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Traditional Management Practices and its Use of Tamarind (Tamarindus Indica L.) By Berta Community in Assosa Zone Northwest, Ethiopia

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Abstract: ***Tamarindus indica L. (Tamarindus) belongs to the family leguminous (Fabaceae) and is one of the indigenous fruit tree species that traditionally contributes to food security, traditional medicine and ecosystem stability in sub-Saharan Africa. The purpose of this study was to document traditional uses and management practices of Tamarindus indica among the Berta community in the Assosa Zone. Focus group discussions, key informant interviews, semi-structured interviews and observation were used to collect data. Descriptive statistics were made to analyze the data using SPSS version 20 and Ms-excel software 2019. Among the study area overall, twelve main Indigenous uses (use categories) of Tamarindus indica were identified in each study district among selective study kebeles; including food, beverage, ethnomedicines for humans, ethnoveterinary uses, aesthetic uses, environmental amelioration, commercial, fodder, and for hanging beehives provided shade in homes, public place, for crops and livestock as well as cultural uses. Fruit pulp (30.4%) plant parts were the most commonly used tamarind product. The majority of respondents reported that deforestation, no planting, gold mining, fuel wood, lack of management, illegal cutting, and timber harvesting and forest fire threats to the tree population in the study area. Results can be used to support the sustainable use of Tamarinds indica in the study area, including in-situ and ex-situ conservation from planting around the home area, commercialization and organization of market channels. Furthermore, the benefits from the Tamarindus indica tree need to be promoted to fully utilize its potential in improving the livelihoods of rural communities in the Assosa Zone.***

Keywords: Tamarinds Indica, Management Practices, Assosa Zone, Berta Ethnic Group

Abbreviations:
BGRS: Benishangul Gumuz Regional State

I. INTRODUCTION

Tamarindus indica L. (Tamarind) with the family of Fabaceae is an indigenous fruit tree of the tropics reported to be underutilized worldwide[8] and originating in Africa and Asia is highly valued for its pulp [19] In Ethiopia, Tamarind is found in Combretum Terminalia and Acacia–Commiphora woodlands vegetation types [25]. Its distribution has been recorded from upland areas of Tigray, Gonder, Wollo, Afar, Gojjam, Shewa, Illubabor, Keffa, Gamogofa, Benshangule, Gambella Sidamo, and Harerge floristic regions [10]. *Tamarind indica* tree is ecologically and economically significant, it can also grow at altitudes ranging from 0-1500m above sea level [3] annual temperature 20-330C, with a relatively higher annual rainfall of 350–2700 mm and it is also found along stream and riverbanks [27]. Ecologically, it is important because it grows well under a wide range of deep soils, and climatic conditions and hence is found in semi-arid areas [28], low-altitude ranges, wooded grassland, and savannah bush land [24].

Tamarindus indica is an evergreen tree that can reach 24 m in height and 7 m in girth and has pale yellow and pink flowers [20]. *T. indica* is an indigenous semi-evergreen tree species of the Fabaceae family, preferred for its wild edible fruit and timber, fodder for animals, medicinal value, food and improved soil fertility [11]. Farmers residing in many drought-prone regions seek to improve their lives through the growing of multipurpose trees that mitigate the climate change impact [26].

The factors threatening the distribution of the species in the Tigray region might be due to illegal cutting, fuel wood collection, agricultural expansion [29], lack of replanting, timber harvest, deforestation in general, flooding, lack of management, and soil erosion [10].

These factors are similar to in Assosa zone it is indigenous and the study areas of Homesha and Menge districts in Northwest Ethiopia form part of its natural range. While the importance of indigenous knowledge for the conservation of ecosystems is widely recognized, documentation about its role in the conservation of *T. indica* in the Assosa Zone is very scanty [23].

