



# Distribution, Local Use and Conservation Challenges of Okra (*Abelmoschus Esculentus* (L.) Moench) in Metekel Zone of Benishangul Gumuz Regional State, Western Ethiopia

Melak Agajie

**Abstract:** Okra is a multifunctional vegetable crop since its edible parts can be used for a variety of purposes and are consumed in large quantities in western Ethiopia. Although it is rich in nutrition and readily available in the local market, it is an underappreciated indigenous vegetable in Ethiopia. Therefore, the study aimed to assess and identify the crop potential distribution, traditional uses, and existing conservation challenges of okra (*Abelmoschus esculentus*) in the selected districts of Metekel Zone. Data were collected through interviews and focus group discussions, based on a semi-structured questionnaire, in the three purposively chosen districts. The respondents were purposively selected indigenous okra farmers and agriculture experts in the districts. The collected data were analysed using SPSS software version 21 and Microsoft Excel 2010. The results revealed that most respondents (46.81%) cultivate okra in their primary field, as an intercrop, and in their homestead. Most of the respondents (68.09%) cultivate okra during the monsoon, while the least of them (14.89%) do so in both seasons. Regarding its local use, all respondents agreed that okra has been used in their community both as a food ingredient in the making of soup and stew, and as a traditional Medicine. In the study areas, immature okra pods and fruit are mainly used for food purposes. 91.49% of the respondents agreed that okra has been used to treat stomach ulcers, followed by improving appetite, for the health and well-being of pregnant women, and treating constipation, with 89.36%, 87.23%, and 81.91% of respondents, respectively. 14.89% of them are using okra to heal a wound/cut on a human. A lack of knowledge among urban dwellers about the crop (68.09%), climate change (48.94%), and lower attention given by concerned government bodies were identified as the main conservation challenges of the crop. Therefore, giving due attention to research and promoting and enhancing the food value improves human nutrition and wellbeing among nearby urban consumers, and secures the conservation and sustainable use of okra in the study areas.

**Keywords:** *Abelmoschus Esculentus*, Local Use, Traditional Medicine, Conservation Challenge, Ailment

## Nomenclature:

BGRS: Benishangul Gumuz Regional State

N: Total Population

SPSS: Statistical Package for Social Sciences

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## I. INTRODUCTION

Plants are traditionally used as dietary supplements, pharmaceuticals, nutraceuticals, and cosmetics, and are an essential source of prescription drugs for allopathic treatment [1]. Vegetables are a vital source of nutrition and essential for human health. Along with their high protein and calorie content, they also include large amounts of vitamins, minerals, dietary fibre, and phytochemicals. Vegetables typically offer the nutrients, health-promoting qualities, and enzymes required for appropriate bodily activities [2], although no single vegetable can meet all nutrient needs [3].

Ethiopia is home to various ethnic clans and a mosaic of cultural values, and thus has intricate traditional knowledge of practising conventional medicines for different ailments. [4]. Furthermore, a vast number of plant species, including significant native vegetables, are genetically diverse. There are also native vegetables existing in the country. For instance, some of them can be listed as Okra (*Abelmoschus esculentus*), jute mallow (*Corchorus olitorius*), moringa (*Moringa olifera*), and anchote (*Coccinia abyssinica*) [5]. Okra is a multifunctional crop among these vegetables since its edible parts, such as the fresh leaves, buds, blossoms, pods, stems, and seeds, can be used for a variety of purposes and are consumed in large quantities in western Ethiopia [6]. The okra's seed is its most nutritious component, and the entire plant is edible, with a variety of culinary, non-food, and medicinal uses. This plant has been utilised as part of our dishes for a very long time to relieve some pains and enhance the health of the human body [7].

Okra thrives in poor soil with sporadic moisture. However, it prefers to grow in composted, loamy soil with a slightly alkaline pH. [8], besides, this plant can grow in a vast climatic variation, even in higher temperature areas exceeding 26°C [9]. It can be planted either as a backyard crop at a trim scale level or as a large-scale farm for market commodity [10]. It is commonly grown year-round in the tropics [2], and is a vegetable crop of economic importance [2].

