



हर कदम, हर डगर  
किसानों का हमसफर  
भारतीय कृषि अनुसंधान परिषद

*Agrisearch with a human touch*

# Land Resource and Hydrological Inventory of Shettigeri Sub-watershed for Watershed Planning and Development Yadgir Taluk, Yadgir District, Karnataka (AESR 6.2)

Sujala – III  
Karnataka Watershed Development Project- II  
Funded by World Bank



ICAR - NBSS & LUP



THE WORLD BANK



ICAR - National Bureau of Soil Survey and Land Use Planning, Bangalore  
Watershed Development Department, Govt. of Karnataka, Bangalore



# About ICAR - NBSS&LUP

The National Bureau of Soil Survey and Land Use Planning (ICAR-NBSS&LUP), Nagpur, a premier Institute of the Indian Council of Agricultural Research (ICAR), was set up during 1976 with the objective to prepare soil resource maps at national, state and district levels and to provide research inputs in soil resource mapping and its applications, land evaluation, land use planning, land resource management, and database management using GIS for optimizing land use on different kinds of soils in the country.

The Bureau has been engaged in carrying out soil resource survey, agro-ecological and soil degradation mapping at the country, state and district levels for qualitative assessment and monitoring the soil health towards viable land use planning. The research activities have resulted in identifying the soil potentials and problems, and the various applications of the soil surveys with the ultimate objective of sustainable agricultural development. The Bureau has the mandate to correlate and classify soils of the country and maintain a National Register of all the established soil series. The Institute is also imparting in-service training to staff of the soil survey agencies in the area of soil survey, land evaluation and soil survey interpretations for land use planning. The Bureau in collaboration with Panjabrao Krishi Vidyapeeth, Akola is running post-graduate teaching and research programme in land resource management, leading to M.Sc. and Ph.D. degrees.

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# **PART - A**

## **Land Resource Inventory of Shettigeri Sub-watershed for Watershed Planning and Development Yadgir Taluk, Yadgir District, Karnataka (AESR 6.2)**



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## How to read and use the Atlas

The Land Resource Inventory of Shettigeri Sub-watershed (Yadgir Taluk, Yadgir District) for Watershed Planning (AESR 6.2) was undertaken to provide comprehensive site-specific cadastral level information useful for farm level planning and integrated development of the area under Sujala – III, Karnataka Watershed Development Project- II.

This atlas contains the basic information on kinds of soils, their geographic distribution, characteristics and classification. The soil map and soil based thematic maps derived from soils data on soil depth, soil gravelliness, slope, land suitability for various crops and land use management maps are presented on 1:12,500 scale. The maps of fertility status (soil reaction, organic carbon, available phosphorus, available potassium, available sulphur, available calcium, available copper, available manganese, available zinc, available iron, available boron and salinity (EC) on 1:12,500 scale were derived from grid point sampling of the surface soils from the watersheds.

The atlas illustrates maps and tables that depict the soil resources of the watershed and the need for their sustainable management.

The user, depending on his/her requirement, can refer this atlas first by identifying his/her field and survey number on the village soil map and by referring the soil legend which is provided in tabular form after the soil map for details pertaining to his/her area of interest.

The atlas explains in simple terms the different kinds of soils present in the watershed, their potentials and problems through a series of thematic maps that help to develop site-specific plans as well as the need to conserve and manage this increasingly threatened natural resource through sustainable land use management. The Land Resource Atlas contains database collected at land parcel/ survey number level on soils, climate, water, vegetation, crops and cropping patterns, socio-economic conditions, marketing facilities *etc.* helps in identifying soil and water conservation measures required, suitability for crops and other uses and finally for preparing a viable and sustainable land use options for each and every land parcel.

For easy map reading and understanding the information contain in different maps, the physical, cultural and scientific symbols used in the maps are illustrated in the form of colors, graphics and tables.

# Physical, Cultural and Scientific symbols used in the Atlas

Each map in the atlas sheet is complemented with the physical, cultural and scientific symbols to facilitate easy map reading.

