

**POVERTY ALLEVIATION IN DISTRICT KHYBER THROUGH *SIDEROXYLON*
*MASCATENSE***

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Abstract

District Khyber derives its name from the renowned Khyber Pass or Bab-e-Khyber a globally recognized historical passageway connecting central Asia and Afghanistan, A concept that involves implementing strategies and policies to address the root causes of poverty and improve the living conditions of disadvantaged individuals and communities. One of the most common strategy followed by the people of Khyber under poverty alleviation is the local marketing of *Sideroxylon mascatense* locally called Gurgora, plant species that holds significant botanical and ecological value. Actually, the plants are an erect shrub that can reach heights of up to 2-3 meters. It features small, leathery leaves arranged in an opposite pattern, with a glossy dark green color on the upper surface and a paler shade on the lower surface. *Sideroxylon mascatense* has long been recognized for its medicinal properties. Various research studies have highlighted its bioactive compounds, including alkaloids, flavonoids and terpenoids which exhibit potential antioxidant. The present work was done to illustrate the poverty alleviation and *Sideroxylon mascatense* marketing in the prescribed area of Ex-FATA. From 2022 to 2023, the average market value in Landi Kotl was 308/kg and average production was 830 kg per season and in Tahsil Jamrud was 269/kg and average production per season 515 kg. Multiple study visits were conducted in the study area. Questionnaires were organized and distributed to the residents, including both males and females. Preference was given to respondents of various age groups. The study revealed that *Sideroxylon mascatense* played a crucial yet limited role in addressing food poverty in Khyber. The local communities expressed a strong determination to tackle food scarcity, which was a more pressing concern for them. However, the progress towards utilizing *Sideroxylon mascatense* for poverty alleviation has been limited due to the minimal involvement of individuals in Khyber. Participants identified several challenges faced by the local communities in utilizing *Sideroxylon mascatense* for economic purposes, such as lack of knowledge, inadequate skills, limited access to resources, the difficulty of reaching the plants in remote areas, and the absence of supporting facilities. By raising social awareness about *Sideroxylon mascatense* and facilitating access to markets,

viable and competitive alternative income-generation activities could be promoted in district Khyber.

Keywords: Poverty alleviation, *Sideroxylon mascatense*, bioactive compounds, Khyber, Pakistan.

INTRODUCTION

Study area

District Khyber derives its name from the renowned Khyber Pass or Bab-e-Khyber a globally recognized historical passageway connecting central Asia and Afghanistan. This pass holds immense significance and has captured the interest of historians due to its geographical location and importance situated in FATA, district Khyber spans an area of 2576 km² and is home to a population of 546,730. The administrative headquarters of the district is located in Peshawar. Geographically, it extends from 33° 45' to 34° 20' North latitudes and 70° 27' to 71° 32' East longitudes. The majority of the area is topographically characterized by hills with occasional valley floors.

