**Original Research Article**

**Wild Edible Fruits Diversity and their Traditional Uses for Local Livelihood in Dollo, Qorahay and Nogob Zones, Somali Region, Ethiopia**

**Abstract**

The study on the diversity of wild edible fruits and their traditional uses for local livelihoods was conducted in the Dollo, Qorahay, and Nogob zones of the Somali Region, Ethiopia. The main objectives were to assess the abundance, dominance, and diversity of wild edible fruit species, as well as to analyze the factors affecting their availability and use. The research was undertaken across the three zones mentioned, all located within the Somali Regional State (SRS). Data collection involved extensive discussions with local communities, district agricultural experts, and knowledgeable elders familiar with the study species. A vegetation survey was also conducted using transect walks and field observations to identify representative areas for assessing species abundance. A total of 20 wild edible plant species—including herbs, lianas, shrubs, and trees were identified across Warder and Qorahay districts. These species belonged to eight plant families, with the most dominant being Apocynaceae, which comprised six species, followed by Malvaceae with five species. Together, the top three plant families accounted for approximately 30% of the total species recorded in the study area. Despite their ecological and nutritional importance, these wild edible plant species are underutilized and face increasing threats from overharvesting and environmental degradation. Therefore, it is crucial to raise awareness among rural households regarding the sustainable management, marketing, and domestic utilization of wild edible fruits

***Key words:*** *livelihood, wild edible fruit, Diversity, Traditional uses*

## INTRODUCTION

Human beings are known to use wild plants in different ways since the start of human civilization, thus there is close relationship between people and plants (Rajbhandary *et al*., 2020). Nature is bestowed with diverse life forms on which human beings survived and life is maintained. Before the start of domestication of crop plants, primitive man used to eat different types of fruits, leaves, root of plants collected from the wild for their survival. Wild edible plants are the species those are neither cultivated nor domesticated but growing wild and are however edible (Beluhan and Ranogajec, 2010). The primitive man through trial and error has selected many wild edible plants which are edible and subsequently domesticated them then after (Niveditha, 2017). The wild fruit plants are an important source of food and many wild edible plants are nutritionally rich and can supplement nutritional requirements of human and livestock, especially the vitamins and micronutrient (Mohapatra and Panda, 2009) for poor communities in many rural parts of the world (Chakravarty *et al*., 2016). Rural people are still not only depending either for nutritional needs or for daily food securities but also for their primary health care treatments on wild edible fruits. This wild edible fruits significantly influences their livelihood and food security in rural people (Rafiqul Islam *et al*., 2019).

Edible wild fruit plants (EWFPs) refer to species that are neither cultivated nor domesticated but are available from their wild natural habitat and used as food sources (Beluhan and Ranogajec, 2010). Despite the primary reliance of most agricultural societies on staple crop plants, the tradition of eating EWFP products continues today. In addition to their role in closing food gaps during periods of drought or scarcity, they play an essential role in maintaining livelihood security for many people in developing countries (Afolayan and Jimoh, 2009). Besides, Ethiopian EWFPs are faced with threats related to habitat loss and degradation; hence a complementary in situ and ex situ conservation measure is vital to conserve the WEP wealth of the country (Ermias and Lulekal *et al.*, 2011). EWFPs have been a focus of research for many ethnobotanists in recent decades. Currently, global interest is increasing in documenting ethnobotanical information on neglected wild edible food sources (Bharucha and Pretty, 2010). Since traditional knowledge on EWFPs is being eroded through acculturation and the loss of plant biodiversity and indigenous people and their cultural background, promoting research on wild food plants is crucial to safeguard this information for future societies (Asfaw, 2009). In Somali region there are diverse wild edible fruits. Wardher, Qabridar and Garbo are among potential area were availability of wild fruits very high. This most valuable wild edible fruits remain undocumented in the region particularly in shrub land where there is a relatively large supply of edible products. furthermore, indigenous knowledge about the use of WEFs has not been sufficiently documented, leading to a cultural erosion of their uses. this situation, thus, greatly undermines their conservation and sustainable utilization. therefore, this study designed to fill this knowledge gap on this resource and the over all object of this research is wild edible fruits diversity and their traditional uses for local livelihood in Dollo, Qorahay and Nogob zones, Somali region, Ethiopia.