The lack of literature on traditional uses and management practices for *Tamarindus indica* by various ethnic groups hinders the promotion of sustainable management of the tree species in Ethiopia. To the best of our knowledge, there are no comparative studies that document the variation in traditional uses and management of *T. indica* among Berta ethnic groups in Ethiopia [27]. This type of study is important to improve the livelihood of the rural households and the use of resources effectively and properly. The aims of this reasonable study were thus to: (i) document traditional uses and local management practices of *Tamarinds indica* among the Berta ethnic group and (ii) identify major threat factors that affect *Tamarinds indica* populations in Assosa Zone, Northwest Ethiopia [18].

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II. MATERIALS AND METHODS

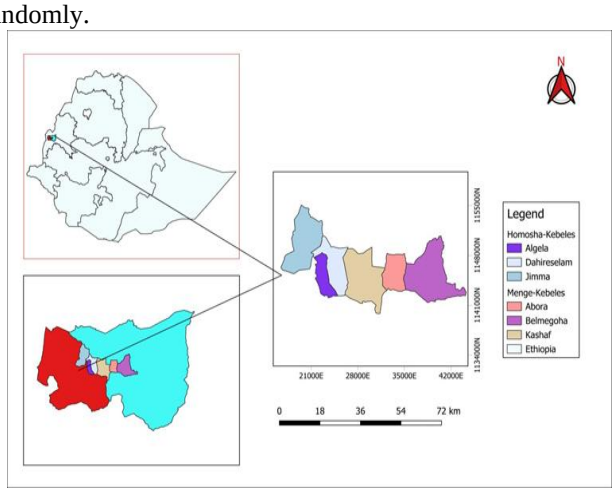
A. Study Area Description

Benishangul Gumuz Regional State (BGRS) is one of the ten Federal States of Ethiopia located in the mid-western part of the country and has a total area of about 50,382 Km^2. Assosa zone is one of the three zones found in Benishangul Gumuz Regional State in Western parts of Ethiopia. The majority ethnic group in the zone is the Berta people.

The Assosa Zone lies in the range of latitudes 10◦ 19 ´ 59 N and longitudes 34 ◦ 39 ´ 589 ´ E and its altitude of 1300-1570m above sea level. The regional capital, Asossa is located at a distance of 687 km west of Addis Ababa, the capital city of Ethiopia. The mean annual rainfall and temperature of the study area are 219.7 to 1858.3 mm and 14.7 to 30.10 C respectively and the soil types from the two agro-climatic zones are vertisol, sandy loam soil and silt loam soil.

The zone has a total population of 283,707 people, out of which 144,616 and 139,091 are male and female, respectively and the population density of the study area is 28 persons per kilometer square. Furthermore, 86.28% of the population lives in rural areas and13.72% lives in urban areas. The Assosa Zone has two Agro-climatic zones namely Kola (lowland) and Woyinadega (midland) that cover about (86.33%) and (13.67 %) are respectively. The main rainy season in the zone is from April to the end September. Mixed farming (crop production and livestock rearing) is the predominant source of livelihood for the majority of the population in the area.

Among the ten districts of the Assosa zone two districts namely Homesh and Meng woreda were purposely random sampling techniques selected for this study due to (i) the abundant distribution and production of *T. indica* products, (ii) the presence of Berta native ethnic groups in the woreda that have different indigenous knowledge and culture and utilization of T. indica products. Proportionate to the size of the population, 6 Kebeles (lowest administrative units) from Menge and 3 Kebeles from Homehsa were selected randomly.



[Fig.1: Map of Assosa Zone and the Study District with Study Site]

B. Sampling Techniques and Sample Size

A cross-sectional survey was carried out between Sep 2022 and Jun 2023 in Homesha and Menge districts, purposively selected based on being among Assosa Zone within the T. *indica* natural range. A multistage sampling technique was used for this particular study. In the first stage, from the Assosa zone the two districts namely Homesha and Menge were selected for the study area based purposively based on 1) the potential and existence of *T. indica*, 2) has a large forest with high population pressure which needs evidence for designing appropriate forest management system and (3) has given lower research attention because of distance and hot climatic condition, 4) and the availability of Berta ethnic group in the districts.

