# INVENTORY OF SOIL RESOURCES OF THRISSUR DISTRICT, KERALA STATE USING REMOTE SENSING TECHNIQUES

## ABSTRACT

| 1. | **Survey Area** | Thrissur District, Kerala State, India |
|----|----|----|
| 2. | **Geographical Extent** | 76° 09' 51" and 76° 54' 15" East Longitudes<br>10° 10' 19" and 10° 46' 55" North Latitudes |
| 3. | **Agro-climatic Region** | Agro-climatic Zone-XII<br>(West Coast Plains & Ghat Region) |
| 4. | **Total Geographical Area** | 3,03,536 ha. |
| 5. | **Type of Survey** | Soil Resource Mapping (SRM) using Remote Sensing Techniques |
| 6. | **Base Maps** | (i) Survey of India Toposheets (scale 1:50,000)<br>58C05, 58C06, 58C07, 58C09, 58C10, 58C11, 58C13, 58C14, 58C15<br>(ii) Geology Map (scale 1:2,50,000) of Geological Survey of India<br>(iii) Satellite Imagery (scale 1:50,000) of LISS-III (IRS-1D) |
| 7. | **Scale of Mapping** | 1:50,000 |
| 8. | **Period of Survey** | December 2013 to January 2014 |

## 9. Mapping unit wise soil association and their extent:

| Sl.No | Mapping Unit | Series Association | Area (ha) | % area |
|-------|--------------|--------------------|-----------|--------|
| 1 | ALw2a1 | Erva-Vaga | 24813 | 8.17 |
| 2 | CAl2b1 | Talikkulam-Vadanappalli | 27992 | 9.22 |
| 3 | GNn6b1 | Chiktal-Vellanikara | 20652 | 6.80 |
| 4 | GNn6c1 | Pukayallpara-Chelakod | 19361 | 6.38 |
| 5 | GNn8b1 | Pettikuzhi-Thozhupadam | 3612 | 1.19 |
| 6 | GNn8c1 | Kannankuzhi-Kumaranellur | 70172 | 23.12 |
| 7 | GNp3b1 | Kombazha-Kannara | 6850 | 2.26 |
| 8 | GNp3c1 | Kallakuzhi-Karikadavu | 1541 | 0.51 |
| 9 | GNu4b1 | Mullurkara-Ponganamkadu | 9159 | 3.02 |
| 10 | GNu4c1 | Kanjirapalli-Pattikad | 1431 | 0.47 |
| 11 | GNv3b1 | Volur-Mannampetta | 45905 | 15.12 |
| 12 | GNw2a1 | Vennur-Chemmanthitta | 14155 | 4.66 |
| 13 | GNw2b1 | Mundthikode-Vennur | 7106 | 2.34 |
| 14 | LAn6b1 | Marahkod-Viranjira-Marankodu | 4367 | 1.44 |
| 15 | LAp3a1 | Velappaya-Chittanda | 8457 | 2.79 |
| 16 | LAu4b1 | Chelakkara-Velangallur-Vallachira | 20832 | 6.86 |
| 17 | e | ROC | 545 | 0.18 |
| 18 | f | Habitations | 9310 | 3.07 |
| 19 | g | Water bodies | 7276 | 2.40 |
|  | **Total** |  | **303536** | **100.00** |

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**10. Distribution of area under different Landscape/Geology classes:**

| S.No | Geology | Area(ha) | Area% |
|---|---|---|---|
| 1 | Alluvium | 24813 | 8.17 |
| 2 | Coastal Alluvium | 27992 | 9.22 |
| 3 | Gneiss | 199944 | 65.87 |
| 4 | Laterite | 33656 | 11.08 |
| 5 | Rock Out Crops (e) | 545 | 0.18 |
| 6 | Habitations (f) | 9310 | 3.07 |
| 7 | Water bodies (g) | 7276 | 2.40 |
| | **Total** | **303536** | **100.00** |

**11. Distribution of area under different Physiography classes:**

| S.No. | Physiography | Area(ha) | Area% |
|---|---|---|---|
| 1 | Undifferentiated hills side slope | 118164 | 38.93 |
| 2 | Pediments | 31422 | 10.35 |
| 3 | Narrow hill valleys | 16848 | 5.55 |
| 4 | Upper pediplains | 45905 | 15.12 |
| 5 | Lower pediplains | 21261 | 7.00 |
| 6 | Wet land | 24813 | 8.17 |
| 7 | Coastal Alluvial Plains | 27992 | 9.22 |
| 8 | Rock Out Crop (e) | 545 | 0.18 |
| 9 | Habitation (f) | 9310 | 3.07 |
| 10 | Water bodies (g) | 7276 | 2.40 |
| | **Total** | **303536** | **100.00** |

