The Assessment of the Ecological and Socio-Economic Benefit of Indigenous Multipurpose Trees, the case of Gidami Woreda, Kelem Wollega Zone, Oromia Regional State, Ethiopia

By

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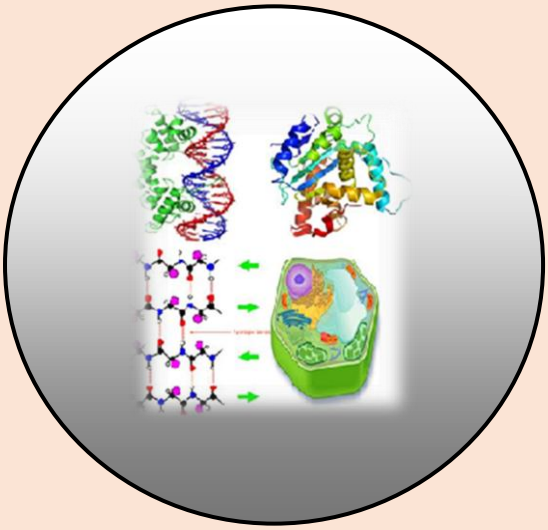

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The Assessment of the Ecological and Socio-Economic Benefit of Indigenous Multipurpose Trees, the case of Gidami Woreda, Kelem Wollega Zone, Oromia Regional State, Ethiopia

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ABSTRACT

Indigenous multipurpose trees have important social, economic and ecological functions such as controlling erosion, contribute to human quality of life, provide sinks for carbon dioxide and methane at the interface between the decaying fallen leaves and the soil and are a source of biodiversity. In this study, we assessed ecological and socio-economic importance of the indigenous multi-purpose tree (MPT) species in three kebeles of Gidami Wereda. Structured questionnaires' were distributed to 90 respondents. The results indicated that indigenous MPTs have important social, economic and ecological functions, such as food supply, shade, traditional medicines, and the preservation of milk, animal nutrition, social values and household income. For animal feeding, vegetation was cut, especially leaves, young tips, twigs and fruits. About 80 % of the respondents were unaware of the benefits of the MPFTs. It is concluded that the indigenous MPT have a strong social and ecological value, and a source of income supplementation.

Keywords: ***Ecological, Social, Economic, Resources, Indigenous and Multipurpose.***

INTRODUCTION

Background of the Study

The social, economic and ecological functions of indigenous multipurpose tree resources are important for human quality of life, national economic support, household income and environmental protection (Jebessa, 2003). Multipurpose trees (MPTs) are woody perennials grown for several functions (for example, shelter, shade, land sustainability) within the land-use system (Moges, 2004). Multipurpose trees are also important for erosion control, carbon dioxide and methane sinks and biodiversity (Dzowela et al., 1997, Sorn, 2003). Indigenous MPTs are grown as part of the farming system. Although most of the indigenous tree species are not primarily grown for but for other purposes, they are readily available for livestock feed.

Several studies on multi-purpose trees (MPTs) have been conducted in different parts of Ethiopia (Yadessa et al., 2000, Chibssa et al., 2006, Tolera, 2007, Tadeg, 2007, Mekoya et al., 2008, Haile and Tolemariam, 2008, Takele et al., 2014). However, most deal with introduced or exotic tree species and very little information is available on the ecological and socio-economic values of indigenous MPTs, despite their importance as resources. A survey conducted in the Ethiopian highlands by Mekoya et al., (2008) showed that farmers use many different local MPT, besides the exotic MPT, to feed their animals and for other farm purposes and a significant proportion of these farmers preferred local to exotic MPT (Mekoya et al., 2006). It is believed that farmers' preference of MPT extends beyond the scientific interpretation of biomass production potential and nutritive value. Farmers might use complex criteria for evaluation of MPT in the frame of their multiple farm objectives (Roothaert and Franzel, 2001, Roothaert et al., 2003). Nevertheless, there is no detailed information available on the species used by farmers, preference between exotic and local MPT and the reasons underlying preferences in the Ethiopian highlands. We also believe that farmers generally possess invaluable knowledge about local and exotic MPT that can lead to the identification of pertinent research questions that help focus research and speed up the development process. It is, therefore, imperative to characterize and assess the socio economic values of the indigenous MPTs in order to design management options for long term sustainable use in Gidami Wereda. Therefore, the objective of this study was to assess ecological and socio-economic importance of the indigenous multipurpose tree species in the study districts.