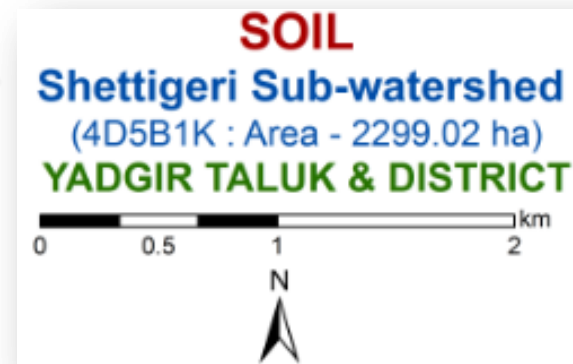
## Inset map

Inset provided in each map conveys its strategic location i.e. Taluk, Sub-watershed and Sub-watershed.



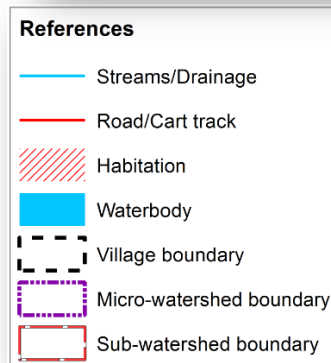
## Map title

Map title conveys the relevance of thematic information presented along with a graphical scale, geographical location and watershed details in text form.



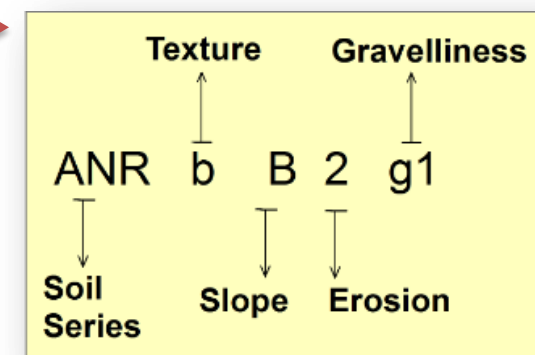
## Legends and symbols

Two legends accompany each map, a map reference, which depicts geographic features and a thematic legend which portrays spatial information. Picking up the symbol and colour of a particular enables one to go to the legends to obtain the required information.



## Soil Units

The soil map may be read at different levels. The most detailed level is that of the soil phase. Soil phases are distinguished within soil series mainly based on differences in surface of soil texture, slope, gravelliness, erosion, etc.



## Map colours

Different shades of colours are used as an aid to distinguish the different classes of soils, crop suitability and other maps.

Soil Phase	Area in ha (%)
<i>Soil of Granite and Granite Gneiss Landscape</i>	
5, BDLB2	26 (1.14)
33, HSLiB2	36 (1.58)
51, ANRbB2g1	12 (0.51)
52, ANRbB3	25 (1.11)
55, ANRiB2	148 (6.43)
58, MDGiB2	74 (3.23)
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62, BMNmB2	237 (10.32)
114, PGPhB2	55 (2.4)
132, MDRhB2	115 (5.01)
<i>Soil of Alluvial Landscape</i>	
95, HGNmB2	963 (41.91)
Railway	13 (0.57)
Mining/Industrial	8 (0.36)
Rock outcrops	94 (4.07)
Others*	240 (10.42)

## Soil and plot boundaries

Soil units shown on the map are represented by both the color and a numeral. The soil boundaries are superimposed on land parcel with revenue survey number boundaries to visualize its spatial extent.



## Map key

There are many thematic types to be differentiated on the map solely based on colour. Therefore soils and suitability types and their limitations are distinguished by colours with a combination of alpha-numeric characters.

Key	
S1-	Highly Suitable
S2-	Moderately Suitable
S3-	Marginally Suitable
N1-	Currently Not Suitable
N2-	Permanently Not Suitable
Limitations	
g-	gravelliness/stoniness
n-	nutrient availability
r-	rooting condition
t-	texture
z-	excess salt/calcareousness

KEY	
TEXTURE	
b-	Loamy sand
l-	Sandy clay
h-	Sandy clay loam
m-	Clay
SLOPE	
A-	Nearly level (0-1%)
B-	Very gently sloping (1-3%)
EROSION	
1-	Slight
2-	Moderate
3-	Severe
GRAVELLINESS	
g1-	Gravelly (15-35%)
DEPTH	
BDL-	Shallow (25-50 cm)
HSL,PGP-	Moderately deep (75-100 cm)
MDG,ANR-	Deep (100-150 cm)
BMN,HGN,MDR-	Very deep (>150 cm)



# 1. Introduction

Land is a scarce resource and basic unit for any material production. It can support the needs of the growing population, provided they use land in a rational and judicious manner. But what is happening in many areas of the state is a cause for concern to anyone involved in the management of land resources at the grassroots level. In India the area available for agriculture is about 51 per cent of the total area and more than 60 per cent of the people are still relying on agriculture for their livelihood. The limited land area is under severe stress and strain due to increasing population pressure and competing demands of various land uses. Due to this, every year there is a significant diversion of farm lands and water resources for non-agricultural purposes. Apart from this, due to lack of interest for farming among the farmers in many areas, large tracts of cultivable lands are turning into fallows and this trend is continuing at an alarming rate.

