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A study on identification, documentation and marketing of underutilized fruits in Kalyana Karnataka region

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Abstract

A study was conducted in Kalyan Karnataka region of Karanataka state during the year 2023-24 to identify and document the underutilized fruit crops of the study area. The exploratory research design was employed in conduct of the study. Primary data were collected by using the questionnaire prepared for the study, a snow ball method of data collection were used to collect data due to difficulty in identifying the farmers those involved in collecting and marketing of these fruits. The suitable statistical tools like frequency and percentage are used for the analysis and tabulation of the data. In this study ten underutilized fruits were identified, their common name, scientific name, family, health benefits and their images were documented. The identified fruits are wood apple, Jamun, Ber (local variety), star gooseberry, custard apple (local variety), Jungle jeelebi, Indian almond, mulberry fruit, karonda and ice apple fruits. With respect to the profile characteristics of the respondents, majority (58.57%) belonged to middle age group, illiterate (61.43%), nuclear family type (57.14%), landless (61.43%), medium farming experience (64.29%) and had low annual family income (95.71%). With respect to marketing behavior of the farmers, majority of farmers marketed wood apple (74.29%), Indian almond (78.57%) and jungle jeelebi (84.29%) directly to the consumer while, jamun (58.57%), ber (75.71%), star gooseberry (67.14%), custard apple (52.86%), mulberry fruits (60.00%) karonda (71.43%) and ice apple (85.71%) were sold to middle men. Vast potential of underutilized fruits contributing significantly to the livelihood of the rural population, enhancing food and nutritional security and fostering sustainable agricultural development, hence government has to initiate the promotional activities for these underutilized fruit crops and provide the platform to sell their fruits at suitable price.

Keywords: Underutilized fruits, documentation, marketing behavior, wood apple

Introduction

Fruit generally refers to the sweet, fleshy, edible product of a tree or other plant that contains seeds and is typically consumed raw or used in desserts and other sweet dishes. Fruits play a profound and continuous role in human development across all life stages. Their rich nutrient profile supports physical growth, cognitive function, immune system strength and overall well-being. Unlike major fruits (like apple, orange, mango, banana, etc.) there are fruits called as underutilized fruits, these fruits has significant nutrition, health benefits, additional income generation and environmental services, but are not cultivated commercially and consumed on a large scale. Underutilized fruits are "hidden gems" of biodiversity that hold great promise for food security, climate resilience, and rural livelihoods, but have been largely overlooked by modern agriculture and food systems.

These fruits untapped and ignored due to

- **Underexploited Potential:** Despite having desirable traits like high nutritional content, adaptability to harsh environments, unique flavors, or medicinal properties, these fruits are not being utilized to their full capacity.
- **Limited commercialization:** They are typically not part of mainstream agricultural production or international trade networks.
- **Localized or niche consumption:** Their use is often confined to specific regions, local communities, or traditional dietary practices.
- **Lack of research and development:** There's generally insufficient scientific attention given to their genetic improvement, optimal cultivation practices, post-harvest handling, or value-added processing.
- **Poor market infrastructure:** They often lack established supply chains, proper storage facilities, and effective marketing strategies that are crucial for widespread commercial success.
- **Low public awareness:** Many consumers are simply unaware of these fruits, their benefits, or how to incorporate them into their diet.

- **Often resilient:** Many underutilized fruits are well-adapted to marginal lands, adverse climates (like drought or poor soils), and require fewer inputs (water, fertilizers) compared to major commercial crops.

Underutilized fruits play a pivotal role in supporting livelihoods and driving rural development. Underutilized fruits play a multifaceted and crucial role in supporting human well-being. While often overlooked by mainstream agriculture and markets, their diverse contributions make them invaluable assets, especially in the context of climate change and the need for more resilient food systems. Their contribution spans nutritional, economic, environmental and social and cultural dimensions.