Statement of the Problem

There is no detailed information available on the species used by farmers, values between exotic and indigenous MPT and the reasons underlying preferences in the Gidami wereda. Despite the favorable agro-ecology for planting indigenous MPTs and the number of indigenous MPTs the wereda is endowed with, the level of knowing and using in the wereda is still low. Therefore, we believe that farmers generally get invaluable values Indigenous MPFT that can lead to the identification of pertinent research questions that help focus research and speed up the development process. Hence, this study was aimed at elucidating the ecological and socio economic importance of indigenous MPTs thereby initiating farmers to prefer such trees than exotic ones.

Objectives

General Objective

The general objective of this study was to understand the socio economic and ecological importance of MPTs in the study area.

Specific Objectives

- ✓ To assess social values of Indigenous MPTs.
- ✓ To assess the economic contribution of Indigenous MPTs.
- ✓ To assess the ecological value of Indigenous MPTs.

Scope of the study

The study was delimited to the assessment of socio economic and ecological role of indigenous MPTs in the Gidami wereda.

MATERIALS AND METHODS

Description of the Study area

The study was conducted in Gidamiwereda, Kelem Wollega, Oromia Regional State. The wereda is located at western part of Ethiopia at distant of 655 km from Finfinne. The wereda has 28 rural kebeles and 2 towns. According to the data obtained from basic socio economic data of the wereda's office of Agriculture and Natural Resource, the total population of the wereda as of 2018 is 119174. Out of this, males were 64354 and females were 54820. The total households were13705; 12500 male HH and 1205 Female HH (GANRO, 2018).

The wereda is known by having diversified multipurpose fodder trees and shrubs. Some of them are *Ficussur, Vernonia amygdalina, Buddleja polystachya, Erythrina brucei, Cordia africana, Ficus sycomorus, Terminalia brownie, Rhus vulgaris, Maesa lanceolate, Millettia ferruginea, Vangueria apiculate, Maytenus sp., Rhus glutinosa, Pavetta oliveriana, Nuxia congesta, Vernonia adoensis Sch., Schrebera alata, Clutia lanceolate, Terminalia schimperiana, Dovyalis abyssinica, Grewia ferruginea, Olea europaea, Ficus thonningii, Maytenus serrata, Celtis africana, Rytigynianeglecta, Clausena anisate,* etc. About 12 kebeles in the wereda are known by having high potential of these MPTs. Therefore, the study was conducted in the 12 kebeles using above mentioned MPTs as base.

Study Population and Sample Size

The data obtained from Gidami wereda Agriculture and Natural Resource Office showed that from the total 28 rural kebeles about 12 kebeles are known by having indigenous MPTs. Thus, this study therefore considered only 12 kebeles as the study area. From these 12 kebeles three kebeles, namely, Komi Koji, Bata and Abono which have high potential of indigenous MPTs was selected purposively based on high priority of having MPTs, accessibility of road, etc. From each kebele 30 HHs were randomly selected using lottery method a total of 90 HHs were used as respondents for sources of data for our study.

Method of Data Collection

Both primary and secondary data were collected. Primary data were collected from stated respondents by preparing interview questions and from group discussion. Observation was also employed to identify the roles of some of the indigenous MPTs within selected kebeles. Secondary data were obtained from different literatures, office reports, basic data, etc. the researchers collected primary data from 90 HHs with the assistance of DAs working in the respective kebeles.

Method of Data Analysis and Interpretation

The collected data were analyzed using simple descriptive statistics such as frequency, percentage, rank and scale and the analyzed data were interpreted and presented in words, tables and percentages as follows.

DATA ANALYSIS AND INTERPRETATION

Ecological and Socio-economic survey

Three kebeles, and from these kebelesa total of 90 households (30HHs from each kebele) were selected purposively based on the availability of indigenous MPTs for socio economic values, ecological distribution and the utilization of these species for livestock feeding and livestock ownership. The HHs were used to collect the survey data. The socio economic survey was collected following the participatory rapid appraisal (PRA) procedure using questionnaire and interviews.

Table 1. List of identified indigenous multipurpose trees species commonly found and collected from three sample kebeles.