**12. Distribution of area under different Slope classes:**

| S.No. | Slope Classes | Area(ha) | Area% |
|---|---|---|---|
| 1 | Nearly level to very gently (0-3% ) | 74066 | 24.40 |
| 2 | Very gently to gently (1-5% ) | 62753 | 20.67 |
| 3 | Gently to moderately (3-10%) | 31422 | 10.35 |
| 4 | Strongly to moderately steep (10-25%) | 44380 | 14.62 |
| 5 | Steep to very steep (25-50%) | 73784 | 24.30 |
| 6 | Rock Out Crop (e) | 545 | 0.18 |
| 7 | Habitation (f) | 9310 | 3.07 |
| 8 | Water bodies (g) | 7276 | 2.40 |
| | **Total** | **303536** | **100.00** |

**13. Distribution of area under different Depth classes:**

| S.No | Depth | Area(ha) | Area% |
|------|-------|----------|-------|
| 1 | Deep | 4367 | 4.45 |
| 2 | Deep to very deep | 169041 | 59.48 |
| 3 | Very deep | 112997 | 30.42 |
| 4 | Rock Out Crop (e) | 545 | 0.18 |
| 5 | Habitation (f) | 9310 | 3.07 |
| 6 | Water bodies (g) | 7276 | 2.40 |
| | **Grand Total** | **303536** | **100.00** |

**14. Distribution of area under different Erosion classes:**

| S.No | Erosion | Area(ha) | Area% |
|------|---------|----------|-------|
| 1 | None to slight water erosion (e1) | 31919 | 10.52 |
| 2 | Slight to Moderate erosion (e1-e2) | 115490 | 38.05 |
| 3 | Moderate water erosion (e3) | 20832 | 6.86 |
| 4 | Moderate to Severe erosion (e3-e4) | 118164 | 38.92 |
| 5 | Rock Out Crop (e) | 545 | 0.18 |
| 6 | Habitation (f) | 9310 | 3.07 |
| 7 | Water bodies (g) | 7276 | 2.40 |
| | **Total** | **303536** | **100.00** |

**15. Distribution of area under different Management classes:**

| S.No | Management | Area(ha) | Area% |
|------|-----------|----------|-------|
| 1 | Poorly managed (M2) | 70172 | 23.12 |
| 2 | Poorly managed to Moderately managed (M2-M3) | 47992 | 15.81 |
| 3 | Moderately managed (M3) | 52755 | 17.38 |
| 4 | Moderately managed to Well managed (M3-M4) | 76518 | 25.21 |
| 5 | Well managed (M4) | 38968 | 12.83 |
| 6 | Rock Out Crop (e) | 545 | 0.18 |
| 7 | Habitation (f) | 9310 | 3.07 |
| 8 | Water bodies (g) | 7276 | 2.40 |
| | **Total** | **303536** | **100.00** |

**16. Distribution of mapping units under different Land Capability Classes**

| S. No. | Land Capability Class | Mapping Units | Area (ha) | Area (%) |
|---|---|---|---|---|
| 1 | II | GNw2b1 | 7106 | 2.34 |
| 2 | III | GNu4b1, LAu4b1 | 29991 | 9.88 |
| 3 | II-III | GNp3b1, GNv3b1, GNw2a1, LAp3a1 | 75367 | 24.82 |
| 4 | III-IV | ALw2a1, CAl2b1 | 52805 | 17.4 |
| 5 | IV | GNn6b1, LAn6b1 | 25019 | 8.24 |
| 6 | VI-VII | GNn8b1 | 3612 | 1.19 |
| 7 | Forest | GNn6c1, GNn8c1, GNp3c1, GNu4c1 | 92505 | 30.48 |
| 8 | Rock Out Crop (e) | | 545 | 0.18 |
| 9 | Habitation (f) | | 9310 | 3.07 |
| 10 | Water bodies (g) | | 7276 | 2.40 |
| | **Grand Total** | | **303536** | **100.00** |

**17. Distribution of mapping units under different Soil Irrigability classes:**

| S. No. | Soil Irrigability Class | Mapping Units | Area (ha) | Area (%) |
|---|---|---|---|---|
| 1 | B | GNv3b1, GNw2b1 | 53011 | 17.46 |
| 2 | B-C | GNn8b1, GNp3b1, GNu4b1, GNw2a1, LAp3a1, LAu4b1 | 63065 | 20.77 |
| 3 | C | CAl2b1, GNn6b1, LAn6b1 | 53011 | 17.45 |
| 4 | D | ALw2a1 | 24813 | 8.17 |
| 5 | Forest | GNn6c1, GNn8c1, GNp3c1, GNu4c1 | 92505 | 30.5 |
| 6 | Rock Out Crop (e) | | 545 | 0.18 |
| 7 | Habitation (f) | | 9310 | 3.07 |
| 8 | Water bodies (g) | | 7276 | 2.40 |
| | **Grand Total** | | **303536** | **100.00** |