In the region where it originated (Benishangul Gumuz Regional State), okra is referred to by a variety of local names. Some of the most common ones are Kenkatse in Benishangul, Andeha in Gumuz, and Bamuya in Afaan Oromo [1]. Among the people in the region, the



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Benishangul population utilises it as both a fruit and a vegetable, making it an essential traditional dish. It is a crop typically grown on a small scale to compensate for food shortages throughout the year. Due to its use as a conventional delicacy at festivals, weddings, parties, and consolidation days, okra cultivation has deep cultural ties to the Berta populations. Okra is also believed to strengthen and improve the health of nursing mothers [11].

Okra is native to Ethiopia and is highly valued by the local population for various reasons, although there are few studies promoting and enhancing its nutritional value. It is regarded as an orphan crop [11]. Furthermore, the market value of okra is low, in part because little is known about the specific variation or genotype suitable for use in food, non-food, and medicinal applications. A locally accessible and reasonably priced source of energy and essential nutrients, it is an underappreciated native plant species in Ethiopia [12].

The significance of okra, particularly its therapeutic uses, physical characteristics, genetic diversity, nutritional composition, and food value for humans, is not well understood. It is an underappreciated native plant. However, there has been very little research and development to capitalise on the potential of many okra cultivars' morphological features, food, nutritional qualities, and ethnomedicinal effects. In this sense, this study aimed to assess and identify the crop potential distribution, traditional uses, and existing conservation challenges of okra (*Abelmoschus esculentus*) in the selected districts of Metekel Zone.

## II. MATERIALS AND METHODS USED

### A. Site Description

This assessment work was administered in three districts of the Metekel Zone of the Benishangul-Gumuz Region. The regional state is one of the 12 administrative states in Ethiopia, located in the western part of the country. Geographically, it is situated between latitudes of 09°17'N and 12° 'N and longitudes of 34°10' and 37°04' E with altitudinal ranges of 580 and 2731 m above sea level [13]. The regional state in which the study area is located is surrounded by the Amhara region to the north, the Oromiya Region to the east and south, and Sudan and South Sudan to the west. The landscape of the regional state is described as plains and ragged mountains that decline steadily towards the western border of Ethiopia.

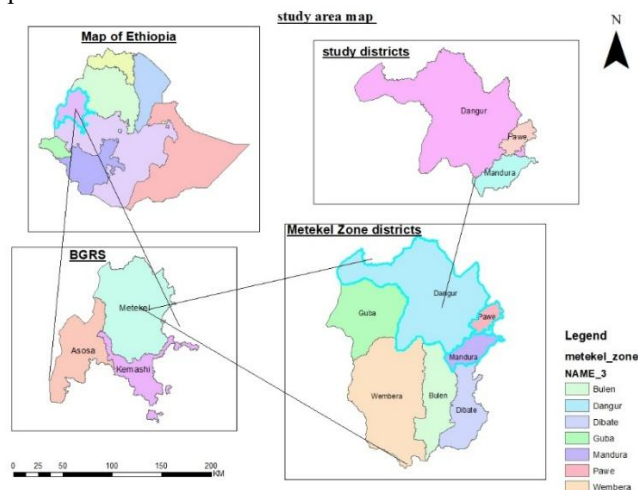
This regional state comprises three zonal administrations, one of which is the Metekel Zone, where the study districts are located. The other two zonal administrations are the Assosa and Kamashi zones. In the regional state, the population settlement pattern is sparse, in which several native clans and tribes like Gumuz, Benishangul, Shinasha and Maokomo dwellers exist [14].

The region experiences a monomodal rainfall pattern. The average annual rainfall in the area ranges from 500 to 1800 mm, occurring from mid-May to October. The temperature in the area varies from a low of 20 °C to a high of 35 °C. The climate of the regional state is highly dependent on its elevation level. [15].

According to a July 2011 population projection, the population was estimated at 1,187,997, of which 50.7%

were males and 49.3% were females [16]. Out of the total population, the rural population was estimated to be more than half, indicating that agriculture is the primary source of livelihood in this region. The main annual crops grown in Benishangul-Gumuz include maize, sorghum, haricot bean, sesame, noug, millet and peanut.