Scientific name	Family Name	Local Name (A.O) and Amharic (A.M)
Acanthus pubescens (Oliv.) Engl.	Acanthaceae	Kosorruu (A.O)
Buddleja polystachya Fresen	Loganiaceae	Adado, Anfare (A.O)
Celtis africana Burm.	Ulmaceae	Amalaqqa (A.O)
Clausena anisata (Willd.) Benth	Rutaceae	Ittacha (A.O)
Clutia lanceolata	Euphorbiaceae	Fiyelefeji (A.M)
Combretum molle R. Br. ex G. Don	Combretaceae	Didigsaa, Biqqaa (A.O)
Cordia africana Lam.	Boraginaceae	Waddeessa (A.O)
Dovyil asabssynica	Flacourtiaceae	Ankaakkutee (A.O)
Ehertia cymosa	Boraginaceae	Hulaqa (A.O)
Erythrina brucei Schwein	Fabaceae	Waleensuu (A.O)
Grewia ferruginea Hochst. ex A. Rich.	Tiliaceae	Dhoqonu (A.O)
Ficus thonningii Blume	Moraceae	Danbi(A.O)
Maytenus serrata (A. Rich.) Wilczek	Celasteraceae	Koshomi (A.O)
Maytenus sp.	Celestraceae	Kombolcha (A.O)
Maesa lanceolata Forssk.	Myrsinaceae	Abbayyii (A.O)
Millettia ferruginea (Hochst.)	Fabaceae	Sootalloo (A.O)
Nuxia congesta R.Br. ex Fresen	Loganiaceae	Bitana, Anfare (A.O)
Olea europaea L. subsp. cuspidate	Oleacea	Ejersa(A.O)
Pavetta oliveriana	Rubiaceae	Yetota Buna (A.M)
Rhus glutinosa	Anacardiaceae	Xaaxessaa (A.O)
Rhus vulgaris Meikle	Anacardiaceae	Tates (A.O)
Rytigynianeglecta (Hiem) Robyns	Rubiaceae	Mixoo (A.O)
Vangueria apiculata K. Schum	Rubiaceae	Foskoo (A.O)
Vernonia adoensis Sch. Bip. Ex Walp.	Asteraceae	Aba-Musa, Umel-iruq (A.M)
Vernonia amygdalina	Compositae	Eebicha(A.O)
Vernonia sp.	Asteraceae	Reejjii (A.O)
Schrebera alata (Hochst.)	Oleaceae	Gagamaa, Qan'ee (A.O)
Terminalia schimperiana Hohst	Comberataceae	Dabaqqaa (A.O)

Source for names identification (Mekoya et al., 2008, Azene, 2007)

Identification and Selection of Indigenous Multipurpose Trees

Households were asked to identify and rank the different multipurpose trees (MPTs) on the basis of their uses mostly as feed for animals, availability of fodder trees, ecological and socio-economic and other benefits. Data collected were included HH structure, income source for households, ecological uses and socio-economic importance of multipurpose fodder trees, utilization practices for multipurpose trees, and perceptions of people towards fodder trees, attitude and skill of utilization, their knowledge gap toward indigenous multipurpose trees for multiple use strategies. The respondents include elders, adults, women, and young boy and girls using indigenous multipurpose trees for different socio economic uses.

Respondents revealed that the indigenous MPTs were used as feed resource during feed scarcity or shortage that commonly happens during the dry season of the year. Based on the interview result, 28 indigenous MPT species were identified in the area (Table 1). The respondents indicated that the indigenous MPT foliages as having good fodder potential for supplementation to fill the gap feed scarcity and result to better animal productivity.

Indigenous multipurpose tree resources can increase feed resource base for the season of feed gap to supplement poor quality roughages, as the MPTs are rich in CP, minerals and energy and can maintain their feeding value for extended period of time due to their deep root system (Paterson et al., 1998, El Hassan et al., 2000, Upreti and Shresta, 2006, Zomer et al., 2009). This observation is similar to the findings of (Komwihangilo et al., 1995). About 21.4 % of identified indigenous MPFTs were used as honey bee forage. For example, the farmers uses *O. cuspidata* trees leaves to smoke their traditional bee hives to attract the wild and absconding bees with its good smell.

