# Papagni River Basin : GIS Database

Foundation for Ecological Security (FES)

Anand

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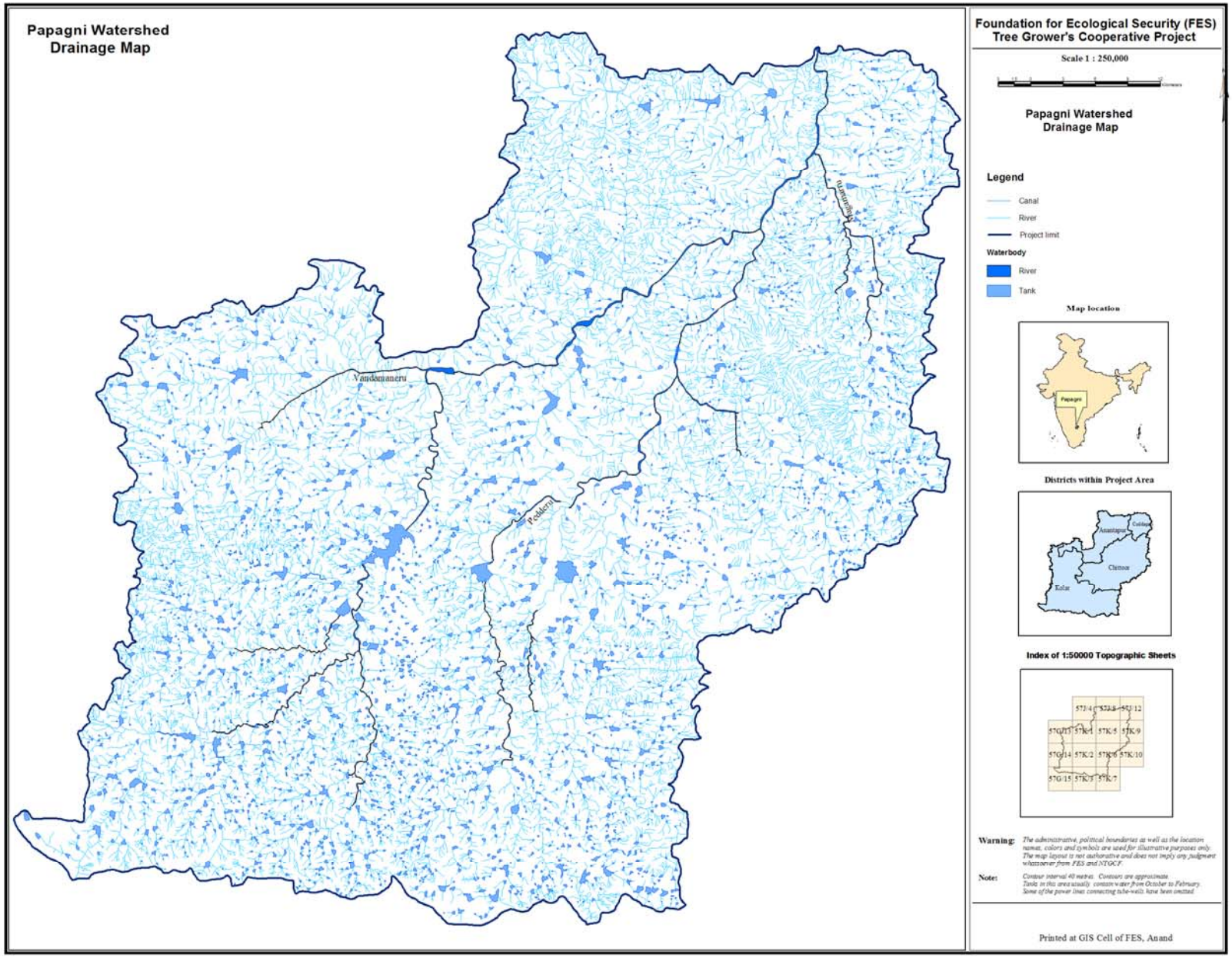

# Papagni Uplands Project
## Physical Map (Digital Terrain Model)

Tree Growers' Cooperative Project (TGCP)
A project supported by CIDA

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Map location

Index: Project States

Scale 1 : 200,000

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*Contour interval 20 meters. Contours are approximate. Tanks in this area usually contain water from October to February.*

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**Legend**

- Village
- Towns
- Reserve Forest
- Waterbody
- Taluk boundary
- Stream

**Elevation (Meters)**

- 275 - 465
- 466 - 545
- 546 - 620
- 621 - 680
- 681 - 740
- 741 - 795
- 796 - 850
- 851 - 925
- 926 - 1,030
- 1,031 - 1,370

Index: Papagni Watershed

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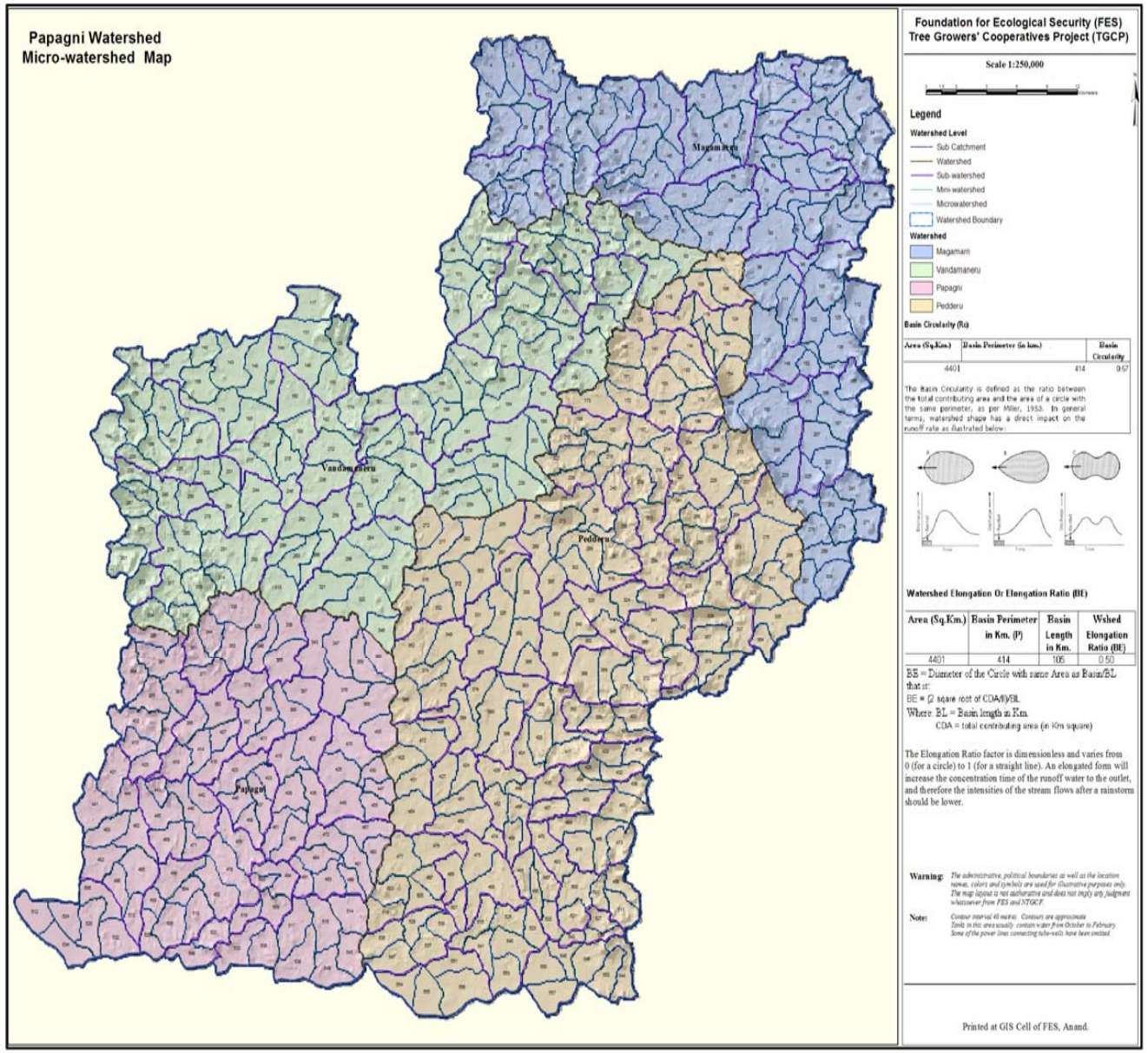