In the second stage, a total 6 representative kebeles were selected purposively from each of the two districts based on their availability higher abundance and distribution of the T. *indica* tree population the study species and representativeness of the different agro-ecologies were selected purposively in two districts.

C. Sampling Techniques and Sample Size

Individual household sample size respondents were selected randomly from the Berta ethnic group. The size of households interviewed was determined according to [17] sampling formula used for each selected kebele. All submitted paper should be cutting edge, result oriented, original paper and under the scope of the journal that should belong to the engineering and technology area.

$$n = \frac{z^2\, p^* q^* N}{e^2\,(N-1) + z^* p^* q} \quad \ldots \quad (1)$$

Where, n = Representative sample respondents, z = Degree of Confidence level (1.96) at 95%-degree p = Proportion of population included in the sample was 15% (0.15), q = Proportion of population excluded in the sample was 85% (0.85) e = Standard error (0.05)

$$n = \frac{(1.96)^{2*}(0.15)|^*(0.85)^*(786)}{(0.05)^2(786-1)+(0.15)^*(0.85)} \quad \ldots \quad (2)$$

Accordingly, a total of 160 households, 88(55%) from the Homosha, 72 (45%) from the Menge district and were randomly selected from the six Kebeles for interview (Table 1).

Besides, 15 participants from the two districts were invited for group discussion and key informants were purposively selected for key informant interviews from the Berta ethnic group only. The key informants from the Berta ethnic group were knowledgeable and able to provide the required important information about the production and marketing of products from the study plant since they were all involved actively in developing, producing and marketing different products from *T. indica* trees.

Further discussion was held with the Woreda agricultural office experts and merchants about the traditional uses and market values of *T. indica* products, which was used as an additional source of information to triangulate the information generated through the questionnaires and group discussion. A sample size of households at the district level was determined based on probability proportion to size

and the households were identified using a simple random sampling technique as follows.

Table-I: Sample Size Distribution by Berta Ethnic Group in Each District

Name of district	No House holding in district	Sampling Respondents from district	Percentage
Homesha	366	88	55
Menge	420	72	45
Total	786	160	100%

D. Data Collection Methods

The data were collected in six of the selective administrative kebele from Homesha and Menge Woreda from Sep 2022 to Jun 2023. As a result, semi-structured interviews, direct observation and focused group discussions were used to collect mainly detailed quantitative data about indigenous knowledge on the uses, management and threats of *T. indica* tree from the sampled household and local key informants. All of the semi-structured interviews were undertaken to collect primary qualitative and quantitative data from participants who met on a face-to-face basis and conducted using a checklist of closed and open-ended questionnaires developed in English and translated into "Benshangulega" (Berta) the local language of the people.

E. Data analysis

The collected data from the questionnaires of household interview respondents, key informants and focused group discussion with selected individuals were summarized coded and entered into a Microsoft Office Excel sheet. The majority of the qualitative data on key variables was analyzed and expressed using descriptive statistics (frequency and percentages). Some data is presented in tables and graphs. The quantitative data were analyzed using Statistics SPSS Version 20 and MS Excel software 2019.

III. RESULT AND DISCUSSION

A. Socioeconomic Characteristics of Respondents

The majority of the respondents were male heads (75%) while the remaining (25%) were female heads. The limited participation of women was due to the cultural beliefs and low education level of women in the Assosa zone.

From the total, 50% of respondents were in the age of 45–65 years old, 20% in the age of 31–45 years old, 15.6% in the age of >66 years old and 14.7% of respondents were above 20-30 years old. Most of the respondents (40.6%) were ill-treated and could not read and write, 20% were from grades 1–4, 15.6% of the respondents were from grades 5-8, 14.3% were from grades 9-12, 7.5% were diploma and the rest 1.87% of the respondents were from above diploma. Most of the respondents' main sources of livelihood were cropping farming (46.8%), local trade and mining (34.4%) and livestock rearing (18.75%) in the study area (Table 2)

B. The Main Primary use Value of T. Indica

Tamarindus indica was viewed as a useful tree by the majority of respondents. *Tamarindus indica* served a variety of functions and uses including food 21.7%, Medicine 19.5%, timber (tools and utensils 17.4%, fodder 16.65%, soil fertility 8.7% Shade and shelter7.25%, Commercial 5.8%, Fuel wood and Charcoal 2.9% respectively. Details of the various uses and modes of use of *T. indica* are summarized in (Table 4).