Ecological and Socio-economic Values of Indigenous Multipurpose Trees

About 74 % of the respondents of the three kebeles noted that the identified indigenous MPFTs of the area serves as a shade for animals and humans, and sustaining agro-ecology while close to 18 % of the respondents said that the fodder trees are used to treat animal diseases. MPTs also provide social acceptance for the owners in social meetings by serving as a shaded meeting place. In some districts, farmers use trees and shrubs to preserve livestock products such as milk. Wood from some species of trees was, for example, are used to smoke milk containers for preservation or increase the shelf life and to provide better flavor for the milk.

Table 2. List of identified marketable indigenous fodder trees of the three kebeles.

Scientific name	% of respondents (%)	Rank	Form of sale*
C. molle	73.3	10	2
C. africana	91.8	1	1, 2
D. abyssinica	65.5	5	2
E. cymosa.	76.3	6	2
E. brucei	82.6	2	1, 2
F. thonningii	68.5	7	1, 2
M. ferruginea	78.2	8	1, 2
O. cuspidata	80.7	3	2
V. amygdalina	70.0	4	2
T. schimperiana	79.6	9	1,2

Source (Azene 1993; Azene, 2007). *1 = timber; 2 = whole sale

In addition to their uses as animal feed and role in social and livelihood, the identified indigenous MPTs are marketable (Table 2) and provide an opportunity to enhance household incomes in the sample kebeles. The analysis result also showed that 93.7 % of respondents in the three kebeles use MPTs as income source. Income is generated from sale of whole trees or after processing. Timber production (e.g., *C. africana*) has particular significance to resource poor farmers in order to meet their basic needs. The fruit of *O. cuspidata* is also used as raw materials for Zenith Cosmetics manufacturing industry in Addis Abeba, Ethiopia is known for production of Oliva Hair oil which is extra rich for dry hair.

According to Mekoya et al. (2008) indigenous multipurpose trees provide many benefits including food, drink fruits, fuel wood, construction of hedges (fences), charcoal, furniture, resins or dyes, domestic uses or tools, honey from bees and also agro-ecological sustainability such as soil fertility, land improvement, erosion control and environmental air or atmosphere balance. They also serve as a storage material for grain (Eg. *E. brucei, O. cuspidata*). These social and livelihood benefits reinforce the importance of MPTs in multiple use strategies. The research conducted in Southern part of Ethiopia Getachew et al. (2005) revealed that the sale of wild plant like fodder supplements contributes as additional sources of incomes to resource poor farmers.

Table 3. Synopsis of season of maximum uses, types of animal using the plant and benefit claimed from indigenous multipurpose trees in the sample kebeles.

Scientific name	Season of Maximum uses	Types of animal	Benefit expected*
E. brucei	All year round	Cattle, goat, sheep	A , B
V. amygdalina	All year round	Cattle, sheep, goat	A, B, D
E. cymosa	All year round	Cattle, sheep, goat	A, B, D
C. africana	Sept. to Mar.	Cattle	A
D. abyssinica.	All year round	Cattle, Goat, Sheep	A,C
B. polystachya	Sept. to Mar.	Cattle, sheep and goat	A,B
G. ferruginea	Sep. to Feb	Goat, Cattle, Sheep	A,B
O. cuspidate	Nov. to Apr.	Cattle, sheep and goat	A
A. pubescens	Nov. to Mar.	Goat	A
F. thonningii	Sept. to Mar.	Cattle, sheep and goat	A, C
T. schimperiana.	Sept. to Mar.	Cattle, sheep and goat	A
R. vulgaris	All year round	Cattle and Goat	A, B
C. lanceolata	Sept. to Feb.	Cattle	A, B
Vernonia sp.	Nov. to Apr.	Cattle, sheep	A, B
S. alata	Oct. to Feb	Cattle, sheep	A, D
M. serrata	Nov. to Feb.	Cattle	A
V. adoensis	Nov. to Apr.	Cattle	A, B
Celtis Africana	Sept. to Mar.	Cattle, sheep	A, B, D
M. ferruginea	Nov. to Mar.	Cattle, sheep	A
R. neglecta	Nov. to April	Goat, Cattle	A
C. anisata	Sept. to Mar.	Cattle, Goat	A, D
V. apiculata	All year round	Goat	A, D
Maytenus sp.	All year round	Goat	A,D
N. congesta	Sept. to Mar.	Cattle	A,B
M. lanceolata	Nov. to Mar.	Cattle, Goat	A, D
R. glutinosa	Sept. to Feb.	Cattle	A
P. oliveriana	Nov. to Feb.	Goat, Cattle	A
C. molle	Nov. to Mar.	Cattle	A

Source taken from (Mekoya et al., 2008. *A=Maintenance, B=Milk production, C=Traditional medicine, D=Growth.

