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RESEARCH PAPER

Study on utilization pattern and value addition of *Buchanania lanzan* Spreng in Banavasi forest range, Uttara Kannada, Karnataka

H. R. SHASHANK AND M. HANUMANTHA*

Department of Forest Products and Utilization, College of Forestry, Sirsi - 581 401
University of Agricultural Sciences, Dharwad - 580 005, India
*E-mail: hanumantham@uasd.in

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Abstract: *Buchanania lanzan* Spreng. belongs to family of Anacardiaceae, is a valuable Non Timber Forest Product (NTFP) species producing commercial edible fruits, which is popularly known for its high-priced kernels and seeds, leaves and bark are used in traditional Ayurvedic and Unani systems of medicine. Fresh fruits and their kernels having a sweet flavor and used by the local communities for making juice, jam and sweets. Residents near the forests mainly dependent on forest for the locally available forest species and used for different economic and medicinal purposes. The present study was carried out in Banavasi Forest Range comprising four sections namely Banavasi, Sugavi, Ekkambi and Dasankoppa. In each section 25 families were selected for the study to know its utilization pattern by local people; where higher representation of males (56.00%) compared to females (44%) were taken the nearby forest dwellers have extensive traditional knowledge with respect to *Buchanania lanzan*. In the study area it was documented that fruits and seeds were used by maximum number of villagers (100%) followed by leaves (46%), wood (12%) and bark (9%) of the tree. Among the different uses, medicinal uses were more (86.00%), followed by fuelwood use (78.00%), fruits juice preparation (65.00%), preparation of different culinary ingredients (56.00%), making of manure (29.00%) and in making of different furniture (14.00%). The present study also documented seven different medicinal uses of *Buchanania lanzan* tree for the treatment of stomach pain, dysentery, cough, joints pain, asthma, skin and blood diseases.

Key words: Banavasi, Chironji, Edible fruit, Kernel, NTFP

Introduction

Buchanania lanzan, commonly known as Chironji or Charoli, is a Non-Timber Forest Product (NTFP) yielding tree belongs to family Anacardiaceae. Culturally, it holds significant importance, reflected in its various local names such as Chironji, Achar, Charoli, Nuruklu, Rajadana, Saarachettu and Morichettu depending on the region (Siddiqui *et al.*, 2014). Chironji deciduous tree typically grows up to 18 meters tall and present in moist and dry deciduous and even in semi-evergreen forests across various regions of India including Madhya Pradesh, Bihar, Orissa, Andhra Pradesh, Chhattisgarh, Jharkhand, Maharashtra, Uttar Pradesh and Karnataka (Malik *et al.,* 2012). The bark of the tree is easily identifiable because of its rough texture, which is roughly 10–12 mm thick and resembles that of a crocodile and its blaze is red in colour. The leaves are simple, alternating, roughly oblong that can be either round or pointy. However, there is a substantial decline in the population of chironji plants due to over exploitation, climate change, low regeneration, destructive harvesting of immature fruits in the forest areas (Rajput *et al.,* 2018). The population of this species is facing a severe threat of vulnerability and extinction due to over harvesting of fruits. In 2009, *Buchanania lanzan* was declared as vulnerable species in the Red Data Book of the International Union for Conservation of Nature and Natural Resources (Malik *et al.,* 2012).

Buchanania lanzan is one the economically valuable tree grown for its fruits and kernels. The edible fruits are highly valued and used extensively in the production of various value-added products. These small, almond-sized fruits are rich in nutrients and traditionally consumed as snacks or added to sweets, desserts and savory dishes. Seeds are also processed into oils, which are used in cooking and as a base for traditional medicines (Siddiqui *et al.*, 2014; Khatoon *et al.*, 2015).Various parts of the tree including the seeds, leaves and bark are used in traditional Ayurvedic and Unani systems of medicine. The wood is used for small scale handicrafts and wood works (Malik *et al.,* 2012). Fresh fruits and their kernels having a sweet flavor and used by the local communities. Chironji is popularly known for its high priced kernel and acts as a substitute for almonds (Rajput *et al.,* 2018). It has been used for the treatment of digestive disorders such as diarrhoea, dysentery and indigestion. The seeds are sometimes powdered and used as curative with liquids. (Kumar *et al*., 2012). Banavsi forest range consists of dry deciduous, moist deciduous and evergreen forests and blessed with several economically valuable trees. Chironji is one the dominant species in dry and moist deciduous forests. However, the work on value addition of this species is very sparsely found. Hence, with this background the study was carried out to document the utilization pattern and value addition of *Buchanania lanzan* Spreng in different forest types of Banavasi forest range.

