Table S1

 Existing land use and land cover classification results for Lake Tana basin.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **Land Cover** | **General descriptions**  | **Area in ha** | % |
| 1 | Forest land | It consists of dense natural and plantation forests. Natural forests occupy primarily steep slopes that are situated on escarpments, hill and mountain slopes, while plantation forests occur mainly on degraded river valley sides, hill and mountain sides and also at places around homesteads. | 78,179.02 | 4.95 |
| 2 | Sub-afro-alpine vegetation | It mainly occurs in the highland areas at the altitude >2800 m, specifically around mountains and encompasses woodland, wooded shrub grassland, shrub grassland, and grasslands. | 12,261.75 | 0.78 |
| 3 | Built-up area | The built-up area constitutes towns and farm villages, which are recognized by patterns of constructions, trees grown around homesteads and along roadsides and grasslands left for livestock. | 87,829.29 | 5.56 |
| 4 | Bush and shrub land | Bushes and shrubs are dominant at high altitude of the basin, particularly in the moderate/low cultivation and degraded lands. | 102,071.16 | 6.46 |
| 5 | Grass land | It consists of open grassland and shrub grassland important for grazing and silage production.  | 137,952.74 | 8.74 |
| 6 | Water body | It includes rivers, lake, pond and dams. | 310,423.42 | 19.66 |
| 7 | Wetland | It includes both seasonal wetlands and permanent wetlands.  | 25,203.33 | 1.60 |
| 8 | Cultivated land | It includes intensive, moderate and sparsely cultivated crops and available in the extensive plains surrounding the Lake Tana, valleys of major rivers and highland plateau areas.  | 825,176.23 | 52.26 |
|  | Total  |  | 1,579,096.94 | **100** |

Land use-land cover of Lake Tana Basin

 Existing land use-land cover for the study area is indicated in Fig. S1 and summarized in Table S1. The analysis of land-use revealed that cultivated land took the largest area share in Lake Tana basin with an area of 825,176.23 ha accounts for 52.3% of the total areal coverage. The second dominant land cover of the basin is water bodies which occupy approximately 310,423.42 ha (almost 20 % of the total basin land). The other land use types such as grassland, built-up area, forest land and wetland are important land-use in the basin comprised 8.7% (137,952.74 ha), 5.6% (87,829.29 ha), 5% (78,179.02 ha), and 1.6% (25,203.3 ha), respectively, of the total land area. The forest cover of the basin is comparable with the current forest percentage share of the country, in which plantation forests mainly covered with eucalyptus trees that are belonged to the farm villages. In spite of high cultivated land expansion, the basin still has a large area of grass land (grazing land) coverage. However, afro-alpine and sub-afro-alpine vegetation constitutes the smallest area coverage in the basin with only 0.78 percent and restricted to the high land “Guna” mountain and its surroundings. These different land coverages of the area are not equally significant for the establishment of fish pond aquaculture. Accordingly, grassland, woodland and bush/shrub land are considered highly suitable. Plantation and agricultural land are considered moderately suitable, whereas towns and artificial water bodies are found to be marginally suitable. Forest and water bodies are considered unsuitable due to their ecological importance (Dejen and Mintesnot 2012).