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**Tree Growers' Cooperatives Project (TGCP)**

Scale 1:250,000

**Legend**

**Watershed Level**

- Sub Catchment
- Watershed
- Sub-watershed
- Mini-watershed
- Microwatershed
- Watershed Boundary

**Watershed**

- Magamari
- Vandamaneru
- Papagni
- Pedderu

**Basin Circularity (Rc)**

| Area (Sq.Km.) | Basin Perimeter (in km.) | Basin Circularity |
|---|---|---|
| 4401 | 414 | 0.67 |

The Basin Circularity is defined as the ratio between the total contributing area and the area of a circle with the same perimeter, as per Miller, 1953. In general terms, watershed shape has a direct impact on the runoff rate as illustrated below:



**Watershed Elongation Or Elongation Ratio (BE)**

| Area (Sq.Km.) | Basin Perimeter in Km. (P) | Basin Length in Km. | Wshed Elongation Ratio (BE) |
|---|---|---|---|
| 4401 | 414 | 105 | 0.50 |

BE = Diameter of the Circle with same Area as Basin/BL that is:
BE = (2 sqare root of CDA/Π)/BL
Where: BL = Basin length in Km.
CDA = total contributing area (in Km square)

The Elongation Ratio factor is dimensionless and varies from 0 (for a circle) to 1 (for a straight line). An elongated form will increase the concentration time of the runoff water to the outlet, and therefore the intensities of the stream flows after a rainstorm should be lower.