Nutritional Security and Health

- **Rich nutrient profile:** Many underutilized fruits are powerhouse sources of essential vitamins (especially Vitamin A, B and C), minerals (iron, calcium, phosphorus, zinc), dietary fiber and unique bioactive compounds like antioxidants and phytochemicals. They can fill critical nutritional gaps that are common in diets heavily reliant on a few staple crops.
- **Combating hidden hunger:** Their diverse nutrient content directly addresses micronutrient deficiencies, often referred to as "hidden hunger," which affects billions globally and impairs health, cognitive development, and productivity.
- **Medicinal Properties:** Historically and presently, many underutilized fruits are integral to traditional medicine systems (like Ayurveda in India). They possess documented anti-inflammatory, antimicrobial, anti-diabetic, antioxidant and immunomodulatory properties, offering natural remedies and contributing to local healthcare.

Economic Livelihoods and Rural Development

- **Additional income generation:** Farmers can sell fresh underutilized fruits in local and regional markets, creating additional income to the farming community. And also Processing these fruits into jams, jellies, juices, dried fruits, pickles, candies, and even non-food products (like natural dyes, cosmetics or medicinal extracts) extends their shelf life, adds significant value, and opens up new markets.
- **Risk mitigation:** Diversifying agricultural production with hardy underutilized fruits reduces farmers' reliance on a few major crops, buffering them against market price volatility, pest outbreaks and climate-induced crop failures.
- **Utilization of Marginal Lands:** Many underutilized fruits thrive on degraded or marginal lands (e.g., dry, saline or poor soils) where conventional crops struggle. This allows farmers to utilize otherwise unproductive land, converting it into an asset and generating income.
- Low input farming: Often, these fruits require fewer external inputs (water, fertilizers, pesticides), reducing cultivation costs and making them economically viable for smallholder farmers with limited resources.

Environmental Sustainability and Climate Resilience

- Agro-biodiversity conservation: By promoting the cultivation and consumption of underutilized fruit species, we actively conserve genetic diversity within agricultural systems.
- **Climate change adaptation:** Many underutilized fruits are inherently resilient to abiotic stresses like drought, heat, and salinity.
- **Ecosystem services:** Perennial fruit trees contribute to soil health by preventing erosion, improving soil structure, enhancing water infiltration and sequestering carbon.

Social and Cultural Preservation

- **Preservation of traditional knowledge:** The knowledge surrounding the identification, cultivation, harvesting, processing, and medicinal uses of underutilized fruits is often deeply embedded in the traditional practices and oral histories of indigenous and local communities.
- **Cultural identity:** Many underutilized fruits hold cultural significance, being used in festivals, rituals, or as symbols within communities.
- **Improved livelihoods for Vulnerable Groups:** As many underutilized fruits are wild-harvested or grown by marginalized farmers, their promotion can disproportionately benefit women, tribal communities and other vulnerable groups, improving their economic and social standing.

Considering the role of underutilsed fruits in sustainable agriculture and keeping all the beneficial points of underutilized fruit crops in mind a study was conducted on identification, documentation and marketing of underutilized fruits in Kalyana Karnataka region with the following objectives,

1. To study the profile of the farmers involved in collection and marketing of underutilized fruits
2. To identify and document the underutilized fruits in Kalyana Karnataka REgion
3. To study the marketing aspects of the underutilized fruits in the study area

Materials and Methods

The present study was conducted in Kalyan Karnataka region of Karnataka state during the year 2023-24. Kalyana Karnataka region was purposively selected for the study. Kalyana Karnataka region comprising six districts *Viz*. Klaburagi, Bidar, Yadgir, Raichur, Ballari, Koppal and Vijayanagar district. The exploratory research design was employed for the study as the study was aimed at exploring the method of collecting and marketing of underutilized fruits by the sample farmers. Data were collected by using snow ball method of data collection due to difficulty in identifying the farmers those involved in collecting and marketing of these fruits and unavailability of such information with Agriculture Department, NGO and with Private Firms. The statistical tools such as frequency and percentage were employed to analyse the data so as to arrive at valid conclusions.