# **MATERIALS AND METHODS**

## The Study area and site selection

The present study was carried out in three districts from Dollo, Nogob and Korahy (one district per each zone) were selected purposely based on their potential which were obtained by a thorough discussion with local leader/ elders who have knowledge on the study species. As the aim of this particular research was to study wild edible fruits bearing species, further discussions were made focused on the availability, abundance and distribution of the study species.

Accordingly, Kabri dahar district from Korahey, Garbo district From Nogob and Warder district from Dollo were selected. The selected study sites were found to be have the best habitats that harbour most of wild edible fruits species with good abundance.

## Methods of data collection

### Vegetation data collection

Transect Walk and field observation was made to select representative area for vegetation data collection and then three transact line laid after site selection in Ado kebele. In each transect 10 plots with a size of 20m x 20m were established. A total of 30 plots in three transect in Ado Kebele (warder Woreda) established and similarly 30 plots in 3 transect were also made in Karinmile kebele (Kabri dahar Woreda) and Karin agaag kebele (Garbo Woreda). A totally 90 plots in each site established and wild edible fruit bearing species survey was conducted. In each plots all necessary data was collected and recorded on a diversity of the wild edible fruits bearing species, data on frequency, abundance of tree, tree/shrub and shrub species rooted in all sample plots.

####  Sampling Procedure and Determination of Sample Size

**Selection of household respondents**

A multi-stage sampling procedure was used to select sample households. In the first stage three districts with higher abundance and distribution of the study species were selected purposively and in the second stage six kebeles were selected from the two districts. Then the number of households who are native to district and know the socio- economic uses of the gum and resin in the area were selected based on probability proportional to the size (number of households of the three districts) following the formula developed by Green (1991).

N ≥ 50 + 8m----------------------------------------------------------------------------- (1)

N= Sample size required

 m= Variables/predictors (in our case, the variables were 10).

For this study, the number of households (N) selected for face-to-face interview were 130: N ≥ 50 + (8\*10) =130. The numbers of households from each district were determined proportional to the total number of households in each district. A total of six Kebeles, from three districts were systematically identified and 50, 45 and 45 households were randomly selected from Warder, Qabridahar and Garbo districts respectively.

##  Data collection

Close and open-ended questionnaires were developed and face to face semi-structured interviews were under taken to assess the factors affecting wild edible fruit bearing species. The questions were prepared in to ‘Somali language’. Enumerators who were researchers, knowledgeable about the area were involved in data collection. In addition, 10 key informant interviews and 12 Focus group discussions were conducted to get general information on the vegetation status, production and the traditional uses and challenges faces; and factors affecting of the species production and conservation. The information generated here was used to validate the information collected from household respondents.

## Data Analysis

In this portion of data analysis data was analysed by using descriptive statistics such as frequencies and percentages to analyse the demographic characteristics of the house hold. Moreover, Shannon diversity index was used to compute species diversity among the different sites.

**RESULT AND DISCUSSION**

**Demographic and Socioeconomic Characteristics**

A total of one hundred thirty sample households had completed the interview. Among the total households 30% were female respondents and 70 % were male. Besides, 100% of the respondents were Muslim in religion and majority of 82.3% of the respondents were illiterate. The most respondents’ family size was about 6-10 which is about 44.6 (Table 1).