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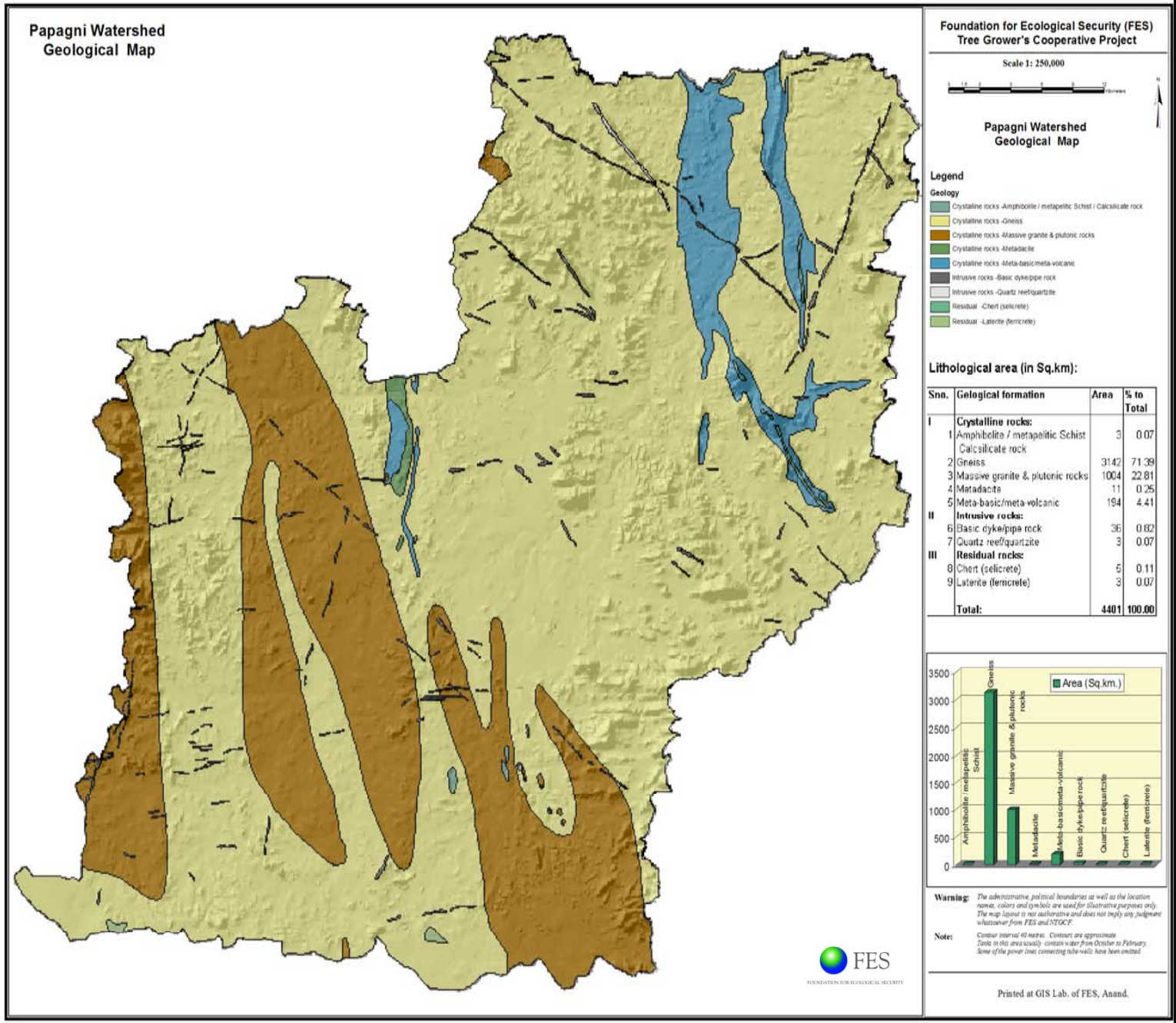
Papagni Watershed
Geological Map
Foundation for Ecological Security (FES)
Tree Grower's Cooperative Project
Scale 1: 250,000
Papagni Watershed
Geological Map
Legend
Geology
Crystalline rocks -Amphibolite / metapelitic Schist / Calcsilicate rock
Crystalline rocks -Gneiss
Crystalline rocks -Massive granite & plutonic rocks
Crystalline rocks -Metadacite
Crystalline rocks -Meta-basic/meta-volcanic
Intrusive rocks -Basic dyke/pipe rock
Intrusive rocks -Quartz reef/quartzite
Residual -Chert (silicrete)
Residual -Laterite (ferricrete)
Lithological area (in Sq.km):
Sno. Gelogical formation Area % to Total
I Crystalline rocks:
1 Amphibolite / metapelitic Schist Calcsilicate rock 3 0.07
2 Gneiss 3142 71.39
3 Massive granite & plutonic rocks 1004 22.81
4 Metadacite 11 0.25
5 Meta-basic/meta-volcanic 194 4.41
II Intrusive rocks:
6 Basic dyke/pipe rock 36 0.82
7 Quartz reef/quartzite 3 0.07
III Residual rocks:
8 Chert (silicrete) 5 0.11
9 Laterite (ferricrete) 3 0.07
Total: 4401 100.00
Area (Sq.km.)
3500
3000
2500
2000
1500
1000
500
0
Amphibolite / metapelitic Schist
Gneiss
Massive granite & plutonic rocks
Metadacite
Meta-basic/meta-volcanic
Basic dyke/pipe rock
Quartz reef/quartzite
Chert (silicrete)
Laterite (ferricrete)
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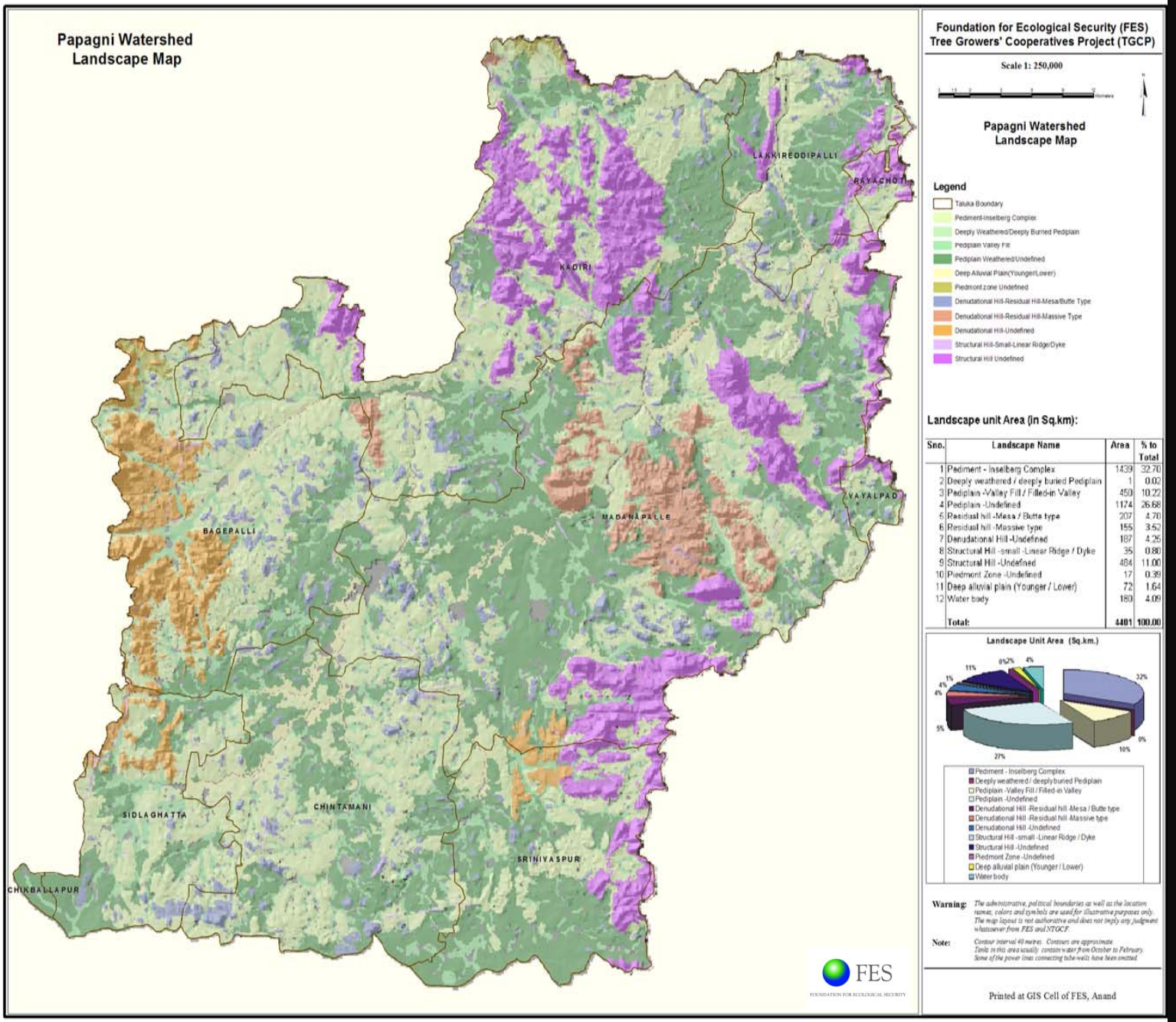


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Scale 1: 250,000

**Papagni Watershed Landscape Map**

**Legend**

- Taluka Boundary
- Pediment-Inselberg Complex
- Deeply Weathered/Deeply Buried Pediplain
- Pediplain Valley Fill
- Pediplain Weathered/Undefined
- Deep Alluvial Plain(Younger/Lower)
- Piedmont zone Undefined
- Denudational Hill-Residual Hill-Mesa/Butte Type
- Denudational Hill-Residual Hill-Massive Type
- Denudational Hill-Undefined
- Structural Hill-Small-Linear Ridge/Dyke
- Structural Hill Undefined

