Supplementary 1

Appendix 1: Woody species recorded in the highland of Beda kebele in parkland agroforestry, Tembaro special district, Central Ethiopia

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Vernacular name** | **Species name** | **Family Name** | **Growth habit/Tr,Sh** | **Origin I/E** |
| Bazra girar | *Acacia abyssinica Hochst.* | Fabaceae | Tr | I |
| Akacha Saligna | *Acacia saligna* | Fabaceae | Tr | E |
| Bisana | *Croton macrostachyus Del.* | Euphorbiaceae | Tr | I |
| Kontir | *Entada abyssinica* | Fabaceae | Sh | I |
| Shola | *Ficus sur* | Moraceae | Tr | I |
| Nech bahirzaf | *Eucalyptus globulus Labill.* | Myrtaceae | Tr | E |
| Wanza | *Cordia Africana* | Boraginacee | Tr | I |
| Grevila | *Grevillea robusta R. Br.* | Proteaceae | Tr | E |
| Kosso | *Hagenia abyssinica (Bruce) J.F.Gmelin* | Rosaceae | Tr | I |
| Warka | *Ficus vasta* | Moraceae | Tr | I |
| Sesa | *Albizia gummifera (J. F. Gmel.)* | Fabaceae | Tr | I |
| Korch | *Erythrina brucei* | Fabaceae | Tr | I |
| Sensel | *Justicia schimperiana (Hochst.)* | Acanthaceae | Sh | I |
| Weira | *Olea europaea subsp. cuspidata* | Oleaceae | Tr | I |
| Zigba | *Podocarpus falcatus (Thunb.) Mirb.* | Podocarpaceae | Tr | I |
| Yezinjero wonber | *Polyscias fulva (Hiern) Harms* | Araliaceae | Tr | I |
| Dokma | *Syzygium guineense (Wild.) DC.* | Myrtaceae | Tr | I |
| Grawa | *Vernonia amygdalina Del.* | Asteraceae | Tr | I |

Appendix 2: Woody species recorded in the midland of Durgi kebele in parkland agroforestry, Tembaro Special district, Central Ethiopia

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Vernacular name** | **Species name** | **Family Name** | **Growth habit/Tr,Sh** | **Origin I/E** |
| Akacha | *Acacia decurrens* | Fabaceae | Tr | E |
| Bazra girar | *Acacia abyssinica Hochst.* | Fabaceae | Tr | I |
| Kawoot | *Celtis africana Burm.* | Ulmaceae | Tr | I |
| Bisana | *Croton macrostachyus Del.* | Euphorbiaceae | Tr | I |
| Kontir | *Entada abyssinica* | Fabaceae | Sh | I |
| Key bahir zaf | *Eucalyptus camaldulensis Dehnh.* | Myrrtaceae | Tr | E |
| Kulkual | *Euphorbia abyssinica* | Euphorbiaceae | Tr | I |
| Shola | *Ficus sur* | Moraceae | Tr | I |
| Nech bahirzaf | *Eucalyptus globulus Labill.* | Myrtaceae | Tr | E |
| Wanza | *Cordia Africana* | Boraginacee | Tr | I |
| Grevila | *Grevillea robusta R. Br.* | Proteaceae | Tr | E |
| Physic nut | *Jatropha curcas* | Euphorbiaceae | Sh | E |
| Yehabesha tid | *Juniperus procera Hochst. ex Endl.* | Cupressaceae | Tr | I |
| Warka | *Ficus vasta* | Moraceae | Tr | I |
| Sesa | *Albizia gummifera (J. F. Gmel.)* | Fabaceae | Tr | I |
| Korch | *Erythrina brucei* | Fabaceae | Tr | I |
| Korch | *Erythrina abyssinica* | Fabaceae | Tr | I |
| Sensel | *Justicia schimperiana (Hochst.)* | Acanthaceae | Sh | I |
| Birbira | *Millettia ferruginea (Hochst.) Bak.* | Fabaceae | Tr | I |
| Zigba | *Podocarpus falcatus (Thunb.) Mirb.* | Podocarpaceae | Tr | I |
| Tikur inchet | *Prunus africana (Hook.f.) Kalkm.* | Rosaceae | Tr | I |
| Candle bush | *Senna didymobotrya* | Fabaceae | Sh | I |
| Girangire | *Sesbania sesban* | Fabaceae | Sh | I |
| Eret | *Aloe vera* | Aloeaceae | Sh | I |
| Dokma | *Syzygium guineense (Wild.) DC.* | Myrtaceae | Tr | I |
| Nim | *Azadirachta indica* | Meliaceae | Tr | I |