Utilization of Indigenous Multipurpose Trees for Animal Production

Indigenous MPTs can serve as supplementary feed for animal production. Fodder trees contribute to the ration of animals during different seasons, although there are season of maximum use for each MPT. Respondents believe that MPTs can serve to provide nutrients for maintenance and milk production and growth. But different MPTs were believed to have varying feeding value according to the respondents. There are also some MPTs that serve as medicinal value to treat certain ailments (Table 3). Data from this study revealed that out of 28 identified indigenous MPFTs, 23 % were fed all year round, 27 % were fed from September to March, 10 % were fed from September to February, 17 % were fed from November to March, 13 % were fed from November to April, 3 % were fed from October to February and 7 % from November to February in three kebeles.

Utilization practice of indigenous MPT species by animals depends on availability of fodder trees, selection by the animals, their effects after consumption and purposes to be obtained after consumption. Some indigenous trees were consumed commonly and preferentially by certain animals than by others. Among identified indigenous MPTs, 33 % were consumed by cattle, sheep and goat, 17 % by cattle and goat, 13 % by cattle and sheep, 23 % by cattle only, and 13 % were consumed by goat only in three kebeles, respectively.

Data for the benefit of indigenous MPTs for animal production showed that about 17 % were for both maintenance and to improve milk production, 7 % for maintenance, improve milk production and traditional medicines, 13 % for both maintenance and traditional medicines, 43 % only for maintenance, 17 % for both maintenance and growth, and about 3 % were for maintenance, growth and to improve milk production.

Utilization practice of indigenous MPT species by animals depends on availability of trees, selection by the animals and their effects after consumption and purposes to be obtained after consumption. Some indigenous trees were consumed commonly and preferentially by certain animals than by others. Among identified indigenous MPTs, 33 % were consumed by cattle, sheep and goat, 17 % by cattle and goat, 13 % by cattle and sheep, 23 % by cattle only, and 13 % were consumed by goat only in three sample kebeles, respectively. Data for the benefit of indigenous MPFTs for animal production showed that about 17 % were for both maintenance and to improve milk production, 7 % for maintenance, improve milk production and traditional medicines, 13 % for both maintenance and traditional medicines, 43% only for maintenance, 17 % for both maintenance and growth, and about 3 % were for maintenance, growth and to improve milk production.

Perception of Farmers toward Indigenous Multipurpose Trees

According to respondents of the sample kebeles, indigenous MPT species (Appendix 1) are believed to be nutritious, and these MPTs are noted to be important to livestock production in promoting not only maintenance of animals but also in enhancing growth and milk production. Butter-fat production in lactating animals and improvements in animal health were also mentioned by the respondents as good attributes of MPTs. Indigenous MPT species such as *V. amygdalina and E. cymosa* are believed to have traditional medicinal value and the leaves, tips and pods of such plants are ground mixed with *Coffee arabica* leaves and boiled and used as medicine to treat certain ailments.

The respondents revealed that indigenous MPTs are miracle tree used as meeting under the tree shade, providing service like boundary demarcation or barrier.

About 68 % , 59 % and 61 % of respondents' in Komi Koji, Bata and Abonokebele respectively, noted that indigenous MPTs were used as social and cultural values relating to spiritual, aesthetic, symbolic, historical and primarily with the interaction and relationships among people these may be wide ranging and include for example belonging, status, friendship and identity (Appendix 1). According to Louise et al. (1996) the leaves of the most MPT species are good sources of green roughage if free from or contain minimal anti-nutritional factors. The edible parts of indigenous trees are mostly leaves and in some species young tips, twigs and stem, fruit pods are consumed by animals. The dominance of leaves as part of MPT used as feed has also been reported in previous studies (Solomon, 2002, Alemayehu, 2006, Mekoya et al., 2008, Mohammed et al., 2008). About 80 % of the respondents appeared to have a knowledge gap about the advantage indigenous MPTs. Even if indigenous multipurpose trees have multiple advantages in social and livelihood, economic and ecological values, they were generally ignored in reforesting. Only 20 % of respondents noted that of having some knowledge about the social and livelihood, economic and ecological values of indigenous MPTs in three kebeles.