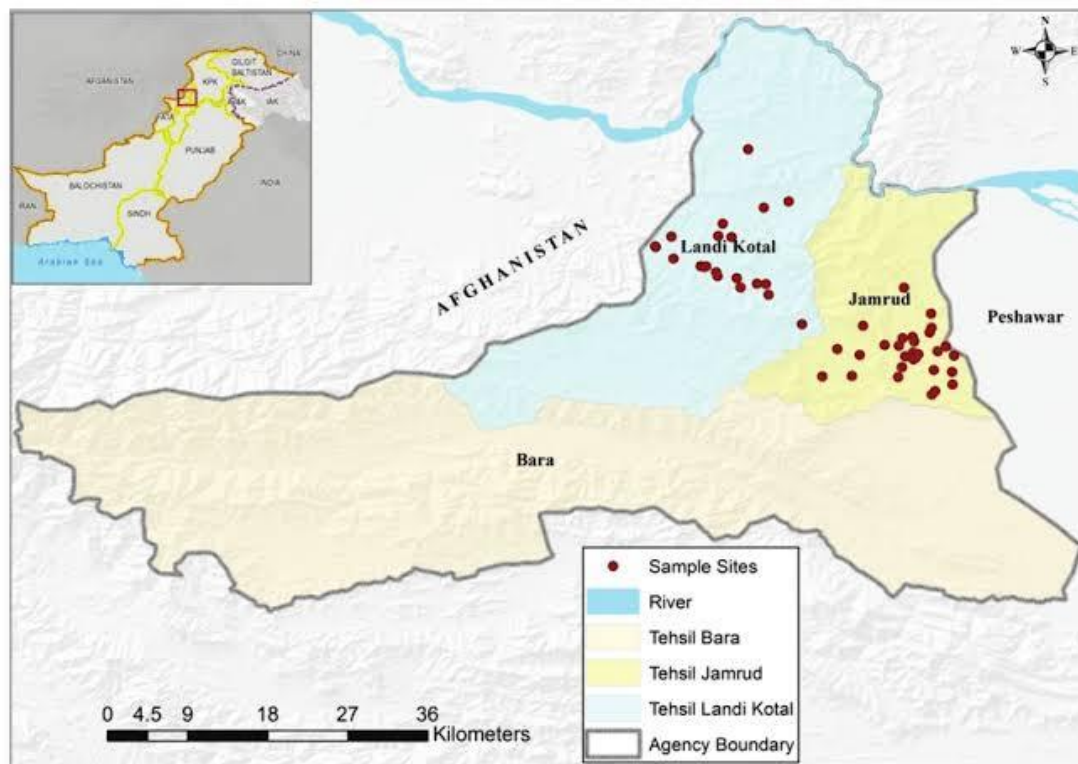


Fig 1. Study area Map

Poverty

Refers to a state of extreme deprivation and lack, where individuals or communities struggle to meet their basic needs for sustenance, shelter, education, healthcare, and other essential resources. It is characterized by a scarcity of material possessions, limited access to

opportunities, and a diminished quality of life, often leading to social exclusion a Poverty and inequality. The land is plagued by severe poverty, out of the global population of 6.8 billion people, approximately 1.4 billion individuals live on \$1.25 a day or below, facing extreme poverty reported by IFAD (2011). According to a report by UNICEF (2010), an average of 22,000 children succumb daily to conditions directly linked to poverty.

Poverty alleviation refers to the collective efforts aimed at reducing and ultimately eradicating poverty in societies. It is a multifaceted concept that involves implementing strategies and policies to address the root causes of poverty and improve the living conditions of disadvantaged individuals and communities. The goal of poverty alleviation is to ensure that everyone has access to basic necessities such as food, clean, healthcare, water, education, and economic opportunities. By promoting sustainable development, social welfare programs and empowering marginalized groups, poverty alleviation seeks to create a more equitable and just society where poverty becomes a thing of the past.

Sideroxylon mascatense

Sideroxylon mascatense locally called “Gurgora” is a plant species that holds significant botanical and ecological value. Native to various regions in South Asia, including India, Pakistan and Nepal, this evergreen shrub belongs to the family Sapotaceae. *Sideroxylon mascatense* is renowned for its distinctive characteristics and diverse applications in traditional medicine, horticulture and reforestation efforts.

The *Sideroxylon mascatense* is an erect shrub that can reach heights of up to 2-3 meters. It features small, leathery leaves arranged in an opposite pattern, with a glossy dark green color on the upper surface and a paler shade on the lower surface. The plant produces attractive white flowers with prominent stamens, followed by spherical fruits that turn purple-black when ripe. Within its native range, *Sideroxylon mascatense* has long been recognized for its medicinal properties. Various research studies have highlighted its bioactive compounds, including alkaloids, flavonoids and terpenoids which exhibit potential antioxidant, Rahman *et al.* (2017), anti-inflammatory Ullah *et al.* (2016), and antimicrobial activities Din *et al.* (2018). Traditional healers have utilized fruit for digestive and urinary tract disorders, Jan and Khan (2016).

Sideroxylon mascatense plays a vital role in horticulture, landscaping and are scrub vegetation. Its dense foliage, compact growth habit and tolerance to pruning make it an excellent choice for creating hedges, topiaries and decorative borders in gardens and parks. Additionally, its ability to adapt to diverse soil condition and withstand moderate drought conditions contributes to its popularity as an ornamental plant. From an ecological perspective, *Sideroxylon mascatense* plays a crucial role in reforestation effort, ecosystem restoration and

conservation. Its ability to thrive in harsh environmental conditions, including degraded lands and arid regions, makes it valuable for afforestation programs aimed at combating desertification, soil erosion and water runoff as by Duran Zuazo and Rodriguez Pleguezuelo (2009).