Material and methods

Banavasi is one of the rich and high valued biodiversity places of Uttara Kannada district and well known for its richest sources in different types of forest which has medicinal as well

Table 1. Demographic details of respondents interviewed in the villages of enumerated areas

Variables	Subgroup	Number of respondents	Per cent
Gender	Male	56	56.00
	Female	44	44.00
Age	20-30	08	08.00
	30-40	32	32.00
	40-50	43	43.00
	50-60	11	11.00
	60 and above	06	06.00
Education level	Illiterate	26	26.00
	SSLC	43	43.00
	PUC	12	12.00
	Degree	19	19.00

Total number of key respondents (N) = 100

as commercially valuable species. Banavasi forest range is located at a height of 700 m from the mean sea level and receives average rainfall of 2500-3000 mm annually. *Buchanania lanzan* is one of the important commercially valuable Non-Timber Forest Product species. Its fruits and seed kernels are highly valued for production of different value added products. Residents near the forests mainly dependent on forest for the locally available forest species used for different economic and medicinal purposes. The nearby forest dwellers have an extensive traditional knowledge with respect to local plants and other different resources that are present in abundance in their surrounding forest areas.

A questionnaire survey was conducted in the villages near by the natural populations of *Buchanania lanzan* to know its utilization pattern by the local people. Proper documentation of ethno-medicinal knowledge is a prime requirement to preserve ancient knowledge. Hundred respondents in four sections namely Banavasi, Sugavi, Ekkambi and Dasakoppa were interviewed through semi-structured survey for collection of data regarding utilization and value addition of *B. lanzan* using standard format (Hanumantha *et al.,* 2019 and 2022).

Results and discussion

A proper documentation of traditional and ethno-medicinal knowledge is one of the basic tools for preservation of ancient knowledge of a place. Banavasi is one of the richest biodiversity places of Uttara Kannada district; it is known for its richest sources of different types of forest with medicinal as well as commercially valuable species. A total of 100 members/ respondents from different villages of nearby natural population of *Buchanania lanzan* were surveyed; where higher

Table 2. Per cent use of different parts of *Buchanania lanzan* by local people

Parts used	Number of respondents	Per cent utilization
Fruits	100	100
Seed	100	100
Leaves	46	46.00
Wood	12	12.00
Bark	9	9.00

Total number of key respondents (N) = 100

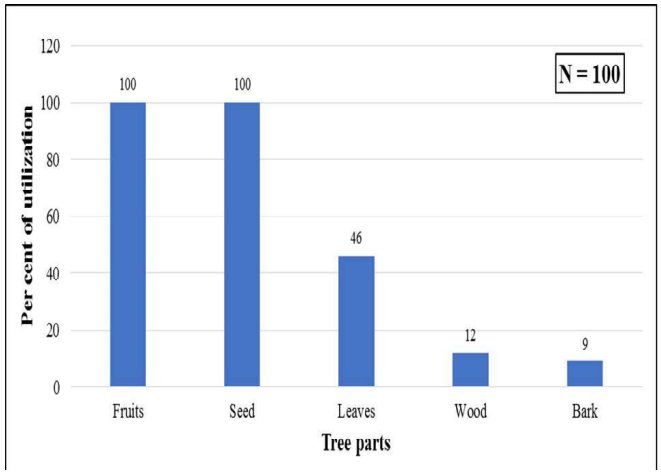

Fig 1. Per cent use of *Buchanania lanzan* tree parts in Banavasi forest range

representation of males (56%) was reported compared to females (44%) in gender gap distribution and the majority of their educational status is SSLC (Secondary School Leaving Certificate) (Table 1).

