

29. Kumar M, Nehara K, Duhan JS (2013) Phytochemical analysis & antimicrobial efficacy of leaf extract of *Pithecellobium dulce* *Asian Journal of Pharmaceutical & clinical research* 6(1)70-76
30. Kumar V (2017) Medicinal Properties of *Anthocephalus indicus* (Kadam): An indigenous medicinal plant. Era's, *Journal of Medical Research* Vol.4(2) 7-11
31. Medicinal Plants (2015) Medicinal plants with usage, patents and their publications <http://medplants.blogspot.com/2015/03/pterospermum-acerifolium-muchukund.html>
32. Pharmacognostic phytochemical and pharmacological investigation on *pterospermum acerifolium willd sterculiacea* https://shodhganga.inflibnet.ac.in/bitstream/10603/195325/12/11_chapter4.pdf
33. Psychologies (2018) Wellness: The healing power of trees <https://www.psychologies.co.uk/body/the-healing-power-of-trees.html>
34. Powell RG, Peoria, Smith CR, Dunlap, Jr (1982) Chemotherapeutically active maytansinoids from *Trewia nudiflora*, *United States Patent* Vol 19(11)1-10
35. Prakash D, Suri S, Upadhyay G, Singh, BN (2007) Total phenol, antioxidant and free radical scavenging activities of some medicinal plants *International Journal of Food Sciences and Nutrition* 58(1) 18-28
36. Rastogi RP, Mehotra B.N (1994) *Compendium of Indian Medicinal Plants* Vol. V, CDRI, Lucknow 707
37. Rizvi SAI, Sultana J (1972) Phytochemical studies of the flower of *Pterospermum acerifolium*. *Phytochemistry* 11(2) 856-858
38. Sharma P, Sharma R, Rao HS and Kumar D (2016) Phytochemistry and medicinal attributes of *A. scholaris*: a review *International Journal of Pharmaceutical Sciences and Research* Sr No 6 505-513
39. Sumitra M, Manikandan P, Kumar DA, Arutselvan N, Balakrishna K, Manohar BM (2001) Experimental myocardial necrosis in rats- role of arjunolic acid on platelet aggregation, coagulation and antioxidant status, *Molecular and Cellular Biochemistry* 224 135-42