Materials and Methods

From 2022 to 2023, multiple study visits were conducted in the study area. Questionnaires were organized and distributed to the residents, including both males and females. Preference was given to respondents of various age groups. The focus of the survey revolved around traditional uses of *Sideroxylon mascatense* and potential methods for alleviating poverty through its utilization. A total of 210 participants took part in the survey. Additionally, the market value of *Sideroxylon mascatense*'s fruits, timber, and other components was assessed in the local market. As followed Omotesho *et al.* (2013), and Farooq and Azam (2007).

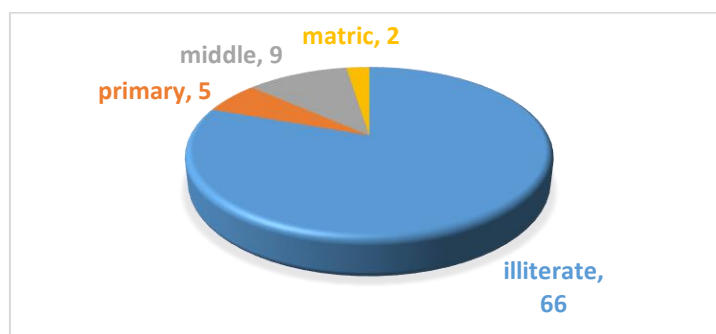
Results and Discussion

The present study focused on the knowledge and perceptions of local inhabitants regarding *Sideroxylon mascatense* in district Khyber. The study found that people of all age groups were familiar with *Sideroxylon mascatense*, but older individuals had greater knowledge about its uses compared to younger ones Badshah *et al.* (2014). Both males and females were aware of the medicinal purposes of *Sideroxylon mascatense*. The elder people particularly recognized the potential uses of *Sideroxylon mascatense* in terms of timber, fruits, and ornamental value to alleviate poverty in the district as documented by Khan *et al.* (2019). In his work “Socioeconomic impacts of the billion trees afforestation program in Khyber Pakhtunkhwa Province (kpk), Pakistan”.

The study revealed that *Sideroxylon mascatense* played a crucial yet limited role in addressing food poverty in Khyber. The local communities expressed a strong determination to tackle food scarcity, which was a more pressing concern for them. However, the progress towards utilizing *Sideroxylon mascatense* for poverty alleviation has been limited due to the minimal involvement of individuals in Khyber. Participants identified several challenges faced by the local communities in utilizing *Sideroxylon mascatense* for economic purposes, such as lack of knowledge, inadequate skills, limited access to resources, the difficulty of reaching the plants in remote areas, and the absence of supporting facilities. The research findings suggest that the consumption of *Sideroxylon mascatense* is a highly effective means of sustenance and should be promoted. As mentioned by Delang (2006) in his work “The role of wild food plants in poverty alleviation and biodiversity conservation in tropical countries”.

Table. 1. Females education level and knowledge about *Sideroxylon mascatense*.

Ages	Respondents No.	Respondents Education level	Knowledge about <i>Sideroxylon mascatense</i>
20-35	15	<ul style="list-style-type: none"> • 9 with middle. • 3 with primary. • 2 with matric. • 1 illiterate. 	Their understanding of the traditional applications of <i>Sideroxylon mascatense</i> was rather limited.
35-50	17	<ul style="list-style-type: none"> • 2 with primary. • 15 illiterates. 	Their cognizance of the customary utilizations of <i>Sideroxylon mascatense</i> surpassed that of the younger generation.
Above 50	23	All the respondents' ages above 50 were illiterates.	The geriatric population exhibited a greater depth of erudition regarding the multifarious applications of <i>Sideroxylon mascatense</i> in contrast to their juvenile counterparts.