The present study documented the use of chironji parts for different purposes in the study area (Table 2 and Fig 1). Fruits and seeds were used by all the 100 respondents (100%) and they consumed directly, followed by leaves (46.00%), which were used for manure and treating some disorders in human beings; whereas, least usage was noticed for timber and bark (12.00% and 9.0%) for furniture, carts and bark for treating blood related disorders respectively. The results are in line with the study conducted by Rai *et al.* (2015); where they documented the maximum per cent utilization of fruits, seeds and leaves by tribal people of Jharkhand and Chhattisgarh, followed by wood and bark in *Buchanania lanzan.* Fruits and seeds were most economical products used for production of many value added products such as sweets, payasa, laddu *etc*. The fruits were extensively harvested by the local community for their economical value; which had resulted in poor germination and population status in natural population (Rajput *et al.,* 2018).

Majority of the chironji parts were used for edible purpose, medicinal, firewood, furniture and manure purposes in different areas. The present study documented six different utilization patterns of *Buchanania lanzan* tree by local people of nearby villages in Banavasi forest range (Table 3 and Fig 2). In the

Table 3. Use of *Buchanania lanzan* tree parts for different purposes

Different purposes of usages	Parts used	Number of respondents used	Per cent of respondents used
Medicinal	Fruits, seeds, leaves, bark	86	86.00
Firewood	Wood	78	78.00
Juice	Fruits	65	65.00
Culinary	Seeds and kernel	56	56.00
Manuring	Leaves and twigs	29	29.00
Furniture	Wood	14	14.00

Total number of key respondents N = 100

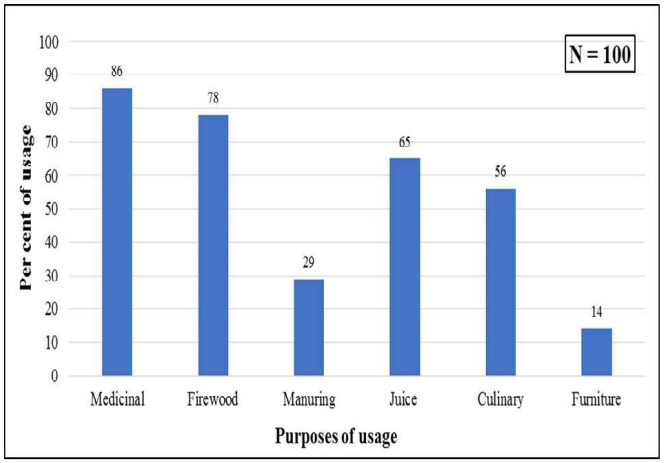

Fig 2. Utilization pattern of *Buchanania lanzan* by the local people in Banavasi forest range

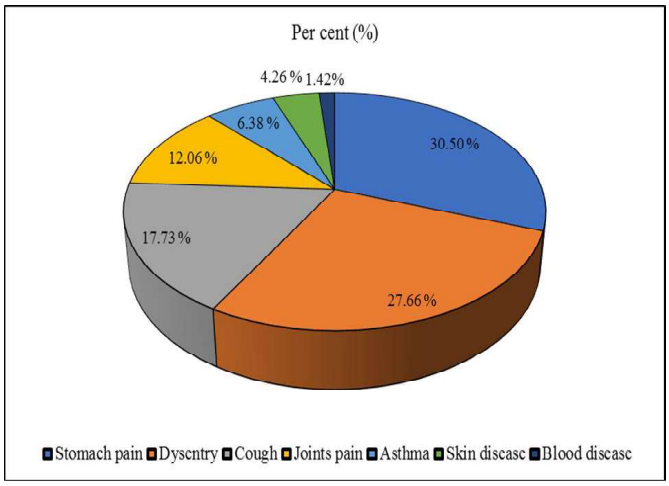

Fig 3. Medicinal usage of *Buchanania lanzan* documented in Banavasi forest range

present study majority of the respondents (86) used fruits, seeds, leaves and bark for medicinal purpose followed by fire wood (78), juice (65), culinary (56), manure (29) and least for furniture (14). People in this area use fruits for preparing juice and for direct consumption. Seeds utilized for preparation of culinary ingredients like payasa, additives to laddu as an alternative to almonds. Leaves and twigs are mainly used for manure. Wood is mainly used for making different furniture such as tables, carts and tools as shown in Table 3. Similar results were reported by Rajput *et al.* (2018) in *Buchanania*