The watershed management programs are aimed at designing suitable soil and water conservation measures, productivity enhancement of existing crops, crop diversification with horticultural species, greening the wastelands with forestry species of multiple uses and improving the livelihood opportunities for landless people.

The objectives can be met to a great extent when an appropriate Natural Resources Management (NRM) plan is prepared and implemented. It is essential to have site specific Land Resources Inventory (LRI) indicating the potentials and constraints for developing such a site specific plan. LRI can be obtained by carrying out detailed characterization and mapping of all the existing land resources like soils, climate, water, minerals and rocks, vegetation, crops, land use pattern, socio-economic conditions, infrastructure, marketing facilities and various schemes and developmental works of the government. From the data collected at farm level, the specific problems and potentials of the area can be identified and highlighted, conservation measures required for the area can be planned on a scientific footing, suitability of the area for various uses can be worked out and finally viable and sustainable land use options suitable for each and every land holding can be prescribed to the farmer and other land users of the area.

The major landforms identified in the Sub-watershed are uplands and low lands. The database was generated by using cadastral map of the village as a base along with high resolution satellite imagery (IRS LISS IV and Cartosat-1). The objectives of the land resource survey, carried out in the Shettigeri Sub-watershed covering an area of 2299.02 ha are indicated below.

- Detailed characterization of all the land resources like soil, water, land use, cropping pattern and other resources available at parcel level in the village.
- Delineation of homogenous areas based on soil-site characteristics into management units.
- Collection and interpretation of climatic and agronomical data for crop planning.
- Identification of problems and potentials of the area and strategies for their management.
- Assessment of the suitability of land resources for various crops and other uses.
- Establishment of village level digital land resources database in a GIS framework.
- Enable the watershed and other line departments to prepare an action plan for the integrated development of the watershed.