Table-II: The Use Value of Tamrandus Indica in the Study Area

Use Value	Number of Respondents House Holding	
	Frequency (f)	Percentage
Food	35	21.74
Medicine	31	19.56
Timber (Tools and utensils)	29	17.4
Fodder	27	16.65
Soil fertility	14	8.7
Shade and shelter	10	7.25
Commercial	9	5.8
Fuel wood and Charcoal	5	2.9

C. Food Value

Accordingly, 21.7% of the key informants and group discussion participants mentioned that food is the most widespread and common benefit of *T. indica* for Berta ethnic groups. The fruit pulp of *T.indica* is the most commonly used part as supplementary food during drought periods by Berta ethnic groups in Assosa Zone (100%)

A similar study in Uganda by [8] showed that food use of *T. indica* was the highest-ranked benefit by the local people. Local communities in Assosa Zone consume *T. indica* fruit pulp directly as a snack and in the form of juice, a locally made beverage for home consumption by adding the fruit pulp to water.

Another study by [4] indicated that in Senegal constituency Indigenous fruit tree species such as tamarind traditionally act to build resilience into Sub-Saharan Africa's farming system in terms of food security.

D. Medicine Use

T. indica has medicinal use for the Berta ethnic groups in the Assosa zone. Fruit pulp (85.7%) and root (14.3%) of the tree species were used to cure different diseases by the Berta ethnic group. Fruit pulp was used to cure diarrhea, and roots are important for washing infants or pre-mature babies to increase growth (Table 3). In the group discussion, participants also mentioned that the fruit pulp had been used by local people to cure gastric pain.

Similarly, a study in the country of Ethiopia in the Tigray region was reported by [5] that tamarind fruits are used for treating abdominal problems and hypertension. Tamarind is also used for abdominal problems in southern Ethiopia, as well as to treat diarrhea and as an anti-emetic [16].A similar study by [22] reported that tamarind fruit pulp helps with the relief of abdominal pain and diarrhea acts on bile secretion and prevents liver disease. Other Similar findings were reported by [6] *Tamarindus indica* fruit pulp is used in the treatment of several ailments including fevers, rheumatism, and throat infections as well as possessing anti-fungal and anti-bacterial properties. Another similar study in East and West Africa by [13] pointed out that the use of T. indicia seeds is a valuable remedy for diarrhea and dysentery Fruit, bark and leaves are used to treat diarrhea and as a laxative. Another study by [19] indicated that the tamarind pulp with lemon is used to treat diarrhea and to relieve

constipation and abdominal pains. The pulp in Mali is prepared as drinks, and in Burkina Faso and across rural Fulanis in Nigeria, it is crushed and soaked for half a day in water with a little salt before consumption.

E. Environmental Benefits

All the respondents in the study area the Berta ethnic group (80.7%) used the *T. indica* tree for environmental benefits. Similar to the findings of [8] who describe *Tamarindus indica* provides perennial cover thus protecting the soil and aiding in the storage and recycling of plant nutrients and organic matter.

Focus group discussions commended *T. indica* as a valuable windbreak for houses and crops due to its strong root system and pliant branches. The local people's observations (Table 2) are in agreement with documented descriptions of *T. indica* as having strong roots and branches, wind resistant, highly resistant to disease attacks and able to grow successfully under a variety of soil and agro-climatic conditions. Another similar study by [2] indicates that it serves as windbreak and fire break, soil and water conservation and hence recommended for agroforestry systems.