CONCLUSION

This study was assessed that the indigenous MPTs have social and economic value to the people in general. Indigenous MPTs provides social values serving as a shaded meeting place three sample kebeles. Particularly to their uses as social and livelihood, the identified indigenous MPTs are marketable and provide an opportunity to enhance household incomes. The five MPT species identified as important in the study area based on their abundance and utilization as social and economic value and animal feed are *E. brucei, V. amygalina, E. cymosa, C. africana* and *D. abyssinica.* Further studies may examine the status of these plants in other regions and also include more species for evaluation.

APPENDICES

Appendix 1. Perception data result.

Parameters	Sub parameters	Percent
Season of feed scarcity	Dry season	100
	Wet season	0.0
Social and cultural value	Komi Koji	68
	Bata	59
	Abono	61
Household that plant MPT	Planting	69
	Not planting	31
Purposes of feeding MPT	Maintenance	53
	Growth	30
	Production	10.4
	Other purpose	6.7
Season MPT mostly used	Wet season	16.6
	Dry season	56.7
	Both seasons	26.7
Knowledge gap people	Knowledge gap	80
	Not knowledge gap	20
Income sources	Used as income sources	87
	Not used as income sources	13

Appendix 2. The Utilizations practice of Indigenous MPFT Species, Source taken from (Mekoya et al., 2008).

No	Scientific name	Local Name (Afan Oromo)	Parts used	Utilization practices	Habitat found	Other uses
1.	*Erythrinabrucei Schwein*	Waleensuu	Leaf and young tip	Leaves are threshed /pitted or lopped are collected to livestock consumption. Tip parts are used as traditional medicinal values for children during tonsil disease on their esophageal grove.	-Hedgerows -Boundaries -Fencing	-Shade -Storage of crop -Increase soil fertility and control erosion Environmental air balance
2.	*Vernonia amygdalina Del.*	Eebicha	leaf	Leaves are collected or cut from the trees for cattle's and leaves are grounded in the grinding materials and mixed with water used as traditional medicinal values for livestock. In addition to livestock, leaves are used as traditional medicine to human being for elephant foot disease.	Cropland Home stead Grassland	Domestic uses Fuel wood, constructions, Ecological balance of air
3.	*Ehretiacymosa Thonn.*	Hulaqa	Leaf	Leaves are cut or collected from the trees for livestock consumption directly or grinded with the leaves of coffee and mixed with water & provided for cattle used as traditional medicine. Leaf are grinded with leaf of coffee & mixed with water and boiled with little amount of butter used as traditional medicinal values for human being	-Cropland -Home stead - Grassland -Forests	Traditional Medicine Drinking its juices Fuel wood Erosion control Constructions Fencing

4.	*Cordia africana Lam.*	Waddeessa	Leaf & fruit	Leaves are threshed or cut or pitted are collected to livestock consumption. The ripe fruit are collected either from the ground or picked from the tree &the pulps of fruits are eaten &seeds are discarded. The ripe fruits are also grounded and mixed with H2O used as juices in ancient times	Farmland Grassland Home stead Cropland Fallow land	-Timber Land improvement -Honey bee forage -Fuel wood -Leisure trees -Shade
5.	*Dovyalis abyssinica (A. Rich.) Warb.*	Ankakute	Leaf & fruit	Leaves are threshed or cut or pitted are collected to livestock consumption. The ripe fruits are collected and consumed raw & seed are discarded	Forests Boundary Riverbank Grazing land	Construction Fences Fuel wood Charcoal production
6	*Buddleja polystachya Fresen*	Araje	Leaf	The leaves of this tree is used to improve milk production for the cattle	-Property boundary - Grassland	Shade Fuel wood Construction
7.	*Grewia ferruginea Hochst. Ex A. Rich.*	Dhoqonu	Leaf, young stem & pods	Leaves are threshed or pitted are collected to livestock consumption flower are consumed by human being	-Forests -Boundary -Grazing land	Bee forage Fencing Land mark
8	*Oleaeuropaea L. subsp. cuspidate (Wal L. ex G. Don) Cif*	Ejersa	Leaf	Leaves are cut or provided for livestock consumption in during feed shortages. Leaves are used for smoking traditional beehives	-Hedgerows -Home stead -Pastureland	-Constructions -Honey bee forage -Fencing, Fuel wood -Grain storage, smoking
9	*Acanthus pubescens (Oliv.) Engl.*	Kosorru	Leaf	Leave are browsed by goats & highly consumed	Property boundary -Forests -River bank	-Honey bee forage, Fencing, Soil conservation, Fuel wood