**Fig 2. Female respondent's Education Level****Table.2. Males education level and knowledge about *Sideroxylon mascatense*.**

Ages	Respondents No.	Respondents Education level	Knowledge
20-35	37	<ul style="list-style-type: none"> • 15 with bachelors. • 3 with M.Phil. • 1 with PhD. • 12 with FSC. • 6 with Matric. 	While their familiarity with traditional wisdom remained marginal, they displayed and enhanced acumen concerning contemporary trends and knowledge.

35-50	50	<ul style="list-style-type: none"> • 6 with bachelors. • 11 with FSC. • 7 with matric. • 17 with primary. • 9 illiterates. 	They possessed a profound understanding of ancestor wisdom, couple with an event greater expertise in emerging trends and a novel knowledge.
Above 50	68	<ul style="list-style-type: none"> • 3 with bachelors. • 4 with FSC. • 13 with matric. • 19 with primary. • 29 illiterates. 	The elder generation exhibited exception prowess in traditional wisdom, yet remained uninformed and unaware of the ever-evolving trends and contemporary knowledge.

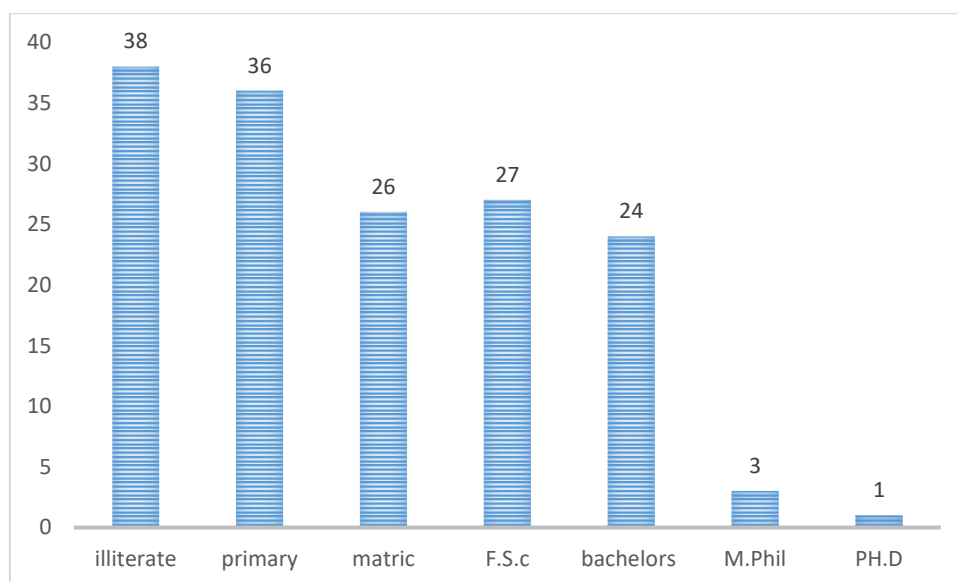


Fig. 3. Male respondent's education level

According to the respondents, there is a need for the government to improve road infrastructure to ensure easier accessibility. They also suggested organizing seminars to educate the local communities about the medicinal value of *Sideroxylon mascatense*. Some individuals emphasized the importance of addressing mining issues to protect the existing wild population of *Sideroxylon mascatense*, Unanaonwi and Amonum (2017). Participants unanimously agreed that no specific programs focused on *Sideroxylon mascatense* and its uses had been arranged, but they believed that organizing seminars or programs could raise awareness among the local communities about the plant's potential for poverty alleviation.

The study highlighted that *Sideroxylon mascatense* was economically used for two main purposes in district Khyber: as a source of food they contain high amount of Ash, protein, moisture fat and carbohydrates, Begum *et al.* (2006) and as a means of generating income through the sale of its wood. Females primarily played a significant role in collecting *Sideroxylon mascatense* from the mountains and selling it in the market to support their households. The respondents mentioned that there was high demand for *Sideroxylon mascatense* within the local communities but no international demand due to limited production. Many foods are used by local communities of that are but less production cannot be supplied to international market as mentioned in the book “The future of food and agriculture – Trends and challenges” (2017).

Table.3. Market value of *Sideroxylon mascatense* in Tahsil Landi Kotal.