**Landscape unit Area (in Sq.km):**

| Sno. | Landscape Name | Area | % to Total |
|---|---|---|---|
| 1 | Pediment - Inselberg Complex | 1439 | 32.70 |
| 2 | Deeply weathered / deeply buried Pediplain | 1 | 0.02 |
| 3 | Pediplain -Valley Fill / Filled-in Valley | 450 | 10.22 |
| 4 | Pediplain -Undefined | 1174 | 26.68 |
| 5 | Residual hill -Mesa / Butte type | 207 | 4.70 |
| 6 | Residual hill -Massive type | 155 | 3.52 |
| 7 | Denudational Hill -Undefined | 187 | 4.25 |
| 8 | Structural Hill -small -Linear Ridge / Dyke | 35 | 0.80 |
| 9 | Structural Hill -Undefined | 484 | 11.00 |
| 10 | Piedmont Zone -Undefined | 17 | 0.39 |
| 11 | Deep alluvial plain (Younger / Lower) | 72 | 1.64 |
| 12 | Water body | 180 | 4.09 |
| | **Total:** | **4401** | **100.00** |




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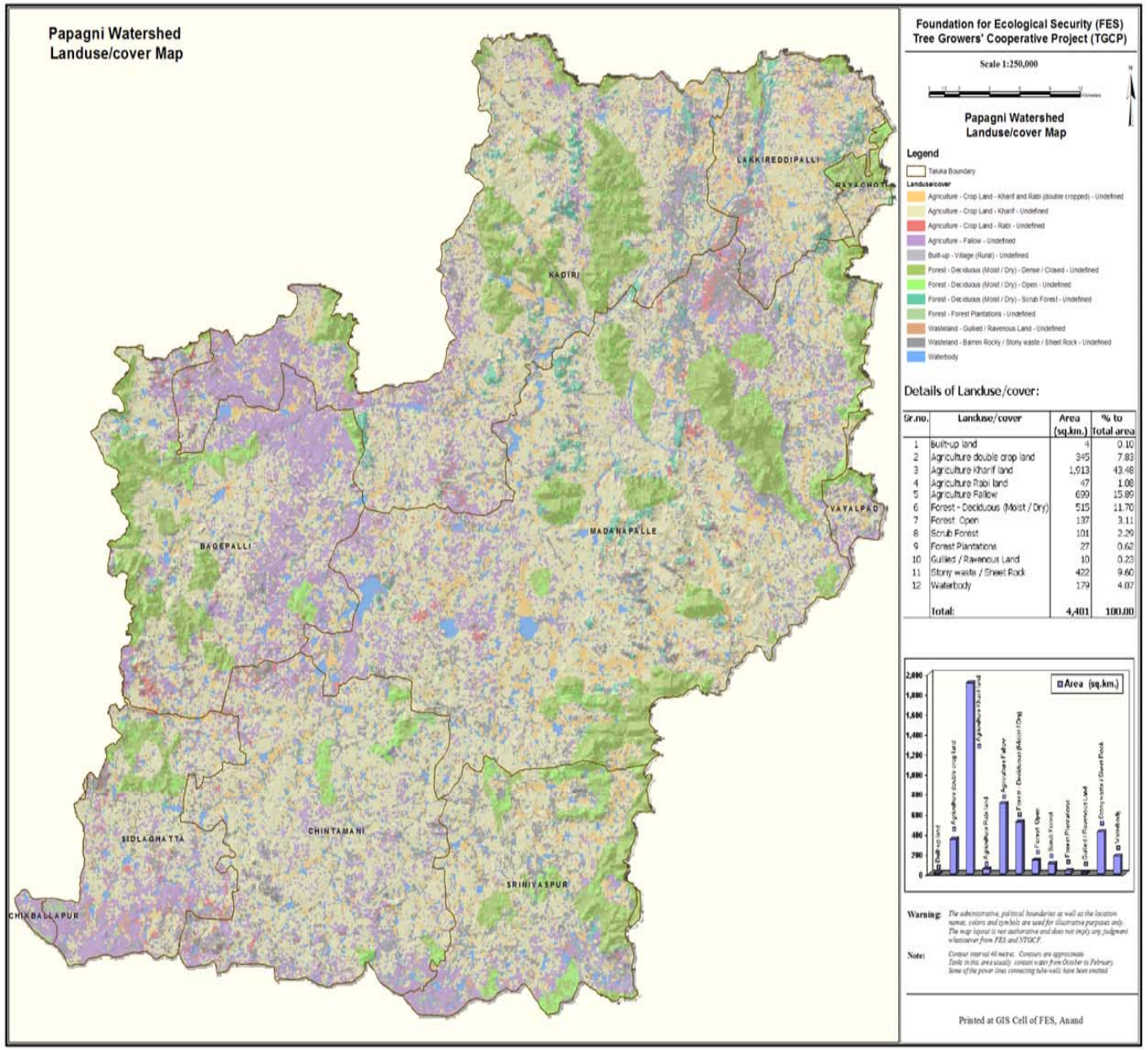


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Scale 1:250,000

**Papagni Watershed**
**Landuse/cover Map**

**Legend**

Taluka Boundary

Landusecover

- Agriculture - Crop Land - Kharif and Rabi (double cropped) - Undefined
- Agriculture - Crop Land - Kharif - Undefined
- Agriculture - Crop Land - Rabi - Undefined
- Agriculture - Fallow - Undefined
- Built-up - Village (Rural) - Undefined
- Forest - Deciduous (Moist / Dry) - Dense / Closed - Undefined
- Forest - Deciduous (Moist / Dry) - Open - Undefined
- Forest - Deciduous (Moist / Dry) - Scrub Forest - Undefined
- Forest - Forest Plantations - Undefined
- Wasteland - Gullied / Ravenous Land - Undefined
- Wasteland - Barren Rocky / Stony waste / Sheet Rock - Undefined
- Waterbody

Details of Landuse/cover:

| Sr.no. | Landuse/cover | Area (sq.km.) | % to Total area |
|---|---|---|---|
| 1 | Built-up land | 4 | 0.10 |
| 2 | Agriculture double crop land | 345 | 7.83 |
| 3 | Agriculture Kharif land | 1,913 | 43.48 |
| 4 | Agriculture Rabi land | 47 | 1.08 |
| 5 | Agriculture Fallow | 699 | 15.89 |
| 6 | Forest - Deciduous (Moist / Dry) | 515 | 11.70 |
| 7 | Forest Open | 137 | 3.11 |
| 8 | Scrub Forest | 101 | 2.29 |
| 9 | Forest Plantations | 27 | 0.62 |
| 10 | Gullied / Ravenous Land | 10 | 0.23 |
| 11 | Stony waste / Sheet Rock | 422 | 9.60 |
| 12 | Waterbody | 179 | 4.07 |
| | Total: | 4,401 | 100.00 |