Appendix 3: The encountered Family, number of species, and number of genera in parkland agroforestry in the study area

|  |  |  |  |
| --- | --- | --- | --- |
| **Family** | **Species name** | **Number of Genera** | **Number of Species** |
| Fabaceae | *Acacia decurrens* | 7 | 10 |
|  | *Acacia saligna* |  |  |
|  | *Albizia gummifera* |  |  |
|  | *Entada abyssinica* |  |  |
|  | *Erythrina abyssinica* |  |  |
|  | *Erythrina brucei* |  |  |
|  | *Millettia ferruginea* |  |  |
|  | *Senna didymobotrya* |  |  |
|  | *Acacia abyssinica* |  |  |
|  | *Sesbania sesban* |  |  |
| Ulmaceae | *Celtis africana* | 1 | 1 |
| Boraginaceae | *Cordia africana* | 1 | 1 |
| Euphorbiaceae | *Croton macrostachyus* | 3 | 3 |
|  | *Euphorbia abyssinica* |  |  |
|  | *Jatropha curcas* |  |  |
| Myrtaceae | *Eucalyptus camaldulensis* | 2 | 3 |
|  | *Eucalyptus globulus* |  |  |
|  | *Syzygium guineense* |  |  |
| Moraceae | *Ficus sur* | 1 | 2 |
|  | *Ficus vasta* |  |  |
| Proteaceae | *Grevillea robusta* | 1 | 1 |
| Rosaceae | *Hagenia abyssinica* | 2 | 2 |
|  | *Prunus africana* |  |  |
| Cupressaceae | *Juniperus procera* | 1 | 1 |
| Acanthaceae | *Justicia schimperiana* | 1 | 1 |
| Oleaceae | *Olea europaea* | 1 | 1 |
| Podocarpaceae | *Podocarpus falcatus* | 1 | 1 |
| Araliaceae | *Polyscias fulva* | 1 | 1 |
| Asteraceae | *Vernonia amygdalina* | 1 | 1 |
| Aloeaceae | *Aloe vera* | 1 | 1 |
| Meliaceae | *Azadirachta indica* | 1 | 1 |
| Total |  | 26 | 31 |

Appendix 4: The encountered Family, number of species, and number of genera within each agroecology in parkland agroforestry in the study area

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Family** | **Agroecology, Number of species and Number of genera** | | | |
|  | **Highland** |  | **Midland** | |
|  | **Species** | **Genera** | **Species** | **Genera** |
| Fabaceae | 5 | 4 | 9 | 7 |
| Ulmaceae | - | - | 1 | 1 |
| Boraginaceae | 1 | 1 | 1 | 1 |
| Euphorbiaceae | 1 | 1 | 3 | 3 |
| Myrtaceae | 2 | 2 | 3 | 2 |
| Moraceae | 2 | 1 | 2 | 1 |
| Proteaceae | 1 | 1 | 1 | 1 |
| Cupressaceae | - | - | 1 | 1 |
| Acanthaceae | 1 | 1 | 1 | 1 |
| Podocarpaceae | 1 | 1 | 1 | 1 |
| Rosaceae | 1 | 1 | 1 | 1 |
| Aloeaceae | - | - | 1 | 1 |
| Meliaceae | - | - | 1 | 1 |
| Oleaceae | 1 | 1 | - | - |
| Araliaceae | 1 | 1 | - | - |
| Asteraceae | 1 | 1 | - | - |
| Total Fam. = 16 | 18 | 16 | 26 | 22 |

Appendix 5: List of relative frequency (r.f), relative abundance (r.ab), relative dominance (r.do), and importance value index (IVI) of woody species in highland parkland agroforestry in the study area