Results and Discussion

The data presented in Table 1 reveals that, majority (58.57%) of the respondents were belonged to old age category followed by middle age (27.14%) and young age (14.29%) category. With respect to their education levels majority (61.43%) were illiterate followed by middle school (22.86%), primary school (8.57%), high school (5.71%) and PUC (1.43%). The Family type of majority (57.14%) respondents were nuclear family. In relation to land holding 61.43 per cent of the respondents were landless whereas, 28.57 and 10.00 per cent of the respondents were marginal and small farmers respectively. Medium farming experience possessed by 64.29 per cent while, 95.71 per cent of the respondents were had low annual family income. Hence, in the study area the collection and marketing of underutilized fruits was undertaken mainly by the landless and marginal farmers.

Table 1: Profile characteristics of respondents N=70

Sl. No.	Attributes	F	%
1	**Age**		
	Young (less than 35 years)	10	14.29
	Middle (between 36 – 50 years)	19	27.14
	Old (more than 50 years)	41	58.57
2	**Education**		
	Illiterate	43	61.43
	Primary school	6	8.57
	Middle school	16	22.86
	High school	4	5.71
	PUC	1	1.43
3	**Family type**		
	Nuclear family	40	57.14
	Joint family	30	42.86
4	**Land holding**		
	Land less	43	61.43
	Marginal farmers (up to 1.00 ha)	20	28.57
	Small farmers (1.01 to 2.00 ha)	7	10.00
	Semi-medium farmers (2.01 to 4.00 ha)	0	0.00
	Medium farmers (4.01 to 10.00 ha)	0	0.00
	Big farmers (More than 10.01 ha)	0	0.00
5	**Farming experience**		
	Low (up to 10 years)	15	21.43
	Medium (11 – 20 years)	45	64.29
	High (21 years and above)	10	14.29
6	**Annual Income**		
	Low (< Rs. 15000)	67	95.71
	Medium (Rs. 15001-50000)	1	1.43
	High (> Rs.50000)	2	2.86

F-Frequency,%-Percentage

Table 2: Identification and documentation of underutilized fruits

Sl. No.	Underutilized fruits	Common Name	Scientific Name	Family	Health benefits	Photo
1	Wood apple	Belavankai, Elephant Apple, Indian Bael fruit	*Ferronialimmonia*	Rutaceae	Wood apple is known for its high fiber content, making it beneficial for digestive health. The consumption alleviates issues like indigestion and bloating. It is also rich in antioxidants, such as vitamin C and flavanoids	

2	Jamun	Nearale Hannu, Nellada Hannu,	*Syzygiumcumini*	Myrtaceae	It is an excellent source of vitamin C, carbohydrates, protein, iron, magnesium, potassium and few phytochemicals. The fruit is diuretic, anti- scorbutic and carminative in properties and is a rich source of polyphenolic compounds. Ayurveda strongly recommends this berry for treating various conditions related to heart, arthritis, asthma, stomach pain, bowel spasm, flatulence and dysentery.	
3	Ber	Baari hannu,	*Ziziphus Jujuba*	Rhamnaceae	Ber is a low calorie fruit loaded with dietary fiber, vitamins and minerals that makes it an excellent option as a healthy snack. Packed with vitamin C, a potent antioxidant, ber fruit triggers the immune response and keep infections at bay.	
4	Star Gooseberry	Amla, Nellikai,	*Phyllanthus Acidus*	Euphorbiaceae	Gooseberries are nutritious, low-calorie fruits that are rich in vitamins, minerals, and antioxidants. These berries may have health benefits that include lower blood sugar, cholesterol and blood pressure.	
5	Custard apple	Seeethaphal	*Annona squamosa*	Annonaceae	It contains high content of vitamin C than orange. Prevents aging of the skin, keeps the heart healthy, gives the body overall strength and power and Heals wounds	
6	Jungle Jeelebi	Sindur Hannu, Kadu jelebi, Manila tamarind, Seemehunase	*Pithecellobium dulce*	Fabaceae	Rich in Nutrients: Jungle Jalebi is packed with essential vitamins and minerals like vitamin C, iron, calcium, and phosphorus. It helps in getting rid of indigestion, regulates blood sugar and reduces bad cholesterol in your body.	
7	Indian almond	Kad Badam, Tropical almond	*Terminalia catappa*	Combretaceae	It is a nutrient-dense nut that provides a variety of health benefits. It is rich in healthy fats, antioxidants, and other essential vitamins and minerals. Eating tropical almond may help reduce body weight, improve blood sugar control, and protect against chronic disease.	
8	Mulbery fruit	Hippuneralehannu	*Morus nigra*	Moraceae	Mulberries are filled with nutrients that are important for our body, possibly including iron, riboflavin, vitamin C, vitamin K, potassium, phosphorus, and calcium. Aid in Digestion, improves vision, anti-inflammatory, boosts immunity and reduce bad cholesterol.	