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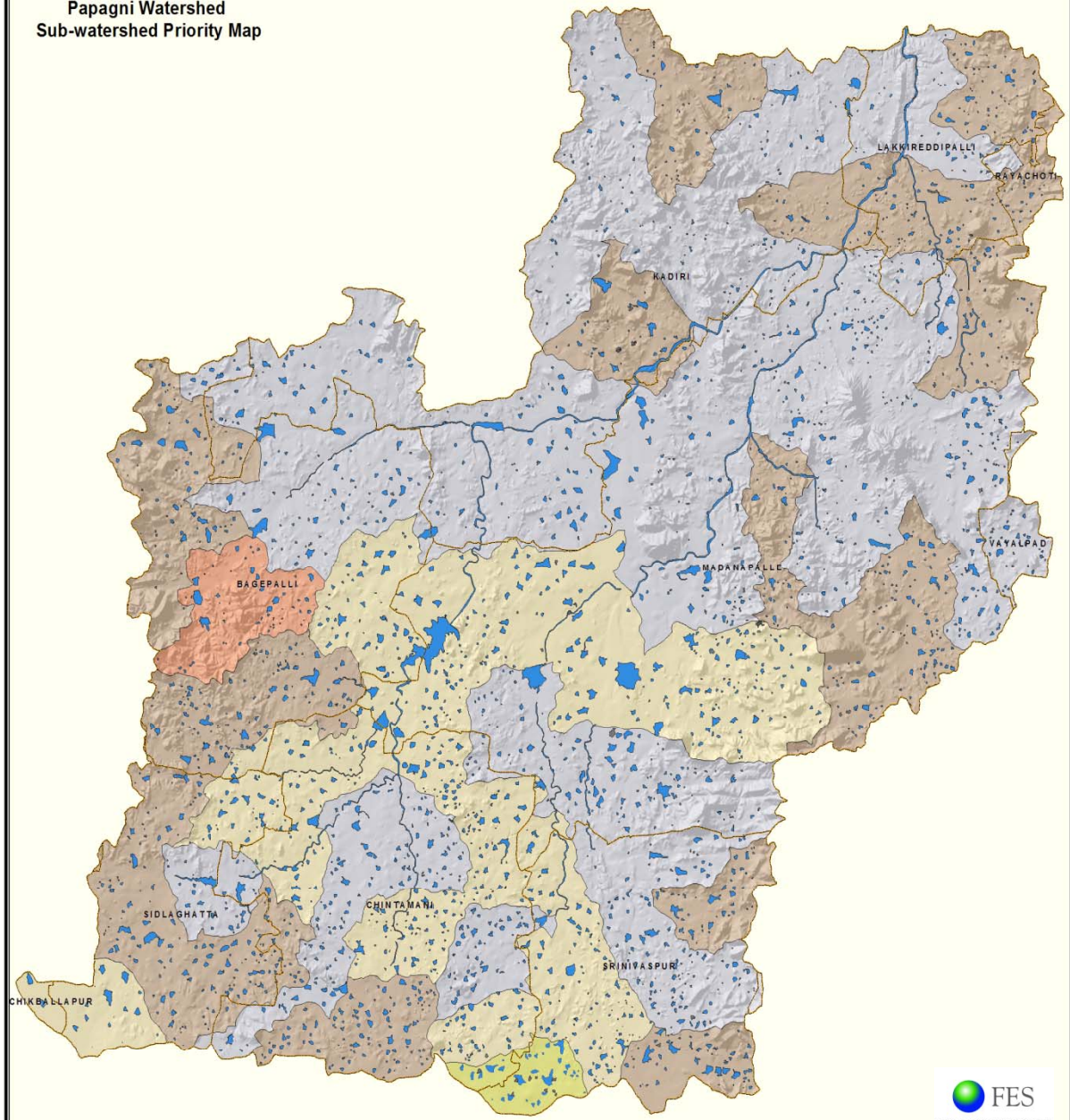
# Papagni Watershed
## Sub-watershed Priority Map

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**Scale 1 : 250,000**

3 1.5 0 3 6 9 12 Kilometers

N

**Legend**

- Taluk boundary

**Priority**

- Very High
- High
- Medium
- Low
- Very low
- Waterbodies
- Built-up

**Map location**


**Districts within Project Area**


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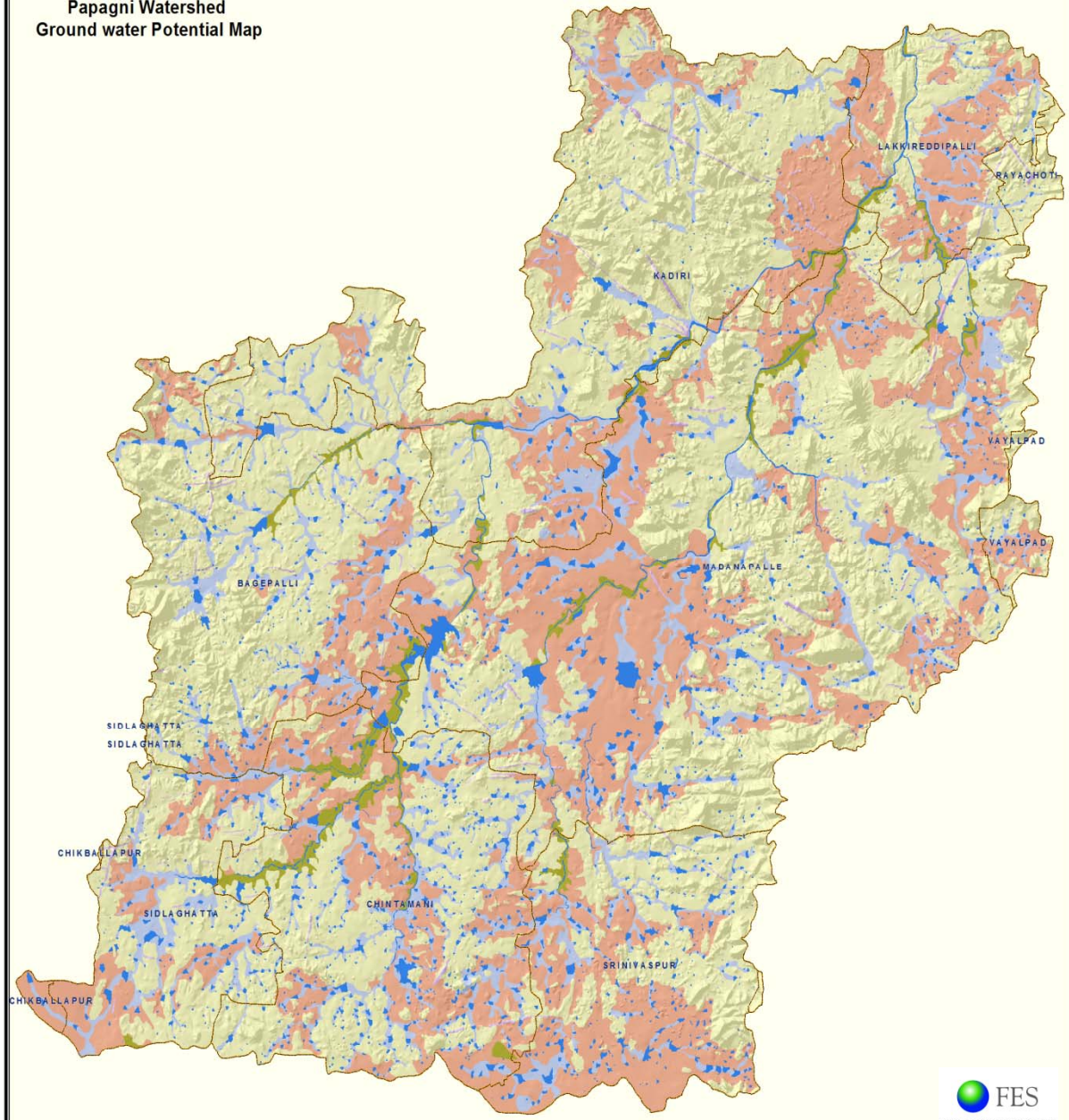
# Papagni Watershed
## Ground water Potential Map