Table 1. Demography of household respondents

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | **Alternatives** | **Total (n = 130** | **Percentage (%)** |
| Sex | Female | 39 | 30.0 |
|  | Male | 91 | 70.0 |
| Age  | 20-40 | 43 | 33.1 |
|  | 41-60 | 43 | 33.1 |
|  | 61-70 | 31 | 23.8 |
|  | >71 | 13 | 10.0 |
| Education | Illiterate | 107 | 82.3 |
|  | grade8-10 | 22 | 16.9 |
|  | >grade 12 | 1 | .8 |
| Household size | 1-5 | 28 | 21.5 |
|  | 6-10 | 58 | 44.6 |
|  | >10 | 44 | 33.8 |
| Land size | 0-3h | 77 | 59.2 |
|  | 4-5h | 40 | 30.8 |
|  | >6h | 13 | 10.0 |

FIG 1. Household respondants

Majority of the wild edible fruit users in Warder and Kabri dahar were about 36% in each district while in Garbo 11% and non-user respondents in warder, Kabridahar and Garbo were 14, 9 and 24% respectively.

Total of twenty WEFP species (herb, Liana’s shrubs and tree) where identified from Warder and Korahay. Total of eight families where identified, in terms of species richness. The dominant family was apocynecea with six (25%) species fallowed by malveceae five (30%) species. The top three families contribute about 30 percent on the seven-plant family recorded in the study area.

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Figure 2. Percent proportion of plant family per species

Table 2. Scientific, local, family name and growth habit of wild edible fruit species

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scientific name** | **Family name** | **Local name of species in (Somali)** | **Growth habitat** | **Parts used** |
| *grawiapenicilata* | *Malvaceae* | Hohob | S | Fruit |
| *Grewiatenax* | *Malvaceae* | Dhafaruur | S | Fruit |
| *grewiavillosa* | *Malvaceae* | Gomesh | S | Fruit |
|  | *Hydnoraceae* | Ciid | S | Fruit |
| *gardenia florii* | *Apocynaceae* | Himir | S | Fruit |
| *Cordia sinensis* | *Boraginaceae* | Madheedh | S | Fruit |
| *Givotiagosl* | *Apocynaceae* | Gosey | S | Fruit |
| *Zizphusmauritiana* | *Rhamnaceae* | Gob | T | Fruit |
| *Commeliniaspp* | *Tiliaceae* | Kordhis | S |  |
| *Cucumelakelleri* | *Apocynaceae* | Uneexo | H | Bud/root |
| *Cynanchum* | *Apocynaceae* | Dombir | H | Bud/root |
| *Pterodisousobtusiflorus* | *Apocynaceae* | Cialal | H |  |
|  | *Rubiaceae* | Jacjacle | Sh |  |
| *Cyperusobtusiflorus* | *Tiliaceae* | Goon | H |  |
| *Ehicostemal* | *Apocynaceae* | Askax | H |  |
| *Hydro abyssinica* | *Tiliaceae* | Liko | H |  |
| *Dobera glabra* | *Apocynaceae* | Garas | T | Fruit/seed |
|  | *Tiliaceae* | Madaxbuq | L |  |
|  | *Malvaceae* | Kidi | T | Fruit |
|  |  | Midhacas | S | Fruit |
|  |  | Dhiin | S | Fruit |
|  |  | Ilcas | S | Fruit |
|  |  | Dhambac | S | Fruit |
|  |  | Maygaag | S |  |
|  |  | Mindoy | S |  |

Table 3. Species richness, diversity an of tree/shrub species in three districts of Somali Region

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Diversity and Richness** | **Warder** | **Qabridahar** | **Garbo** |
| **1** | Species rich ness (WEF bearing spp.) | 18 | 20 | 16 |
| **2** | Species evenness | 2.843 | 0.957 | 0.874 |
| **3** | Shannon-Wiener diversity of wild edible fruit spp. | 0.952 | 2.867 | 2.423 |

As predicted in the table 3, Kabri dahar has the highest species richness about 20 different wild edible fruits were recorded followed by Warder which was about 18 species and the least was Garbo which was about 16 fruit species respectively. The species were more even in Warder 2.843 followed by Kabri dahar about 0.957 and Garbo 0.874 but in species diversity wiener diversity index has Identified that wild edible fruit species was the most divers Kabri dahar followed by Garbo and then Warder district.