F. Timber production

On the other hand, only 17.4% of respondents from the Berta ethnic group use *T. indica* tree for timber production and others. Similar to this finding in Ethiopia [11] also indicated that the *T. indica* is one of the multipurpose trees that provide timber production. These findings are in agreement with the views of [21] who report that *T. indica* is providing timber. A similar study by [22] indicated that *T.inica* is used for general carpentry, sugar mills, wheels, hubs, wooden utensils, agricultural tools, mortars, boat planks, toys, panels and furniture.

G. Fodder use value

About 16.6% of respondents from the Berta ethnic group use leaves and root parts of *T. indica* for fodder. The majority of the respondents from the Berta ethnic group mentioned that they used seeds of *T. indica* to feed their livestock (Table 3). Few of the respondents mentioned that flowers, fresh leaves and root parts of *T. indica* have been used as fodder for goats, sheep and donkeys.

Similarly study in Eastern Ethiopia by [7] reported that the *T. indica* tree is fodder for animals. These results were confirmed by [1] indicated that the *T. indica* seeds are used to make the livestock feed. These findings concur with [25] who point out that in local communities in the southern states of India cooked seeds of the Tamarind tree are fed to draught animals regularly.

H. Soil Fertility

In the study area, some of the respondents in the Berta ethnic group (8.7%) *T. indica* trees are used to improve soil fertility. Mature *T. indica* trees are sources of fertilizer for cropping fields when they die and decompose (usually within six months of falling). Leaves spread in gardens as mulch. Our finding is also in line with the study of [9] that indicated the *T. indica* tree is used to improve soil fertility. This finding is in line with studies performed by [20] showed that for most *T. indica* the increase in porosity of the soil helps to increase the microbial count and soil aeration thereby ensuring good health of the soil. This helps in increasing the agricultural income of the farmers with less water.

I. Commercial purposes

Fruits parts of *T. indica* seem to be sold commercially by Berta ethnic groups. The Berta ethnic groups in the study area collect fruit of *T. indica* for sale. 5.9% of respondents Berta ethnic group collect fruit pulp for commercial purposes for income generation. In the study area, entire trees are sold especially to limestone kiln operators to earn income. Fruit is sold to earn income. In a similar study in Ethiopia by [10], [19] reported that rural people sell Tamarind fruit in local markets to generate income to supplement the household economy.

J. Shade and Shelter

About 7.53% of the respondents use the *T. indica* tree for shade and shelter in the study area among the Berta ethnic groups. The current finding is inline agreement with other studies [10] point out that Studies from other parts of Africa have documented how tamarind provides multiple uses to local communities for shade and shelter. Similar findings were reported by [22] reported that the extended crown of the tamarind offers shade so that it is used as a 'rest and consultation tree' in villages and addition to that we observed during our field visit in the study area that livestock's, birds and domestic animal used as shade and shelter.

A similar study from Eastern Uganda by [8] stated that the *T. indica* is very suitable for resting and meetings due to the evergreen habit and the extending crown thus providing shade for both people and livestock.

K. Fuel Wood and Making Charcoaling

Some of the respondents in the study area (2.9%) mentioned that *T. indica* tree trunk and branches part was an important product for fuel wood and making charcoaling. Trunk and large branches are used to make charcoal.

This result agreed with the finding of [22] was mentioned that provides good firewood with a calorific value of 4850 kcal/kg, and it also produces excellent charcoal. Our finding is also in line with the study of [12] that indicated the suitability. *T.indica* wood gives off an intense heat approaching ≈5000 cal per kg thus valued for firing brick kilns.

L. Other Benefits

The key informants and group discussion participants mentioned that the T. indicia tree is also used for Socio-cultural benefits. Large tamarind trees are favorite venues for village meetings, markets and places of workshops, weeding, and polling stations during elections. Due to their longevity, tamarind trees serve as key landmarks and are often used as reference points and boundary markers during land demarcation between neighbors. A similar study reported by [8].