9	Karonda	Kavalehannu	*Carissa carandas*	Apocynaceae	Rich in vitamin C, B vitamins and iron, moreover, the karonda fruit is bestowed with myriad antioxidants, such as flavonoids, alkaloids, tannins, carissone and triterpenoids, which offer significant advantages like anti-inflammatory, antipyretic, cardio tonic and analgesic traits.	
10	Ice apple	Tale hannu, todyhannu	*Borassus flabellifer*	Arecaceae	Ice apples have a cooling effect on one's body and can help combat dehydration naturally. Rich in vitamins and minerals helps in maintaining good health and clearing of diseases.	

The following two marketing channels for underutilized fruits in the study area were identified.
Channel I: Fruit Collector- Consumer
Channel II: Fruit Collector- Retailer- Consumer

The majority (more than 70 percent) of the underutilized fruits were sold through the channel I.
The data presented in the Table 3 depicts that marketing behaviour of the underutilized fruits in the Kalyana Karnataka region of the Karnataka state. The results showed that, majority of the farmers with respect to the wood apple (74.29%), jungle jeelebi (84.29%) and Indian almond (78.57%) were sold directly to the consumer where as 25.71, 15.71 and 21.43 per cent of respondents sold wood apple, jungle jeelebi and Indian almond to the middle man. The reason for above results might be that very low population of these tree species in the rural area, in a village maximum 10 to 15 trees and these fruits are consumed seasonally as supplement diet by the consumers and low production and low demand might have restricted them to go to the commercial market.

Table 3: Marketing behaviour of underutilized fruits N=70

Sl. No	Underutilized fruits	Marketed to			
		Directly to consumer		Processing/ Middle men	
		F	%	F	%
1	Wood apple	52	74.29	18	25.71
2	Jamun	29	41.43	41	58.57
3	Ber	17	24.29	53	75.71
4	Star Gooseberry	23	32.86	47	67.14
5	Custard apple	33	47.14	37	52.86
6	Jungle Jeelebi	59	84.29	11	15.71
7	Indian almond	55	78.57	15	21.43
8	Mulbery fruit	28	40.00	42	60.00
9	Karonda	20	28.57	50	71.43
10	Ice apple	10	14.29	60	85.71

In case of jamun (58.57%), ber (75.71%), star gooseberry (67.14%), custard apple (52.86%), mulbery fruit (60.00%), karonda (71.43%) and ice apple (85.71%) majority of the respondents sold these underutilized fruits to middle men. These fruit crops were more preferred than wood apple, jungle jeelebi and Indian almond by the consumer. The population of these trees are more compared to other underutilized fruit trees and some farmers grow these trees on commercial basis, more production and demand of the consumer made them to get place in the commercial market.

Conclusion

The result revealed that the majority of the farmers who involved in the collection and marketing underutilized fruits were old aged, illiterate, land less and fall in low annual income category. The findings highlight that these farmers are predominantly marginal and landless farmers, often residing in remote or tribal areas. Hence there is a need of promotion and support to these farmers to earn their livelihood through these underutilized fruits by utilizing the support of Farmer Producer Organizations (FPOs) and Self-Help Groups (SHGs) to enable shared access to processing and marketing infrastructure. Their current marketing behaviour largely characterized by reliance on informal, localized markets, such as village *santhes* (weekly markets) or direct transactions with immediate consumers and local aggregators. Hence there is need of fostering partnerships with food processing industries and leveraging digital platforms to expand their market footprint. Encouraging and supporting the establishment of farmer-led processing units through training, technology transfer and financial incentives, enabling them to capture a larger share of the value chain. Implementing targeted awareness campaigns that highlight the unique health benefits and versatility of

these fruits, thereby stimulating demand and willingness to pay fair prices.

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