S. No	Male respondents	Price per Kg	Sold per Season	Female respondents	Price per Kg	Sold per Season
1.	Respondents 1	400	150 kg	Respondents 1	400	70 kg
2.	Respondents 2	370	290 kg	Respondents 2	350	130 kg
3.	Respondents 3	300	250 kg	Respondents 3	300	115 kg
4.	Respondents 4	250	315 kg	Respondents 4	150	100 kg
5.	Respondents 5	330	90 kg	Respondents 5	230	150 kg
Average		330	219 kg	Average	286	113 kg

Table.4. Market value of *Sideroxylon mascatense* in Tahsil Jamrud.

S. No	Male respondents	Price per Kg	Sold per Season	Female respondents	Price per Kg	Sold per Season
1.	Respondents 1	300	150 kg	Respondents 1	170	50 kg
2.	Respondents 2	370	100 kg	Respondents 2	150	85 kg
3.	Respondents 3	350	200 kg	Respondents 3	200	40 kg
4.	Respondents 4	250	70 kg	Respondents 4	270	70 kg
5.	Respondents 5	330	130 kg	Respondents 5	300	135 kg
Average		320	130 kg	Average	218	76 kg

The average market values of *Sideroxylon mascatense* in Tahsil Landi Kotal exhibited gender-based disparities. Specifically, males fetched a higher value at 330/kg, while females received 286/kg. The overall mean price per kilogram stood at 308. During each season,

respondents achieved an average sale of 116 kg, contributing to a collective seasonal production of 830 kg, (table. 3).

Similarly, in Tahsil Jamrud, the male and female average market values for *Sideroxylon mascatense* differed, with males commanding a price of 320/kg, and females obtaining 218/kg. The mean price per kilogram in this area was 269. Respondents, on average, managed to sell 103 kg per season, with the total average production of *Sideroxylon mascatense* per season reaching 515 kg, (table. 4).

Some respondents mentioned that utilizing *Sideroxylon mascatense* did not require specific skills, while others believed that training and pruning skills were necessary. They suggested mobilizing people and raising awareness about the benefits, uses, and sustainable management of *Sideroxylon mascatense*. The current availability of *Sideroxylon mascatense* was sufficient to meet the demand, but future demand might be challenging due to factors such as fuel wood consumption as Mohammed *et al.* (2020) reported that “fuel woods were to be the second cause of forest degradation next to Agricultural land expansion”, Household members, especially women and children, are involved in fuelwood collection to fulfill the demands of fuelwood gathering it is supported by Arnold (2003), mining activities, browsing, and that the lack of farm land as being the major reason for deforestation Girma (2015).

The study found that there was no significant role played by stakeholders such as the government, NGOs, or the private sector in promoting the utilization of *Sideroxylon mascatense* for poverty alleviation in district Khyber. As Zubair *et al.* (2022) mentioned role of NGOs in Punjab. Furthermore, no traditional or cultural practices related to the utilization of *Sideroxylon mascatense* were reported. There were no barriers to the utilization of *Sideroxylon mascatense*, except for some individuals who mentioned restrictions due to homes located near the mountains, following the cultural norms of "Parda and Pashtoonwali."

The study revealed a lack of knowledge about creating value-added products from *Sideroxylon mascatense* in district Khyber, although the seeds were used for religious purposes or in necklaces. In other regions, *Sideroxylon mascatense* was used for medicinal purposes Ahmad *et al.* (2019), cosmetics, and as a source of food. The plant was recognized for its role in preserving local biodiversity, providing food for humans and livestock, preventing soil erosion, and serving as an indicator species of coal.