## 2. General Description of Sub-watershed

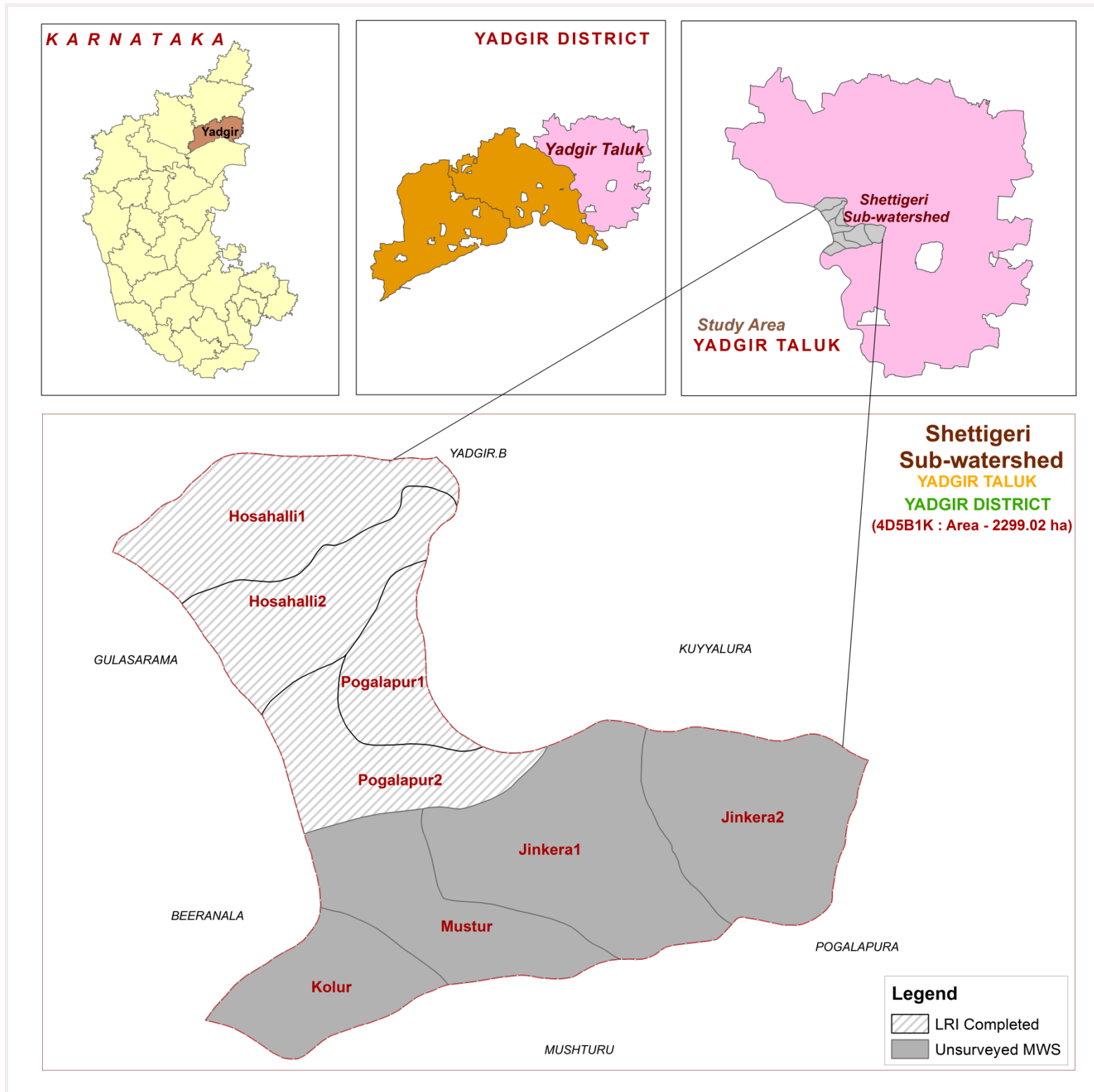
The Yadgir, popularly called as “Yadavagiri” by the local people, district came to existence on 30<sup>th</sup> Dec 2009 by carving out of erst-while Kalaburagi district of Karnataka with a geographical area of 5234.4 square kilometres, located in the northern part of the state. It lies between north latitudes’ 16<sup>o</sup>57’ – 16<sup>o</sup>59’ and east longitudes 77<sup>o</sup> 12’ – 77<sup>o</sup> 13’. The climate of the district is very hot and dry. The district has an average annual rainfall of 636 mm. Soils are well drained red sandy loam to medium deep black soils. This may be the weathering product of gneissic and granite terrain. Agriculture in Yadgir district is dependent upon rainfall, irrigation tanks, wells, streams etc. The major agricultural crops grown are Jowar, Groundnut, Cotton, Red gram, Bengal gram etc.

As a pilot study, **ICAR-NBSS&LUP, Bangalore** carried out the generation of Sub-watershed (SWs) - LRI for the Shettigeri SWs (code– 4D5B1K) in Yadgir taluk, Yadgir district. It was selected for data base generation under Sujala III project. This sub-watershed encompasses of 8 MWs namely Hosahalli-1 (4D5B1M2b), Hosahalli-2 (4D5B1M1a), Jinkera-1 (4D5B1M1b), Jinkera-2 (4D5B1M1c), Kolur (4D5B1M1e), Mustur (4D5B1M1d), Pogalapur-1 (4D5B1M2i) and Pogalapur-2 (4D5B1M2c). Land Resource Inventory (LRI) was generated for four among the eight micro-watersheds.



## 2.1. Location and Extent

### LOCATION MAP OF SHETTIGERI SUB-WATERSHED



Shettigeri sub-watershed (Yadgir Taluk, Yadgir District) is located between  $16^{\circ}39'40''$ - $16^{\circ}45'9''$  North latitudes and  $77^{\circ}7'16''$ -  $77^{\circ}13'58''$  East longitudes, covering an area of about 5422 ha, bounded by Yadgir.B, Kuyyalura, Mushturu and Pogalapura villages.