Table 4. Frequency, relative frequency, abundancy and relative abundance of tree/shrub species at warder district

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Local name of species in (Somali) | F | r-f | Abundance | r-abundance |
| *Hohob* | 29 | 17.791 | 1122 | 79.40 |
| *Dhafaruur* | 22 | 13.496 | 67 | 4.74 |
| *Gomesh* | 20 | 12.269 | 40 | 2.830 |
| *Ciid* | 20 | 12.269 | 59 | 4.175 |
| *Himir* | 14 | 8.588 | 30 | 2.123 |
| *Madheedh* | 12 | 7.361 | 31 | 2.193 |
| *Gosey* | 6 | 3.680 | 11 | 0.778 |
| *Gob* | 5 | 3.067 | 6 | 0.424 |
| *Kordhis* | 3 | 1.840 | 4 | 0.283 |
| *Uneexo* | 2 | 1.226 | 2 | 0.141 |
| *Dombir* | 4 | 2.453 | 6 | 0.424 |
| *Cialal* | 5 | 3.0674 | 9 | 0.636 |
| *Jacjacle* | 3 | 1.840 | 4 | 0.283 |
| *Goon* | 5 | 3.067 | 5 | 0.353 |
| *Askax* | 1 | 0.613 | 1 | 0.070 |
| *Liko* | 4 | 2.453 | 7 | 0.495 |
| *Garas* | 5 | 3.067 | 5 | 0.353 |
| *Madaxbuq* | 3 | 1.840 | 4 | 0.283 |
| Total | 163 | 100 | 1413 | 100 |

In the table 4, in Warder district a total of 18 wild edible fruit species were recorded the most top three dominate species were *hohob,* (which is the commercialized and known as the most attractive wild fruit in the area), *dafaruur and ciid,*. But the rarest specie was *askax*.

Table 5. Frequency, relative frequency, abundancy and relative abundance of tree/shrub species at Qabridahar district

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Local name of species in (Somali)** | **Frequency** | **R-frequency** | **Abundance** | **R- Abundance** |
| *Hohob* | 28 | 9.621 | 276 | 10.538 |
| *Dhafaruur* | 27 | 9.278 | 305 | 11.645 |
| *Gomesh* | 21 | 7.216 | 192 | 7.331 |
| *Ciid* | 24 | 8.247 | 207 | 7.903 |
| *Himir* | 21 | 7.216 | 182 | 6.949 |
| *Madheedh* | 22 | 7.560 | 156 | 5.956 |
| *Gosey* | 13 | 4.467 | 124 | 4.734 |
| *Gob* | 12 | 4.123 | 121 | 4.620 |
| *Kordhis* | 12 | 4.123 | 68 | 2.596 |
| *Uneexo* | 9 | 3.092 | 93 | 3.550 |
| *Dombir* | 11 | 3.780 | 147 | 5.612 |
| *Cialal* | 12 | 4.123 | 131 | 5.001 |
| *Jacjacle* | 23 | 7.903 | 118 | 4.505 |
| *Goon* | 7 | 2.405 | 79 | 3.016 |
| *Askax* | 9 | 3.092 | 74 | 2.825 |
| *Liko* | 5 | 1.718 | 80 | 3.054 |
| *Garas* | 6 | 2.061 | 74 | 2.825 |
| *Madaxbuq* | 17 | 5.841 | 62 | 2.367 |
| *Dheen* | 7 | 2.405 | 83 | 3.169 |
| *Kidi* | 5 | 1.718 | 47 | 1.794 |
| Total | 291 |  | 2619 |  |

As mentioned in the table 5, in Garbo district a total of 16 different wild edible fruit species were recorded and the most top three dominate species were *defaruur, hohob* and *ciid*. But the rarest species *kidi.*

Table 6. Frequency, relative frequency, abundancy and relative abundance of tree/shrub species at Garbo district