The participants of key informants and group discussion mentioned that the T. indicia tree has also been used for hanging beehives, the end branch parts use for toothbrushes, ornamental evergreen habits and beautiful flowers make it suitable for ornamental planting in parks, along a road

and riverbanks, aesthetic and recreation and apiculture.

IV. PLANT PART OF T. INDICA USED

The study results showed that the parts of the Tamarinds tree that were consumed by households were fruit, seeds, leaves and tree, tree branch root bark and stem bark. According to 30.4, 27.5, 21.7 and 7.5% of the respondents used leaves, fruits, leaves fruits, leaves, seeds, tree branches and, respectively (Table 3). The majority of the parts of the tamarind indicia tree in the study area are fruit pulps followed by seed, Leaf, tree breach, trunk, root bark and stem bark.

A similar study by [14] reported that fruit from Tamarind contains high levels of protein and carbohydrates. It also contains a variety of organic acids, including tartaric acid, acetic acid, citric acid, formic acid, malic acid, and succinic acid; amino acids, inverted glucose (25-30%); pectin; proteins; fat. A similar study by [15] reported that Flowers, leaves and seeds are also edible and valuable for human consumption *T. indica* was used by local communities.

Table-III. The Plant Parts Used of *Tamrandus Indica* in the Study Area

Tree parts Used	Number of Respondents House Holding	
	Frequency (f)	Percentage
Fruit	49	30.4
Seed	44	27.5
Leaf	35	21.7
Tree, branch	12	7.5
Trunk	10	6.2
Root bark	7	4.37
Stem bark	3	1.87

V. FACTORS AFFECTING T. INDICA POPULATION IN ASSOSA ZONE

According to informants from all villages, several factors threatened T. indica trees in the Assosa Zone. The main threat to *T. indica* plant resources mentioned by the respondents was deforestation for agricultural expansion with 45 mentions (25%), followed by no planting (31 mentions or 19.2%) and gold mining (23 mentions or 14.2%) (Fig. 4)

Similarly, a study in the Tigray region of Northern Ethiopia by [10] suggests that the main factors threatening the destruction of *T. indica* tree species might be due to illegal cutting, fuel wood collection, agricultural expansion, lack of replanting, timber harvest, deforestation in general, flooding, lack of management, and soil erosion. In a similar study in the Tigray region of Northern Ethiopia by [13] the factors threatening the distribution of the species in the Tigray region might be due to illegal cutting, fuel wood collection, agricultural expansion, and lack of replanting.

Table-IV. The Factors That Affect T. Indica in the Study Area

Threated Factors	Number of Respondents	
	Frequency (f)	Percentage
Agricultural Expansion	40	25.0
No Replanting	31	19.2
Gold Mining	23	14.2
Fuel Wood	22	14.1
Lack of Management	15	9.2
Illegal Cutting	13	8.3
Timber Harvesting	9	5.8
Forest fire	7	4.2

VI. MANAGEMENT PRACTICE OF T. INDICA IN ASSOSA ZONE

Most of the respondents (82.7%) across Berta ethnic groups mentioned that *T. indica* trees have been growing naturally without any appropriate silvicultural management practice such as assisted natural regeneration, seeding, or transplantation of sapling. About 67.5% of the respondents mentioned that pruning, cropping and fencing (of seedlings and saplings) were used to enhance the growth, protect and sustain the *T. indica* population around homestead, agricultural land use type, roads and public lands.

Similar findings were reported in the study in the same district by [10] who indicated that farmers practice different management planting T. indicia such as along boundary roads, compounds and public lands. Planting and keeping *T. indica* around the home garden for their diverse uses were found to be the management strategy practiced for conservation.

In situ and ex-situ conservation practices applied in the study area. Similar findings were reported in the study in the same district by [12] who indicated that farmers practice different traditional management practices such as pollarding, fencing, preventing from cutting and allowing plants to regenerate and grow in their fields for different purposes. We observed during our field visit in the study area that farmers leave uncut *T. indica* trees on their farmland during the clearing of their field lands and around the home garden. According to the participants of key informants and group discussion, *T. indica* tree species has also been protected and conserved in home gardens for social environmental benefits such as traditional ceremonies, and public meetings. Therefore, they protect and allow growing *T. indica* tree species near their homestead.