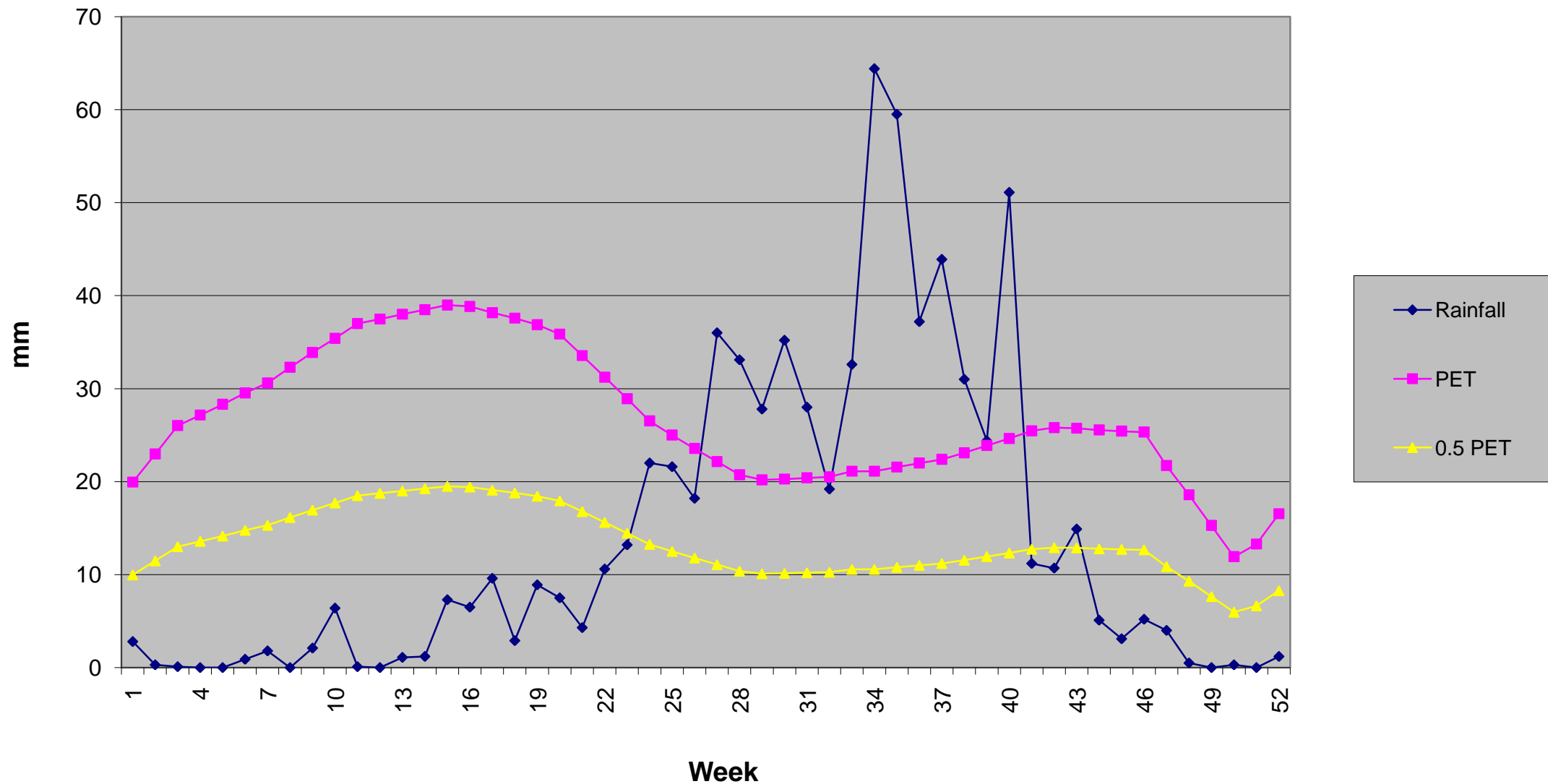
**Agro Ecological Sub Region (AESR) 6.2:** Central and Western Maharashtra Plateau and North Karnataka Plateau and North Western Telangana Plateau, hot moist semi-arid ESR with shallow and medium loamy to clayey Black soils (medium and deep clayey Black soils as inclusion), medium to high AWC and LGP 120-150 days.

**Agro-climatic Zone 2: North-eastern Dry Zone:** The total geographic area of this zone is about 1.76 M ha covering 8 taluks of Gulbarga district and 3 taluks of Raichur. Net cultivated area in the zone is about 1.31 M ha of which about 0.09 M ha are irrigated. The mean elevation of the zone is 300-450 m MSL. The main soil type is deep to very deep soils with small pockets of shallow to medium black soils. The zone is cropped predominantly during rabi due to insufficient rainfall (465-785 mm). The principal crops of the zone are jowar, bajra, oilseeds, pulses, cotton and sugarcane.