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Local name of species in (Somali) | F | r-f | Abundance | r-abundance |
| *Hohob* | 30 | 6.818 | 415 | 9.290 |
| *Ciid* | 30 | 6.818 | 1434 | 32.102 |
| *Gombesh* | 30 | 6.818 | 329 | 7.3651 |
| *Jacjacle* | 30 | 6.818 | 279 | 6.2458 |
| *Askax* | 28 | 6.363 | 144 | 3.2236 |
| *Uneexo* | 27 | 6.136 | 165 | 3.6937 |
| *Dhambac* | 26 | 5.909 | 183 | 4.0967 |
| *Dhafaruur* | 27 | 6.136 | 214 | 4.7906 |
| *Mindoy* | 26 | 5.909 | 182 | 4.0743 |
| *Midhacas* | 27 | 6.136 | 158 | 3.5370 |
| *Dhiin* | 25 | 5.681 | 149 | 3.3355 |
| *Dombir* | 24 | 5.454 | 131 | 2.9326 |
| *Madheed* | 25 | 5.681 | 142 | 3.1788 |
| *Ilcas* | 28 | 6.363 | 166 | 3.7161 |
| *Maygaag* | 29 | 6.590 | 183 | 4.0967 |
| *Himir* | 28 | 6.363 | 193 | 4.3205 |
| Total | 440 | 100 | 4467 | 100 |

As mentioned in the table 6, in Garbo district a total of 16 different wild edible fruit species were recorded and the most top three dominate species were *ciid, hohob* and *gombesh*. But the rarest species *dombir, madheedand* and *dhiin.*

**Traditional/Indigenous uses of wild edible tree fruit species**

Traditional use of wild edible tree fruits, ten tree fruit species was identified as most valuable by the respondents based on their food, medicinal and other values. The various uses of these species are summarized in table 7. The traditional methods of fruit collection are picking, shaking stems and throwing objects to dislodge the fruits or even destructive harvesting as branches were lopped to harvest fruit in a short time. Most of the wild edible tree fruits in districts were eaten fresh and raw. Wild edible tree fruits play a vital role in subsistence economy and livelihood of people in this small kebeles in the sites. A variety of these fruits with enormous economic potential can be seen grown in the districts. These fruits are used for food traditionally by native people as nutritional diet. Some fruit species are commercially important and also have medicinal value such as *grawiapenicilata* and *grewiatenax*. *Hydro abyssinica* and many others were used for spices and pickle purpose along with medicinal and other uses. These species are free and accessible to the local communities. Some of these food plants are supplementary nutrition.

7. Indigenous uses of wild edible tree fruit species

TABLE 7. Some wild edible tree fruit species and their indigenous uses

|  |  |
| --- | --- |
| **Botanical Name** | **Indigenous uses** |
| *Zizphusmauritiana* | Fruits edible, fodder, fuel wood, leaves are good ingredients for composts. It is highly valued for constriction, agricultural implements etc |
| *Grawiapenicilata* | Fruits are edible. Pulps of the fruits are sweet and juicy and can be stored for a longer time due to its high keeping quality. the fruits are used in treating constipation. Also used as house constriction and fodder |
| *Grewiatenax* | Fruit extracts used for curing constipation and steams used for poles. |
| *Grewiavillosa* | Fruits edible, leaves are good fodder. Seed is extracted from the fruit and used locally. It is believed to have medicinal properties and prevents constipation. |
|  *Hydro abyssinica* | Root or bud edible, traditionally it is used for the tooth pain and treatment of ellagic, the paste of it provides delicious fruit |
| *Dobera glabra* | Fruits edible, leaves are good fodder. Seed is extracted from the fruits and used as food after cooked. |
| *Cordia sinensis* | Fruits edible, fairly good nutritious fodder and fuel wood, the fruits and the leaves give a dark green dye |
| *gardenia florii**`* | Fruits are edible, and highly valued as a source of traditional fruit.  |

## Role of Wild edible fruits Enhancing rural livelihood

According FG discussants, fruit trees make a variety of contributions to households’ livelihood. Direct consumption of the fruit has nutritional benefits while fruit sale is an important source of income particularly for women, children and old men. The wild fruit trees provide a range of environmental benefits and contribute to development of permanent wild fruits.