VII. CONCLUSION

Tamarindus indica L. (tamarinds) is an indigenous semi-evergreen, the most multipurpose wild edible tree species of the Fabaceae family, and a key species with high maintenance ecological sustainability and socioeconomic significance in Assosa Zone, North West Ethiopia. All plant parts are used by all ethnic groups. Overall, twelve main traditional uses of *T. indica* products preferred for its wild edible fruit (food, commercial, medicine value, fodder for animals, shade for traditional ceremony, improved soil fertility and hanging beehive) were documented among the Berta ethnic groups. Fruit pulp is commonly used for supplementary food and commercial purposes by Berta ethnic groups.

Deforestation for agricultural expansion, lack of replanting, gold mining exploration, fuel wood, lack of management and illegal cutting to the decline of the *T. indica* tree species' populations in the study area. Most local people indicated an absence of specific management practices such as assisted natural regeneration, seeding, or transplantation of *T. indica* sapling except lopping, pruning and fencing of the naturally grown individual trees.

The results of this study can be used to support the sustainable use of *T. indica* in the study area, new conservation strategies including in-situ and ex-situ

conservation, and planting in their around homestead, farmland and fence area. Conservation efforts should be designed through discussion with the local communities, using their knowledge to ensure that recruitments are enhanced so that this valuable resource continues to contribute to their food and livelihood security.

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I must verify the accuracy of the following information as the article's author.

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- **Authors Contributions:** The authorship of this article is contributed solely.

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APPENDIX - 1

Table- I: Details of the Various Uses and Mode of Use of T. Indica are Summarized

Use Categories	Plant Part Used	Mode of Preparation
Food	Fruit pulp	Mature ripe fruit of the sweet variety eaten as a snack.
Medicine	Fruit pulp	Used to treat abdominal pain and hypertension
	Leaves	Leaves are used to treat livestock for mouth and foot disease and bloating.
	Fruit	The fruit are Chopped, distributed in water and the suspension is drunk for treatment of malaria, diarrhea, and appetizer
Fodder	leaves	Fresh leaves are fed to domestic animals such as goats, sheep and donkey.
Fuel wood & Charcoal	Trunk, branches	Trunk and large branches used to make charcoal. Makes excellent fuel wood for firing bricks and limestone kilns.
Environmental improvement mulch	Leaf	Leaves spread in gardens as mulch It is control soil erosion
Construction for house tools and utensils	Trunk, branches	Straight portions are used in house construction Small stems and branches are used to make clubs and agricultural tool handles for hoes, axes and pangs
Shade or shelter	Tree	Provides shade for livestock, in homesteads, on compounds and for travelers along roads
Wind break	Tree	Windbreak for houses and crops
Apiculture	Tree	The tree is used for hanging beehives
	Flower	Flowers are reportedly a good source for honey production.
Personal hygiene	Branches	Ends of small branches are cut and the ends chewed to make durable toothbrushes
Commercial use	Fruit	Fruit is sold to earn income.
Aesthetic uses and socio cultural	Tree	Trees add beauty to homes and provide shade in homesteads and other compounds thus improving the ambience. Large tamarind trees are used as polling stations during elections. Its favorite venues for public meetings, markets and places of workshop and weeding.

Table- II: Socio-Demographic Characteristics of Respondents

Gender		Age				Education Level						Household Income		
M	F	20-30	31-45	46-65	>66	illtreat	1-4	5-8	9-12	diploma	>dip	Farming	Livestock raising	Local trade
120	40	23	32	80	25	65	32	25	23	12	3	75	30	55
75	25	14.37	20	50	15.6	40.6	20	15.6	14.3	7.5	1.87	46.8	18.75	34.4