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Scale 1 : 250,000

3 1.5 0 3 6 9 12 Kilometers

N

### Legend

- Taluk boundary

**Grownwater Potential**

- Excellent
- Good
- Moderate to good
- Moderate
- Poor
- Waterbodies

### Grownwater Potential:

| Sr.No. | Grownd water Potential | Area (Sqkm.) | % |
|---|---|---|---|
| 1 | Excellent | 450 | 10 |
| 2 | Good | 75 | 2 |
| 3 | Moderate to good | 36 | 1 |
| 4 | Moderate | 1190 | 27 |
| 5 | Poor | 2471 | 56 |
| 6 | Waterbodies | 180 | 4 |
| | **Total area:** | **4401** | **100** |

**Map location**


**Districts within Project Area**


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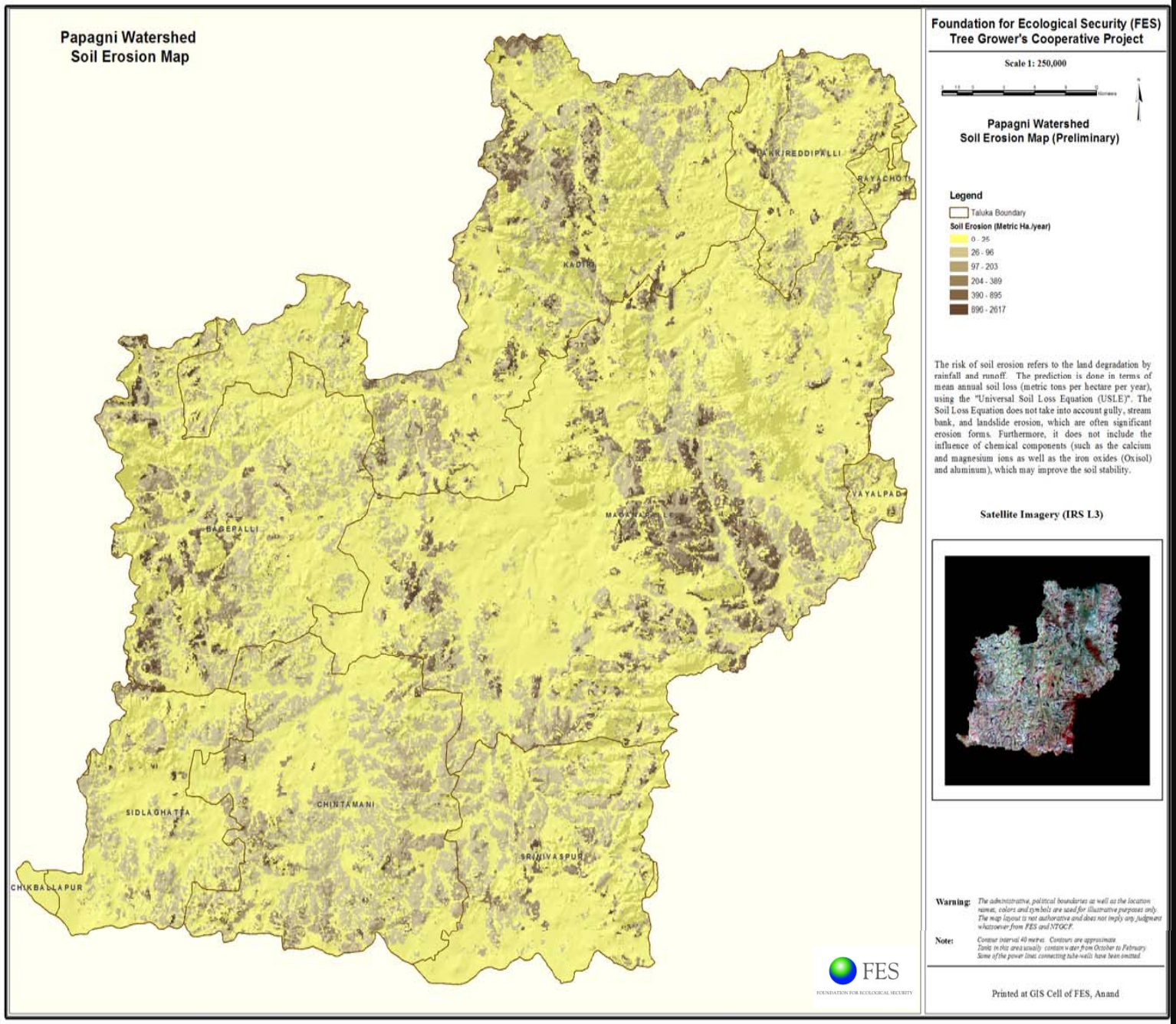


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**Tree Grower's Cooperative Project**

**Scale 1: 250,000**

**Papagni Watershed**
**Soil Erosion Map (Preliminary)**

**Legend**

- Taluka Boundary

**Soil Erosion (Metric Ha./year)**

- 0 - 25
- 26 - 96
- 97 - 203
- 204 - 389
- 390 - 895
- 896 - 2617

The risk of soil erosion refers to the land degradation by rainfall and runoff. The prediction is done in terms of mean annual soil loss (metric tons per hectare per year), using the "Universal Soil Loss Equation (USLE)". The Soil Loss Equation does not take into account gully, stream bank, and landslide erosion, which are often significant erosion forms. Furthermore, it does not include the influence of chemical components (such as the calcium and magnesium ions as well as the iron oxides (Oxisol) and aluminum), which may improve the soil stability.