In this study, Respondents have exposed that wild edible fruit products enhance resilience to drought through different mechanism. Respondent also indicated that wild edible fruit could play a great role in enhancing drought impact by enhancing income, serving as a source of food, micro-climate amelioration as well as environmental protection both from wind or rain by conserving soil and water.

**Marketing of Fruit Products**

Marketing of wild fruit products is studied by considering the situation in the district. As per the findings of the field visit, marketing of various fruit products such as *Zizphusmauritiana, grawiapenicilata, grewiatenaxand grewiavillosa*was carried out. According to FG discussants signposted to their confab that traditional marketing system is used via users of wild fruit to sell fruit product. In districts as the FGDs asserted, the local collectors usually interact with farmers on one-to-one basis, either buying from them at the field or at roadsides near villages markets where many fruit user are located. Local collectors, Provincial wholesale markets and street market provide the most convenient way that users sell their produce. user respondents in the district generally use to distribute their main fruit crops to collectors 60%, and local markets 40%, These buyers usually supply fruit to larger smuggling market systems, and trade to Somalia and Somali land towns. This study is consistent with previous study of Bhawat (2017) that fruit farmers in Chanthaburi used traditional markets to sell the fruit products.

As the FGDs revealed, even though the price is changed in the fruit products through season but the price sold to fruit for the last year is shown in the below.

Table 8. Last year price of the fruits in the districts

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Fruits** | **units/kg** | **Price/birr** |
| 1 | *Hohob* | 1kg | 200 |
| 2 | *Gob* | 1kg | 100 |
| 3 | *Gombesh* | 1kg |  60 |
| 4 | *Ciid* | 1kg |  70 |

Focus groups discussants as well as the key informants stated that the price of the fruit products for the last five years have skyrocketed. Because of the grave famine and starvation which has occurred in the region. The user respondents asserted in to their words that the price rise for the last year helped them to come over the drought and climate shocks. Since the asset or the income generated enabled the households to withstand drought consequences. According the KIs, wild fruits also play a great role on providing products and services. Those in the area provide food, fodder and shade for both animals and households.

**Major challenges affecting wild edible fruit species**

* culturally poor market access,
* poor skill and collection of fruit products: - local collectors lack a good skill and knowledge to utilize the resource
* lower price for fruit products: - less quality of the product leads less income
* inaccessibility of production area: - challenges are faced while collecting the product harshness of the area.
* poor knowledge on production process, storage and quality of fruit product
* Limited financial service
* Absence of support from GOs and NGOs

# **CONCLUSION AND RECOMMENDATION**

Wild edible fruit species have an appreciable role in supplementary food provision, income generation and diversification, nutritional security in different parts of Ethiopia. Moreover, the species are multipurpose, thereby important for fodder, fuel-wood, and timber production among others. However, the species are underutilized and threatened by growing harvesting pressures in natural ecosystems. Many edible fruit-bearing wild species are in the early stage of domestication by farmers with low production. Most indigenous fruit species have not been brought up to their full potential in terms of quality, the scale of production, and the market.is indicates a pressing need for domestication and improvement of some wild edible fruits for increased production, diversifying income for small-scale farmers, sustainable utilization, and conservation of the species. number of promising wild edible fruit species for domestication and wider cultivation is considerable in the region. A review identified widely utilized and priority wild edible fruit species based on their wider utilization, preference by the farmers/ user community, product marketability, and conservation needs for the species. widely utilized and marketed priority wild edible fruit species for domestication and improvement include Zizphusmauritiana, grawiapenicilata, grewiatenaxand grewiavillosa.

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