**18. Distribution of mapping units under different Land Irrigability classes:**

| S. No. | Land Irrigability Class | Mapping Units | Area (ha) | Area (%) |
|---|---|---|---|---|
| 1 | 2 | GNw2a1, GNw2b1 | 21261 | 7.00 |
| 2 | 2-3 | GNp3b1, GNv3b1, LAp3a1 | 61212 | 20.16 |
| 3 | 3 | CAl2b1 | 27992 | 9.22 |
| 4 | 4 | ALw2a1, GNn6b1, GNu4b1, LAn6b1, LAu4b1 | 79823 | 26.3 |
| 5 | 6 | GNn8b1 | 3612 | 1.19 |
| 6 | Forest | GNn6c1, GNn8c1, GNp3c1, GNu4c1 | 92505 | 30.48 |
| 7 | Rock Out Crop (e) | | 545 | 0.18 |
| 8 | Habitation (f) | | 9310 | 3.07 |
| 9 | Water bodies (g) | | 7276 | 2.40 |
| | **Grand Total** | | **303536** | **100.00** |

**SALIENT FEATURES:**

❖ The interpretative grouping on land capability class (LCC) falls under eight classes. LCC class II-III dominated accounting to 24.82 per cent of the area followed by class III-IV accounting 17.4 per cent. Forest accounts 30.48 per cent of the surveyed area.

❖ Nearly 20.77 per cent comes under Soil Irrigability class B-C followed by class B and C which accounts for 17.46 per cent and class D accounting 8.17 per cent of the total area.

❖ As per the Land Irrigability Class, Majority of the area i.e 26.3 per cent comes under Land Irrigability class 4 followed by class 2-3comprising an area of 20.16 per cent and class 3 accounting 9.22 per cent of the total area.

❖ Sixteen mapping units have been established in the survey area, of which, GNn8c1 unit occupies maximum area of 23.12 per cent followed by GNv3b1 unit (15.12%).

❖ Most of the area in Thrissur district comes under Gneiss (65.87 %) followed by Laterite (11.08 %).

❖ The physiography of Thrissur district is dominated by Undifferentiated Hill side slopes (38.93%) followed by Upper pediplains (15.12 %) while Coastal Alluvial plains  and Wet land constitutes 9.22 and 8.17% respectively of surveyed area.

❖ An area of 73784 ha (24.30%) of Thrissur district comes under Steep to very steep slopes and by Strongly to moderately steep (14.62%) while an area of 74066 ha (24.40%) comes under nearly level to very gentle slope and Very gently to gently slope occupied 62753 ha (20.67%) .

❖ Most of the soils of the area are coming under deep to very deep (59.48%) category followed by very deep soils (30.42%).

❖ Major area comes under Moderate to Severe erosion (38.92%) and Slight to Moderate erosion (38.05%) and Moderate water erosion occupies only 6.86 per cent of the total area.

❖ Majority of the area is Moderately managed to Well managed (25.21%) followed by Poorly managed (23.12%) soils of Thrissur district

# HOW TO USE SOIL RESOURCE MAPPING REPORT

This report embodies the results of the Soil Resource Mapping of Thrissur district of Kerala, State and furnishes information on the geographical setting of the state vis-à-vis location, extent, physiography, relief, drainage, climate, geology, natural vegetation, agriculture, land use and soils.

The report contains information on nature and kind of soil resources with its extent on landscape and interpretative grouping of soils and land resources which includes land capability classification that helps to prepare scientific land use plan for agriculture, horticulture, forestry, grassland development and providing suggestive management guidelines for crop suitability and crop recommendations. The soils of the area have also been differentiated as per soil characteristics based on Soil Taxonomy (USDA) to enable the users for scientific land use planning.

Thrissur District which spreads over an area of **3,03,536 ha** have its district headquarters at Thrissur. There are five taluks in the district viz Chavakkad, Kodungallur, Mukundapuram, Thalappilli and Thrissur. Survey of India Toposheets on 1:50,000 scale and the same have been used as reference maps for the survey. Satellite data (NRSC Imagery) has been used for image interpretation and soil mapping. In the report each soil mapping unit is marked by a symbol which represent the five levels of generalization as features within mapping units *viz.*

| Geology (parent material) | GN | - | Gneiss |
|---|---|---|---|
| Physiography | w | - | Lower pediplains |
| Slope | 2 | - | 0-3 % Slope |
| Land use | a | - | Agriculture |
| Soils | 1 | - | Association of soil series |

Each soil association is restricted to a maximum of three soil series found within concerned soil mapping unit.

For the use of the soil resource report, first user needs to locate the area of interest on the map and note down the soil mapping units. Permanent features such as road, stream, lakes and village habitation etc. shown on the map will help user to locate the area of interest on the map. For the detailed information on soil mapping unit in respect of soil series in the area of interest, its extent, present and proposed land uses reference may be made to chapter 4, 5 and Appendix-I and II.

Any comments and/or suggestions on the report are welcome. For any additional information and clarification, further correspondence or personal contact may be established with:

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