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Scientific name** | **r.fr %** | **r.ab %** | **r.do %** | **IVI %** |
| 1 | *Acacia abyssinica Hochst.* | 11.37 | 5.40 | 6.31 | 23.08 |
| 2 | *Acacia saligna* | 10.1 | 8.71 | 9.03 | 27.84 |
| 3 | *Croton macrostachyus Del.* | 14.72 | 9.39 | 8.92 | 33.03 |
| 4 | *Entada abyssinica* | 9.15 | 4.15 | 5.42 | 18.72 |
| 5 | *Ficus sur* | 2.13 | 6.82 | 5.14 | 14.09 |
| 6 | *Eucalyptus globulus Labill.* | 5.17 | 6.25 | 7.63 | 19.05 |
| 7 | *Cordia africana* | 7.92 | 6.46 | 9.48 | 23.86 |
| 8 | *Grevillea robusta R. Br.* | 6.29 | 8.14 | 5.04 | 19.47 |
| 9 | *Hagenia abyssinica (Bruce) J.F.Gmelin* | 4.79 | 5.2 | 6.24 | 16.23 |
| 10 | *Ficus vasta* | 2.32 | 5.8 | 5.79 | 13.91 |
| 11 | *Albizia gummifera (J. F. Gmel.)* | 4.63 | 3.51 | 4.8 | 12.94 |
| 12 | *Erythrina brucei* | 5.96 | 8.17 | 9.21 | 23.34 |
| 13 | *Justicia schimperiana (Hochst.)* | 2.78 | 10.04 | 4.91 | 17.73 |
| 14 | *Olea europaea subsp. cuspidata* | 3.3 | 4.9 | 5.49 | 13.69 |
| 15 | *Podocarpus falcatus (Thunb.) Mirb.* | 1.72 | 2.5 | 2.16 | 6.38 |
| 16 | *Polyscias fulva (Hiern) Harms* | 1.75 | 1.64 | 1.08 | 4.47 |
| 17 | *Syzygium guineense (Wild.) DC.* | 1.1 | 1.02 | 2.5 | 4.62 |
| 18 | *Vernonia amygdalina Del.* | 2.8 | 1.9 | 2.85 | 7.55 |

Appendix 6: List of relative frequency (r.f), relative abundance (r.ab), relative dominance (r.do), and importance value index (IVI) of woody species in midland parkland agroforestry in the study area

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Scientific name** | **r.fr %** | **r.ab%** | **R.do%** | **IVI %** |
| 1 | *Acacia decurrens* | 13.19 | 12.14 | 7.52 | 32.85 |
| 2 | *Acacia abyssinica Hochst.* | 4.80 | 5.23 | 8.79 | 18.82 |
| 3 | *Celtis africana Burm.* | 3.16 | 2.39 | 6.11 | 11.66 |
| 4 | *Croton macrostachyus Del.* | 11.26 | 23.61 | 7.82 | 42.69 |
| 5 | *Entada abyssinica* | 1.4 | 2.01 | 1.71 | 5.12 |
| 6 | *Eucalyptus camaldulensis Dehnh.* | 6.0 | 2.27 | 6.82 | 15.09 |
| 7 | *Euphorbia abyssinica* | 1.04 | 1.30 | 2.94 | 5.28 |
| 8 | *Ficus sur* | 1 | 2.92 | 3.13 | 7.05 |
| 9 | *Eucalyptus globulus Labill.* | 2.09 | 2.35 | 6.5 | 10.94 |
| 10 | *Cordia africana* | 5.45 | 4.10 | 7.65 | 17.2 |
| 11 | *Grevillea robusta R. Br.* | 1.47 | 3.54 | 2.34 | 7.35 |
| 12 | *Jatropha curcas* | 2.51 | 2.96 | 1.4 | 6.87 |
| 13 | *Juniperus procera Hochst. ex Endl.* | 1.64 | 1.07 | 4.83 | 7.53 |
| 14 | *Ficus vasta* | 1.28 | 2.16 | 1.13 | 4.57 |
| 15 | *Albizia gummifera (J. F. Gmel.)* | 1.57 | 1.56 | 5.2 | 3.12 |
| 16 | *Erythrina brucei* | 5.52 | 6.53 | 8.11 | 20.16 |
| 17 | *Erythrina abyssinica* | 4.83 | 7.14 | 2.1 | 14.07 |
| 18 | *Justicia schimperiana (Hochst.)* | 1.92 | 1.02 | 0.6 | 3.54 |
| 19 | *Millettia ferruginea (Hochst.) Bak.* | 6.1 | 3.19 | 3.06 | 12.35 |
| 20 | *Podocarpus falcatus (Thunb.) Mirb.* | 3.5 | 2.41 | 2.04 | 7.95 |
| 21 | *Prunus africana (Hook.f.) Kalkm.* | 2.18 | 1.65 | 0.5 | 4.33 |
| 22 | *Senna didymobotrya* | 1.6 | 2.88 | 1.2 | 5.68 |
| 23 | *Sesbania sesban* | 9.17 | 2.1 | 3.03 | 14.3 |
| 24 | *Aloe vera* | 1.96 | 1.2 | 1.60 | 4.76 |
| 25 | *Syzygium guineense (Wild.) DC.* | 1.24 | 1.23 | 2.73 | 5.2 |
| 26 | *Azadirachta indica* | 4.12 | 1.04 | 0.94 | 6.1 |