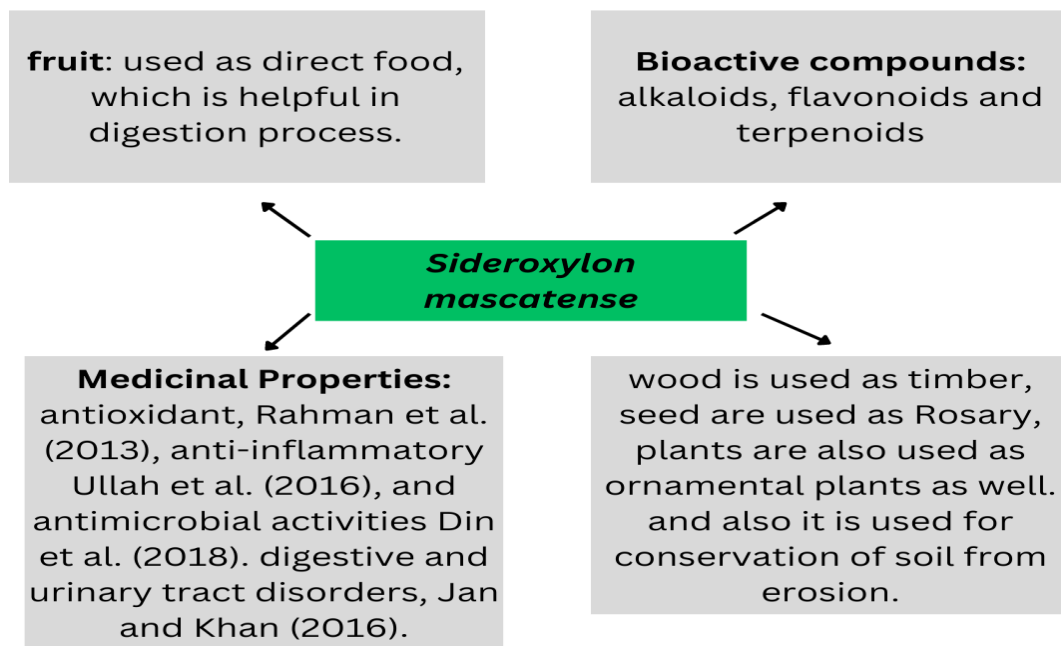


Fig. 4. Different properties of *Sideroxylon mascotense*

There were no networks or platforms promoting the utilization of *Sideroxylon mascotense* for poverty alleviation in district Khyber. Its production was limited to a short period, where people would collect and sell it in the market. Literate respondents highlighted that *Sideroxylon mascotense* played a role in soil conservation, Ali *et al.* (2022) and mitigating climate change by releasing oxygen and absorbing CO₂, Ali *et al.* (2022) and Aryal *et al.* (2018). They also mentioned that it contributed to gender equality and women's empowerment since women were involved in income generation through the collection and sale of *Sideroxylon mascotense*, which reduced gender disparities in resource access and decision-making.

The study suggested that by raising social awareness about *Sideroxylon mascotense* and facilitating access to markets, viable and competitive alternative income-generation activities could be promoted in district Khyber. *Sideroxylon mascotense* had the potential to promote sustainable tourism Ali *et al.* (2022) also recommended in their study in the region if certain conditions were met, such as improved road infrastructure and the establishment of tourism points in the hills. However, due to limited awareness and lack of support from government or non-governmental organizations, the local communities faced difficulties accessing the market. The study shed light on the knowledge, utilization, and challenges associated with *Sideroxylon mascotense* in district Khyber. It emphasized the need for awareness programs, improved infrastructure, and support from stakeholders to harness the plant's potential for poverty alleviation in the region also may writers and researchers documented plants for poverty

alleviation as Nasir et al. (2014), Farooq and Azam (2007), Oladele (2011) and Omotesho *et al.* (2013) “the potential of Moringa tree for poverty alleviation and rural development: Review of evidences on usage and efficacy”.

Conclusion

- I. Study area renowned Khyber Pass, a historic gateway connecting central Asia and Afghanistan, underscoring its global significance.
- II. Local marketing of *Sideroxylon mascatense* (Gurgora) is a prevalent strategy in poverty alleviation.
- III. Medicinal properties, with bioactive compounds like alkaloids, flavonoids, and terpenoids holding potential antioxidant benefits.
- IV. Due to lack of knowledge, inadequate skills, remote access, and absence of facilities, hindering the broader economic use of *Sideroxylon mascatense*.
- V. Average price per kg in tehsil Landi kotal is 308 and Tehsil Jamrud is 269.
- VI. Average production per season in Tehsil Landi kotal is 830 kg while in tehsil Jamrud is 515 kg.

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