Table 4. Medicinal uses of *Buchananialanzan* tree

Medicinal uses	Different plant parts used	Number of respondents	Per cent
Stomach pain relief	Fruits, seeds,bark	43	30.50
Dysentery control	Seed powder	39	27.66
Treatment of cough	Leaves	25	17.73
Joints pain	Leaves	17	12.06
Treatment of asthma	Seed powder	9	6.38
Skin diseases	Seed kernels, seed powder	6	4.26
Blood disease	Bark	2	1.42

Total number of key respondents (N) = 100

Table 5. Value added products of *Buchanania lanzan* tree documented in the study areas of Banavasi forest range

Part used	Purpose/ Products produced	Formulation
Fruit	Juice	Mix fruit juice with jaggery
Fruit	Squash	Thick blended fruit juice with jaggery
Fruit	Salt and green chilly mixture	Immature sour fruits are mixed with salt, green chilly and small amount of jaggery and used as cuisines
Fruit	Reduce thirst	10-15 fruits taken orally
Seed kernels	Sweet	Used as substituent to almonds in laddu preparation
Seeds	Payasa	Used as alternative to almonds and cashew
Wood	Furniture	Small scale furniture like tables, carts and rakes

lanzan from Chhattisgarh. They reported that seeds are used for medicinal purpose, also used in sweets preparation; whereas bark powder used in blood disorder treatments. Rai *et al.* (2015) noticed usage of leaves and fruits in treatment of joints pain and dysentery diseases in Jharkhand and Chhattisgarh.

In the present study seven different traditional applications using different parts of *Buchanania lanzan* for treatment of diseases were documented (Table 4 and Fig 3). Majority of the villagers used the different tree parts like fruits, seeds and bark for treatment of stomach pain relief (30.50%), followed by in curing of dysentery (27.66%), treatment of cough (17.73%), relive of joint pains (12.06%), asthma treatment (6.38%), to control skin (4.26%) and blood (1.42%) related disorders. A similar study was conducted by Meena *et al.* (2022); they reported that *Buchanania lanzan* species was used in curing of various diseases such as dysentery, cough, asthma, diarrhea or stomach disorders and diabetic diseases from different plant parts. In this study the various value added products derived from different parts of *Buchanania lanzan* in the Banavasi forest range were also documented (Table 5). Fruit and seeds were the major commercial parts and used for preparing juice, squash, salt and green chilly mixture, sweets and payasa; which were used for culinary and thirst-reducing purposes. Additionally, the seed kernels were used as a sweet substitute for almonds and in traditional sweet preparation such as payasa, sweet, laddu *etc*. The wood of the tree is also utilized for making small-scale furniture like tables, carts and rakes. Similar finding were also reported by Kumar *et al.* (2012); they reported that chironji fruits are used in drinks, seeds used as a substitute for almond; timber/wood is utilized in making furniture, boxes, tools *etc.*

Conclusion

Buchanania lanzan, commonly known as Chironji or Nuruklu, is a Non-Timber Forest Product (NTFP) yielding tree belonging to Anacardiaceae family. The edible fruits are highly valued and used extensively in the production of various value-added products. The present investigations noticed extensive usage of fresh fruits and their kernels by the local communities and were mainly used as additives in food to get sweet flavour.

In this study majority of respondents were male (56.00%) and falls between 40-50 years age group (43.00%) and their education standard is SSLC (43.00%). All respondents interviewed were utilizing fruits and seeds (100%) from different purposes followed by leaves (46.00%). Majority of people (86 members) use fruits, seeds, leaves and bark for treating different ailments. Many parts of chironji were used for curing many ailments; among 100 respondents, 43 respondents (30.50%) used fruits, seeds and bark for curing stomach pain, 39 respondents (27.66%) used seed powder for curing dysentery and 25 respondents (17.73%) used leaves for curing cough. Chironji fruits and seeds/kernels were the major economic partd used for making juice, squash, sweets, payasa and other value added products. From this study is concluded that chironji is one of the commercially valuable edible fruit yielding tree and all the parts of this are used for different purposes and production of value added products. Because of its commercial and medicinal value parts of this tree is harvested on unsustainable manner. Hence, for preventing decline of population suitable management and conservation measures should be initiated by the Karnataka Forest Department in the Banavasi Forest range and in adjoining areas.

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