The Metekel Zone is located adjacent to Kamashi in the south and southwest, Sudan in the west, and Amhara in the north and east. The dominant native clans existing in the Metekel zone are the Gumuz (36.78%), the Shinasha (21.6%), the Amhara (17.39%), the Awi (11.33%), a subgroup of the Agew, and the Oromo (11.09%); all other ethnic groups made up 1.81% of the population [14]. The assessment study was executed in Mandura Pawe and Dangur districts. According to the information gathered from the district Agriculture office and on-site assessments conducted so far, the study districts were selected purposively based on the tradition and culture of okra production among the indigenous community in the specified administrative districts.



[Fig.1: Map of the Study Area]

### B. Data Collection Method

Data were collected through interviews and focus group discussions based on a semi-structured questionnaire in three purposively selected districts of Metekel Zone. The districts were chosen based on their potential for okra production and the experiences of Gumuz dwellers, who primarily reside in these areas. The respondents are indigenous okra farmers and experts in the district's Agricultural offices who have been aware of the cultural practices of rural agrarian communities. Accordingly, a total of 940 populations of okra producers and stakeholders were selected. From this total number of individuals, 10% were randomly selected using a lottery method, resulting in a total of 94 key respondents among farmers, district agriculture professionals, who were screened using a purposive sampling technique to participate in the questionnaire [17]. Besides, focus group discussions and key informant interviews were used to supplement and validate the data gathered from respondents.

### C. Method of Data Analysis

Descriptive analysis of percentages, frequency and

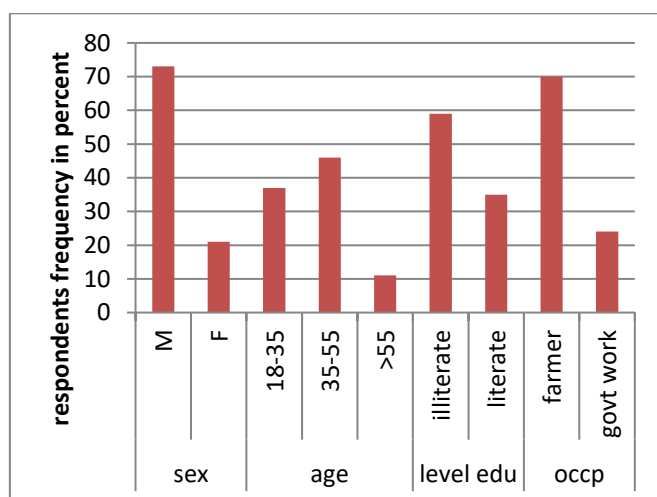


mean on use categories, ethno-medicinal uses, and associated knowledge was calculated and summarized using SPSS software version 21. Microsoft Excel 2010 was used to create simple bar graphs, line graphs, and other visualisations.

### III. RESULT AND DISCUSSION

#### A. Socio-Demographic Characteristics

In the study areas, a total of 94 respondents participated in interviews and focus group discussions. Among these respondents, the majority (78%) are male, and the rest are female. When the age ranges of the respondents were characterised, the vast majority fell within the 18-55 range. This implies that the age range of 18-35 accounts for 39%, the age range of 36-55 accounts for 49%, and the rest are above the age of 55. On the other hand, while evaluating the education level of the respondents, 63% of the okra farming communities are illiterate, and the remaining respondents were educated through both formal and informal means. Most of the respondents who participated in the interview and focus group discussion were farmers (74%). In contrast, the others included government workers and other stakeholders, such as middle-level agricultural practitioners from district offices and kebele-level agriculture agents.



[Fig.2: Simple Bar Chart Showing Socio-Demographic Data of the Study Areas]

#### B. Distribution of Okra

The results of the respondents' interviews showed that the majority (46.81%) of them cultivate okra in both their primary field, intercropped with other main crops such as teff, millet, and soybeans, and in their home garden as a solo crop. In the study areas, Okra has been cultivated in both the rainy and dry seasons using irrigation. Accordingly, most respondents, accounting for 68.09%, were cultivating okra during the monsoon season. And the least of them (14.89 %) cultivate okra in both seasons (Table 1). Similarly, previously done research revealed that different cultivars of okra are grown mainly in rain-fed and in two seasons [1].