**NOTE:** Land Resource Inventory (LRI) was generated for four among the eight micro-watersheds

# Climate

## Balichakra Hobli, Yadgir Taluk and District

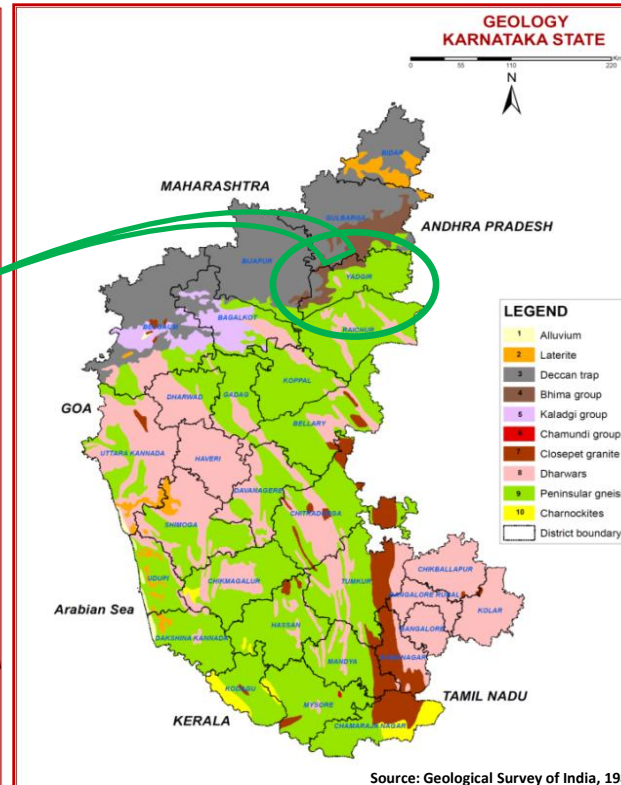
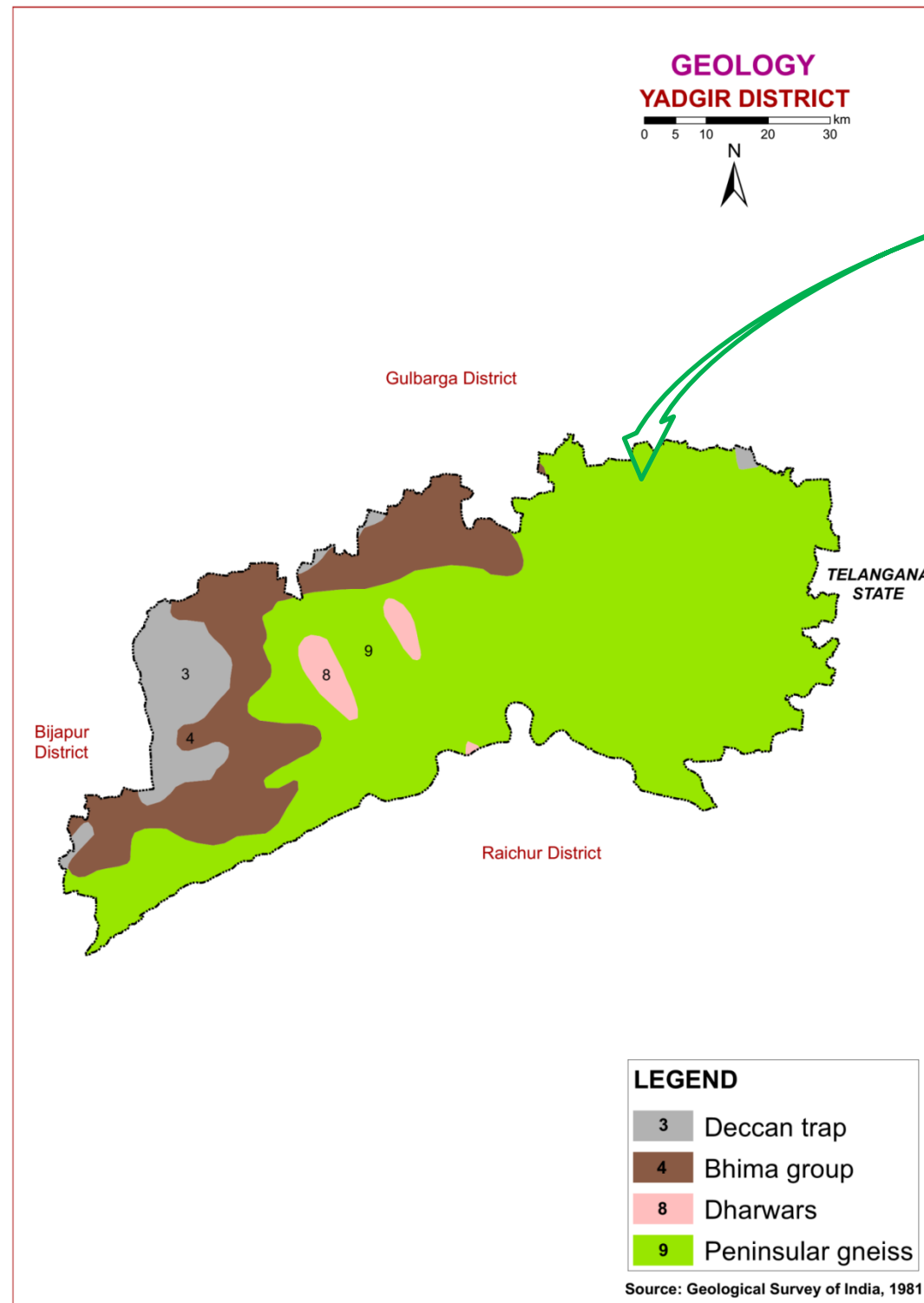