**Satellite Imagery (IRS L3)**



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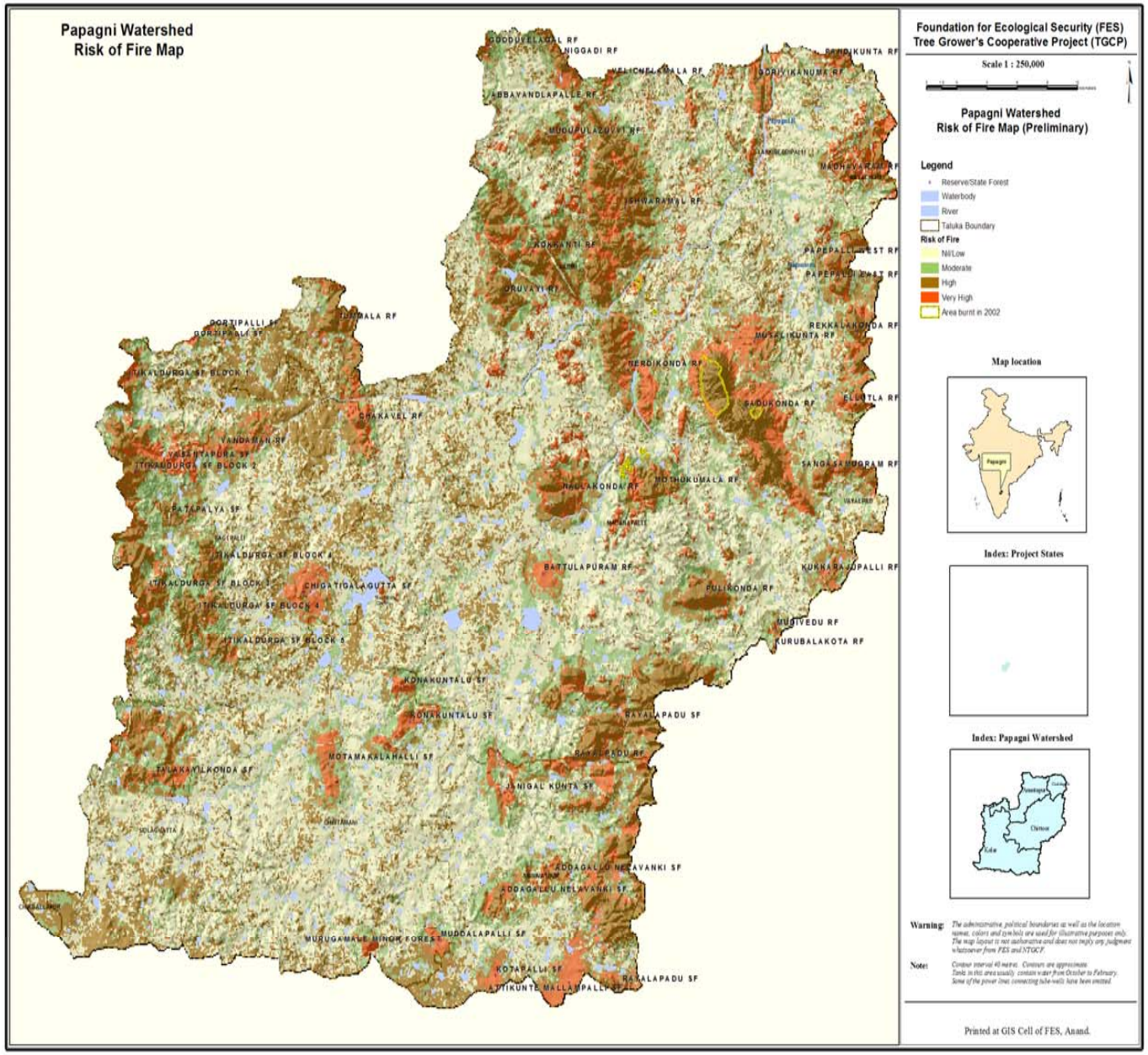
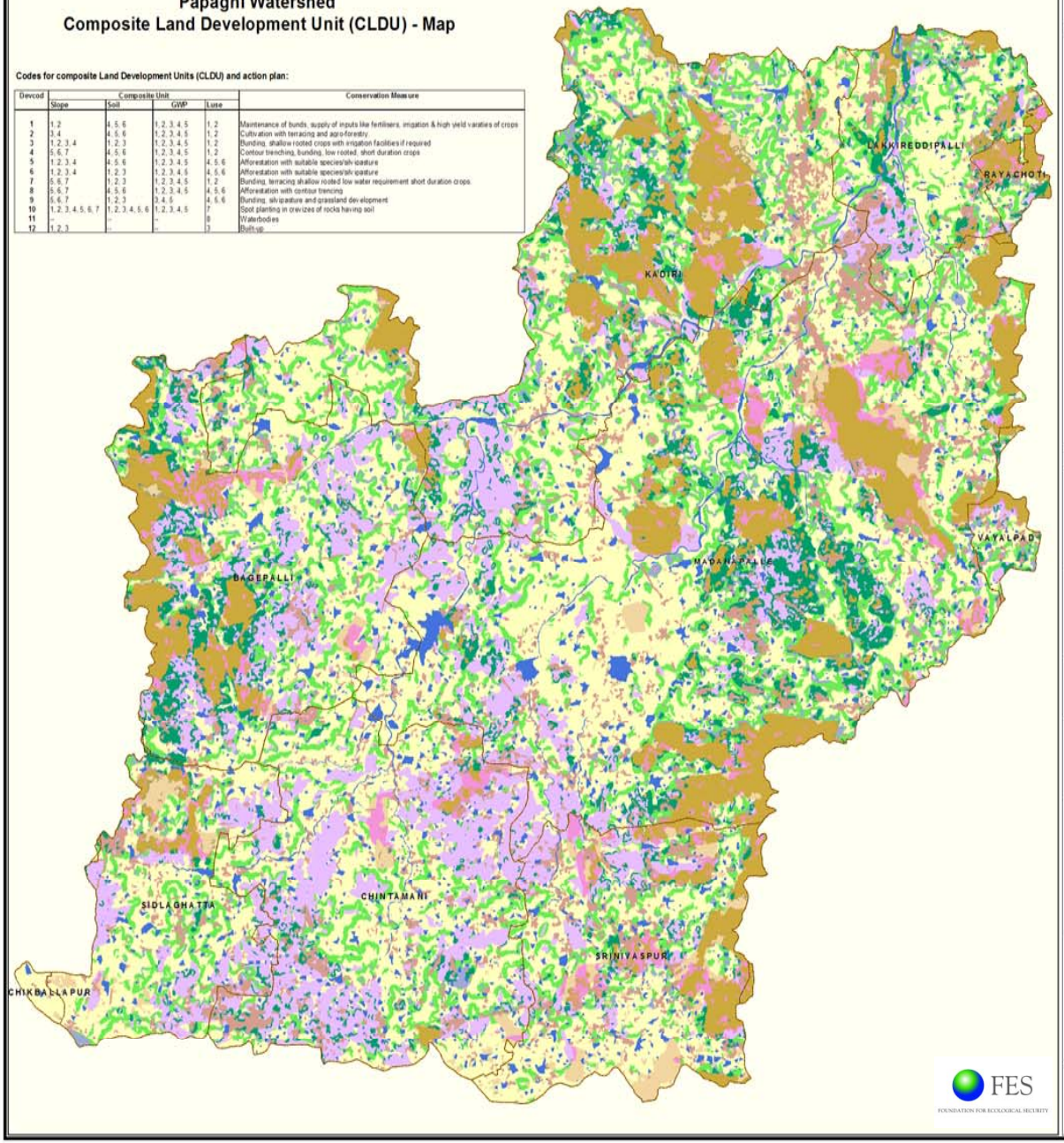


