****

**Fig. S1 Map of land use/land cover distribution in the upper Lancang-Mekong River Basin**

(Note: BSVG: Barren or Sparsely Vegetated; CRDY: Dryland Cropland and Pasture; CRGR: Cropland/Grassland; CRIR: Irrigated Cropland and Pasture; CRWO: Cropland/Woodland; FODB: Deciduous Broadleaf Forest; FODN: Deciduous Needleleaf Forest; FOEB: Evergreen Broadleaf Forest; FOEN: Evergreen Needleleaf Forest; FOMI: Mixed Forest; GRAS: Grassland; MIGS: Mixed Shrubland/Grassland; SAVA: Savanna; SHRB: Shrubland; TUWO: Wooded Tundra; URMD: Urban and Built-Up Land; WATR: Snow or Ice; WEWO: Wooded Wetland.)

**Table S1. Dominant Land Cover Classes in the upper Lancang-Mekong River Basin**

|  |  |  |
| --- | --- | --- |
| **Abbreviation** | **Land Cover Types** | **Area (% of the basin)** |
| GRAS | Grassland | 38.34% |
| FOMI | Mixed Forest | 20.70% |
| FOEB | Evergreen Broadleaf Forest | 15.33% |
| SHRB | Shrubland | 11.36% |
| FODB | Deciduous Broadleaf Forest | 8.71% |
| SAVA | Savanna | 2.42% |
| TUWO | Wooded Tundra | 1.80% |
| CRIR | Irrigated Cropland and Pasture | 1.35% |



**Fig. S2 Map of soil type distribution in the upper Lancang-Mekong River Basin**

**Table S2. Major Soil Types in the upper Lancang-Mekong River Basin**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **FAO Soil Name** | **Area (% of the basin)** | **Texture** | **Hydrologic Soil Group\*** | **Moist Bulk Density (g/cm3)** | **Saturated Hydraulic Conductivity(mm/hr)** | **Available Water Holding Capacity (mm H2O/mm soil)** |
| Rankers | 25.07% | LOAM | C | 1.2 | 14.38 | 0.06 |
| Orthic Acrisols | 23.94% | SANDY\_CLAY\_LOAM | C | 1.3 | 7.27 | 0.06 |
| Ferric Luvisols | 12.98% | SANDY\_CLAY\_LOAM | C | 1.2 | 14.66 | 0.03 |
| Xerosoils | 11.11% | LOAM | D | 1.4 | 6.24 | 0.07 |
| Calcaric Fluvisols | 7.95% | LOAM | D | 1.4 | 5.21 | 0.17 |
| Eutri Cambisols | 7.89% | LOAM | D | 1.3 | 7.99 | 0.08 |
| Ferric Luvisols | 5.41% | CLAY | C | 1.3 | 9.16 | 0.07 |
| Glacier | 2.34% | UWB | D | 2.5 | 99 | 0.01 |
| Humic Nitosols | 1.83% | CLAY\_LOAM | C | 1.2 | 12.6 | 0.17 |
| Pellic Vertisols | 1.39% | CLAY | C | 1.1 | 23.2 | 0.12 |
| Humic Cambisols | 0.09% | LOAM | C | 1.0 | 33.91 | 0.06 |

(\*Note: Hydrologic Soil Group has been divided into four groups (Neitsch et al., 2011): A: (Low runoff potential). The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission. B: The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well-drained to well-drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission. C: The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission. D: (High runoff potential). The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.)

****

**Fig. S3 The channels and streams in the upper Lancang-Mekong River basin**

**Reference**

Neitsch S L, Arnold J G, Kiniry J R, et al. Soil and water assessment tool theoretical documentation version 2009[R]. Texas Water Resources Institute, 2011.