Regarding the purposes of production in the area where the study was conducted, several okra cultivars with varying consumer acceptance were produced, primarily for self-consumption (63.83%), to some extent for use as a market commodity (18.09%), and for both purposes (18.09%). This

result suggests that, given the significant supply of the commodity in these areas, the food complex and pharmaceutical industries can reliably access the crop commodity from the okra farming communities.

**Table 1: Cropping Pattern and Distribution of Okra in the Study Area**

No.	Okra Cultivation Practices	Informants Responses	Percentage of Respondents
1	Area of cultivation	Main crop field	15.96%
		Home garden/backyards	30.85%
		In both	46.81%
		Replaced it with other crops	6.38%
2	Season of cultivation	Rain season	68.09%
		Dry season using irrigation	17.02%
		Both	14.89%
3	Method of cultivation	Solo farming	24.47%
		Intercropping with main field crops	64.89%
		Intercropping with vegetables	10.64%

#### C. Local Uses of Okra

All the respondents stated that okra has been used in their community both as a food ingredient in the making of soup and stew, and as a traditional Medicine to heal different kinds of ailments. As discussed in the group, it is mainly immature okra pods/fruit that are used for food purposes, either in their green form as a salad/soup or in their dried and ground form to make okra stew. However, none of the respondents argued that other parts of the plant, such as the leaf shoot or flower, were used for food purposes. This result was in line with the findings of [12]. Additionally, during the focus group discussion, respondents stated that they usually consume okra but have trouble with other kinds of dishes due to loss of appetite, gastric distress, and constipation issues.

During the focus group discussion, the respondents raised an idea that Okra stew/soup is prepared in communities by mixing and cooking it with other ingredients, such as meat, dried fish, haricot beans, soya beans, mung beans, and other legumes, and served with local breads/sorghum or maize porridge. They indicated that the jelly-like nature of okra powder helps to thicken and improve the texture of okra stew or soup.

On the other hand, okra salad is prepared from the green, immature pods, which are chopped and mixed with different vegetables, such as green peppers, onions, and tomatoes, and served with local breads, including sorghum and maize porridge.

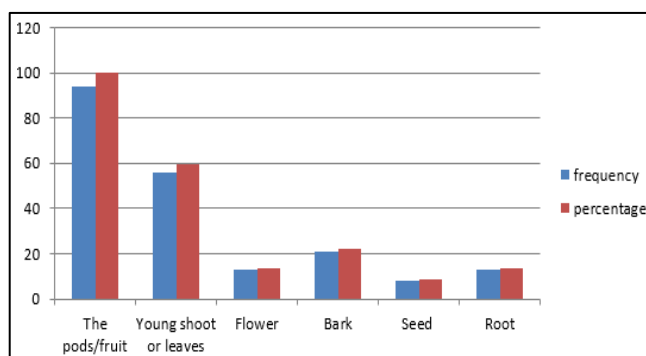
#### D. Ethno-Medicinal Uses of Okra

The vast majority (91.49%) of respondents agreed that okra has been used to treat stomach ulcers, followed by improving appetite, for the health and well-being of pregnant women, and treating constipation, with 89.36%, 87.23%, and 81.91% of respondents, respectively. The least amount (14.89%) of respondents stated that a traditional medicine made from okra is used to heal a

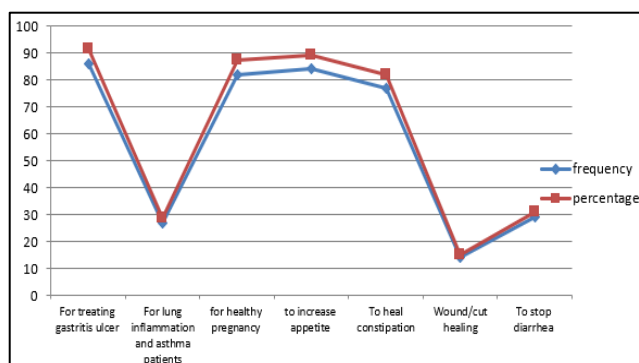


wound/cut on the human body (Figure 4).