# Papagni Watershed
## Composite Land Development Unit (CLDU) - Map

**Codes for composite Land Development Units (CLDU) and action plan:**

| Devcod | Composite Unit | | | | Conservation Measure |
|---|---|---|---|---|---|
| | Slope | Soil | GWP | Luse | |
| 1 | 1,2 | 4, 5, 6 | 1, 2, 3, 4, 5 | 1, 2 | Maintenance of bunds, supply of inputs like fertilisers, irrigation & high yield varaties of crops |
| 2 | 3, 4 | 4, 5, 6 | 1, 2, 3, 4, 5 | 1, 2 | Cultivation with terracing and agro-forestry |
| 3 | 1, 2, 3, 4 | 1, 2, 3 | 1, 2, 3, 4, 5 | 1, 2 | Bunding, shallow rooted crops with irrigation facilities if required |
| 4 | 5, 6, 7 | 4, 5, 6 | 1, 2, 3, 4, 5 | 1, 2 | Contour trenching, bunding, low rooted, short duration crops |
| 5 | 1, 2, 3, 4 | 4, 5, 6 | 1, 2, 3, 4, 5 | 4, 5, 6 | Afforestation with suitable species/silvipasture |
| 6 | 1, 2, 3, 4 | 1, 2, 3 | 1, 2, 3, 4, 5 | 4, 5, 6 | Afforestation with suitable species/silvipasture |
| 7 | 5, 6, 7 | 1, 2, 3 | 1, 2, 3, 4, 5 | 1, 2 | Bunding, terracing shallow rooted low water requirement short duration crops. |
| 8 | 5, 6, 7 | 4, 5, 6 | 1, 2, 3, 4, 5 | 4, 5, 6 | Afforestation with contour trencing |
| 9 | 5, 6, 7 | 1, 2, 3 | 3, 4, 5 | 4, 5, 6 | Bunding, silvipasture and grassland development |
| 10 | 1, 2, 3, 4, 5, 6, 7 | 1, 2, 3, 4, 5, 6 | 1, 2, 3, 4, 5 | 7 | Spot planting in crevizes of rocks having soil |
| 11 | .. | .. | .. | 8 | Waterbodies |
| 12 | 1, 2, 3 | .. | .. | 3 | Built-up |

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Scale 1 : 250,000

Legend

Taluk boundary

CLDU (DEVCOD)

1 2 3 4 5 6 7 8 9 10 11 12

| DEVCOD | Area (Sqkm.) | % |
|---|---|---|
| 1 | 1455 | 33 |
| 2 | 633 | 14 |
| 3 | 600 | 14 |
| 4 | 105 | 2 |
| 5 | 130 | 3 |
| 6 | 109 | 2 |
| 7 | 304 | 7 |
| 8 | 21 | 0 |
| 9 | 509 | 12 |
| 10 | 352 | 8 |
| 11 | 179 | 4 |
| 12 | 2 | 0 |
| Total Area: | 4400 | 100 |

**Composite Land Development Unit (CLDU) unit codes:**

| Sr.No. | Code | Description | Assigned Code |
|---|---|---|---|
| **Slope:** | | **Percent slope** | |
| 1 | 1 | 0 - 1 | 1 |
| 2 | 2 | 1 - 3 | 2 |
| 3 | 3 | 3 - 5 | 3 |
| 4 | 4 | 5 - 10 | 4 |
| 5 | 5 | 10 - 25 | 5 |
| 6 | 6 | 25 - 50 | 6 |
| 7 | 7 | > 50 | 7 |
| **Soil Depth:** | | | |
| 1 | ES | Extremely shallow | 1 |
| 2 | VS | Very shallow | 2 |
| 3 | SH | Shallow | 3 |
| 4 | MD | Moderately deep | 4 |
| 5 | DP | Deep | 5 |
| 6 | VD | Very deep | 6 |
| **Soil Texture:** | | | |
| 1 | MF | Moderately fine | 1 |
| 2 | MM | Medium | 2 |
| 3 | MC | Moderately coarse | 3 |
| **Ground water Potential:** | | | |
| 1 | 1 | Excellent | 1 |
| 2 | 2 | Good | 2 |
| 3 | 3 | Moderately good | 3 |
| 4 | 4 | Moderate | 4 |
| 5 | 5 | Poor | 5 |
| **Landuse Classificaiton:** | | | |
| 1 | AC_CD | Agriculture double crop area | 1 |
| 2 | AC_KX | Agriculture kharif crop area | 1 |
| 3 | AC_RX | Agriculture Rabi crop area | 1 |
| 4 | AF_XX | Agriculture Fallow land | 2 |
| 5 | BT_VX | Built up land | 3 |
| 6 | FD_DX | Deciduous dry forest dense | 4 |
| 7 | FD_OX | Deciduous dry forest open | 4 |
| 8 | FD_SX | Deciduous dry forest scrub | 4 |
| 9 | FP_XX | Forest plantations | 5 |
| 10 | TG_XX | Wasteland gulied or revenous | 6 |
| 11 | TR_XX | Wasteland barren, rocky, sheet rock etc | 7 |
| 12 | WT_XX | Waterbody | 8 |

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# Status of water level of wells of Kalicherla Micro-watershed , AP Project for the period 2004 - 06