10	*Ficus thonningii Blume*	Harbu	Leaf & pod	Leave are consumed by livestock & pods are used as traditional medicinal value	-Hedgerows -Home stead -Grassland	-Soil conservation -Fuel wood, -Charcoal production
11	*Terminalia schimperiana Hochst.*	Hadheessa	Leaf	Leave are consumed by livestock	-Hedgerows -Grassland River bank	Soil conservation -Charcoal, Fuel wood production
12	*Combretum molle R. Br. ex G. Don*	Dabaqqaa	Leaf	Leave are consumed by livestock	Grazing land woodland	Shade, Soil erosion control, Fuel wood, Charcoal
13	*Rhus vulgaris Meikle*	xaaxessaa	Leaves & fruits	Leaves are threshed /pitted are collected to livestock consumption. The fruits are collected and eaten in raw	Grassland woodland Riverbank	Fencing, Fuel wood Shade, Charcoal
14	*Clutia lanceolata Forssk*	Fiyelefeji (A.M)	Leaves	Leaves are threshed are collected and grounded livestock consumption.	Grassland Woodland Riverbank	Fencing, Fuel wood Shade, Control erosion
15	*Vernonia sp.*	Reejjii	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Grassland Woodland Riverbank	Fencing, Fuel wood Shade, Control erosion
16	*Schrebera alata (Hochst.) Welw.*	Gagama	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead	Fencing, Fuel wood Shade, Control erosion
17	*Maytenus serrata (A. Rich.) Wilczek*	Koshomi	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead -Grassland	Fencing, Fuel wood Shade, Control erosion
18	*Vernonia adoensis Sch. Bip. Ex Walp.*	Umel-iruq (A.M)	Leaves & young stems	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead - Grassland	Fencing, Fuel wood Shade, Control erosion
19	*Celtis Africana Burm. f*	Amalaqqaa	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows Home stead	Fencing, Fuel wood Shade, Control erosion

20	*Millettia ferruginea (Hochst.) Bak.*	Sootalloo, Ingidicho	Leaves & pods	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead -Forest	Fencing, Fuel wood Shade, Control erosion
21	*Rytigynia neglecta (Hiem) Robyns*	Mixoo	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead - Grassland	Fencing, Fuel wood Shade, Control erosion
22	*Clausena anisata (Willd.) Benth.*	Ittacha	Leaves & fruits	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home compound - Grassland -Forests	Fencing, Fuel wood Shade, Bee forage Control erosion
23	*Vangueria apiculata K. Schum.*	Foskoo	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead - Grassland	Fencing, Fuel wood Shade, Control erosion
24	*Maytenus sp.*	Kombolcha	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead -Pastureland	Fencing, Fuel wood Shade, Control erosion, Bee forage
25	*Nuxia congesta R.Br. ex Fresen*	Anfare	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead - Grassland	Fencing, Fuel wood Shade, Control erosion
26	*Maesa lanceolata Forssk.*	Abbayyii	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead -Forests	Fencing, Fuel wood Shade, Control erosion
27	*Rhus glutinosa*	Xaaxessaa	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead -Forest	Fencing, Fuel wood Shade, Control erosion
28	*Pavetta oliveriana*	Yetota Buna (A.M)	Leaves	Leaves are threshed or pitted are collected to livestock consumption	Hedgerows -Home stead - Grassland	Fencing, Fuel wood Shade, Control erosion

RECOMMENDATION

The wereda offices of agriculture and natural resource and Livestock should have to document these necessary MPFTs and create awareness among all kebeles within the wereda to benefit other farmers the multiple benefits the MPTs can provide.

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