All respondents agreed that the parts of the okra plant used for traditional medicine were the pods/fruits, followed by young shoots or leaves (59.57%). The part of the plant that was least used by the communities for the preparation of traditional medicine was the seed of okra (8.5%) (Figure 3).



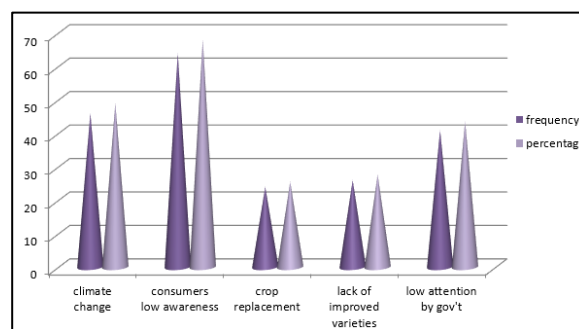
**[Fig.3: Parts of Okra Plant Used for Medicinal Purposes in the Study Area]**



**[Fig.4: Medicinal Uses of Okra in the Study Area]**

#### E. Conservation Challenges of Okra

Most of the respondents (68.09%) reported that urban dwellers have very low awareness of the nearby marketplaces, knowing little or nothing about the food purpose of the crop. Similarly, [12] stated that Okra is a rarely consumed native vegetable commodity in Ethiopia, regardless of its availability at a low price in local markets and tremendous nutritional qualities. This was followed by climate change, including a shortage of rainfall during the early growth stage & blooming time, as well as high humidity and frost during the fruiting stage (48.94%), which are the causal agents of yield loss and pathogen infestations on okra farms. The other factors that the informants confirmed were the very low attention given by agricultural researchers to developing improved varieties (27.66%) and the very little work done by agricultural extension workers to raise awareness of the crop among consumers (43.62%), aimed at increasing demand. In line with this [11] described okra as an orphan crop due to the few efforts done so far to increase awareness on the nutritional value of okra in Ethiopia. These factors discourage the okra farming communities from marginalising the crop on their farms and replacing it with other market-oriented crop farms to improve their income. These conditions were contributing factors that eroded the genetic resources of okra over time.



**[Fig.5: Conservation Challenges of Okra in the Study Area]**

#### IV. CONCLUSION

Ethiopia is endowed with a tremendously diverse traditional knowledge and practices in the application of conventional medicine, featuring a wide variety of plant species, including significant native vegetables, that are genetically diverse. Okra, a multifunctional crop, has been used for a long time as a side dish to help heal some ailments. This survey study confirmed that the local community has traditionally used only immature okra fruit as food and different parts of the plant as a traditional medicine to treat various ailments. The study also indicates that the plant species is neglected, despite its multiple uses, which could provide highly nutritious foods and traditional medicines to heal various diseases in the local community, where medical services are scarce. In addition, the study reveals that okra is produced throughout the year in the local community, providing access for bio-prospecting companies to utilise it as an ingredient in the pharmaceutical and dietary food industries. In conclusion, the study highlights the importance of okra farming communities in Ethiopia, as they have significant resources for self-consumption, market commodities, and ethno-medicinal uses. However, conservation challenges remain, with low awareness of nearby markets and climate change contributing to the erosion of okra's genetic resources.

#### DECLARATION STATEMENT

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

- **Conflicts of Interest/ Competing Interests:** Based on my understanding, this article has no conflicts of interest.
- **Funding Support:** This article has not been funded by any organisations or agencies. This independence ensures that the research is conducted with objectivity and without any external influence.
- **Ethical Approval and Consent to Participate:** The content of this article does not necessitate ethical approval or consent to participate with supporting documentation.
- **Data Access Statement and Material Availability:** The adequate resources of this article are publicly accessible.
- **Author's Contributions:** The authorship of this article is contributed solely.



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## AUTHOR'S PROFILE



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