Length of Growing Period (LGP) is varying from June 2<sup>nd</sup> week to Last week of October (120 - 150 days)

Annual Rainfall : 729 mm. in the Balichakra Hobli, Yadgir Taluk & District



## 2.3. Geology



### GEOLOGY - KARNATAKA STATE

Karnataka forms part of the Peninsular Shield, which is an ancient stable block of the earth's crust. The shield is composed of geologically ancient rocks of diverse origin. These rocks have undergone various degrees of metamorphism and crushing. Overlying these ancient rocks are Proterozoic, late Cretaceous to Palaeocene, Palaeocene to Recent, and Recent sediments.

In the stratigraphic succession of rocks in Karnataka the Archaean group is the oldest, followed by Proterozoic, Mesozoic and Cainozoic formations.

### GEOLOGY - YADGIR DISTRICT

#### Mesozoic Group

Towards the end of the Cretaceous Period there was tremendous volcanic activity in the Peninsular part of India with eruption of a series of lava flows which came out through fissures and cracks. This formation is known as the Deccan Trap.

**Deccan Trap:** The Deccan Trap covers an area of 25,000 sq. km. Eight lava flows have been identified in Karnataka, horizontally overlying the older formations. The thickness of the individual flows averages about five metres. The Deccan Trap is relatively uniform in petrographic character. The most common type is augite basalt. Dominant colour is greyish green; texture ranges from cryptocrystalline to glassy. The rock is often vesicular and scoriaceous.

#### Upper Proterozoic Group

Formations of the Upper Proterozoic in Karnataka are closepet granites, Chamundi granites, Kaladgi series and Bhima series.

#### Bhima series

This series, equivalent to the Kurnool formations, is named after the Bhima river and occurs in Bijapur and Gulbarga districts. It covers an area of about 4200 sq. km and is overlain by the Deccan trap. The group consists of horizontal, unfossiliferous, unmetamorphosed sedimentary rocks such as sandstones, green, purple and black shales, and cream and bluish limestones. The thickness is about 477 metres.

#### Dharwar schists

The Dharwar schists consist of a complex series of crystalline schists associated with ultrabasic rocks such as amphibolite, peridotites and dunites. These schists are found in long, narrow bands of various dimensions running NW-SE through the Peninsular Gneiss. The Dharwars are divided into Upper and Lower.

Upper Dharwars are equivalent to the Archaean to Lower Proterozoic, and are divided into Bababudan.

Lower Dharwars occur in Mysore district and include amphibolite schist, quartzite, ironstone and marble.

#### Peninsular Gneiss

Exposed over a large area of Karnataka in all the districts except Bidar is the Peninsular Gneiss which is a heterogeneous mixture of several types of granitic rocks such as banded gneisses, granitic gneisses, granites and gneissic granites, granodiorites and diorites. The banded gneisses consist of white bands of quartz-feldspar alternating with dark bands of biotite, hornblende, and minor accessories. The granite group includes granites of all shades with varying composition. Peninsular gneiss seems to have formed by the granitization of the older rocks.

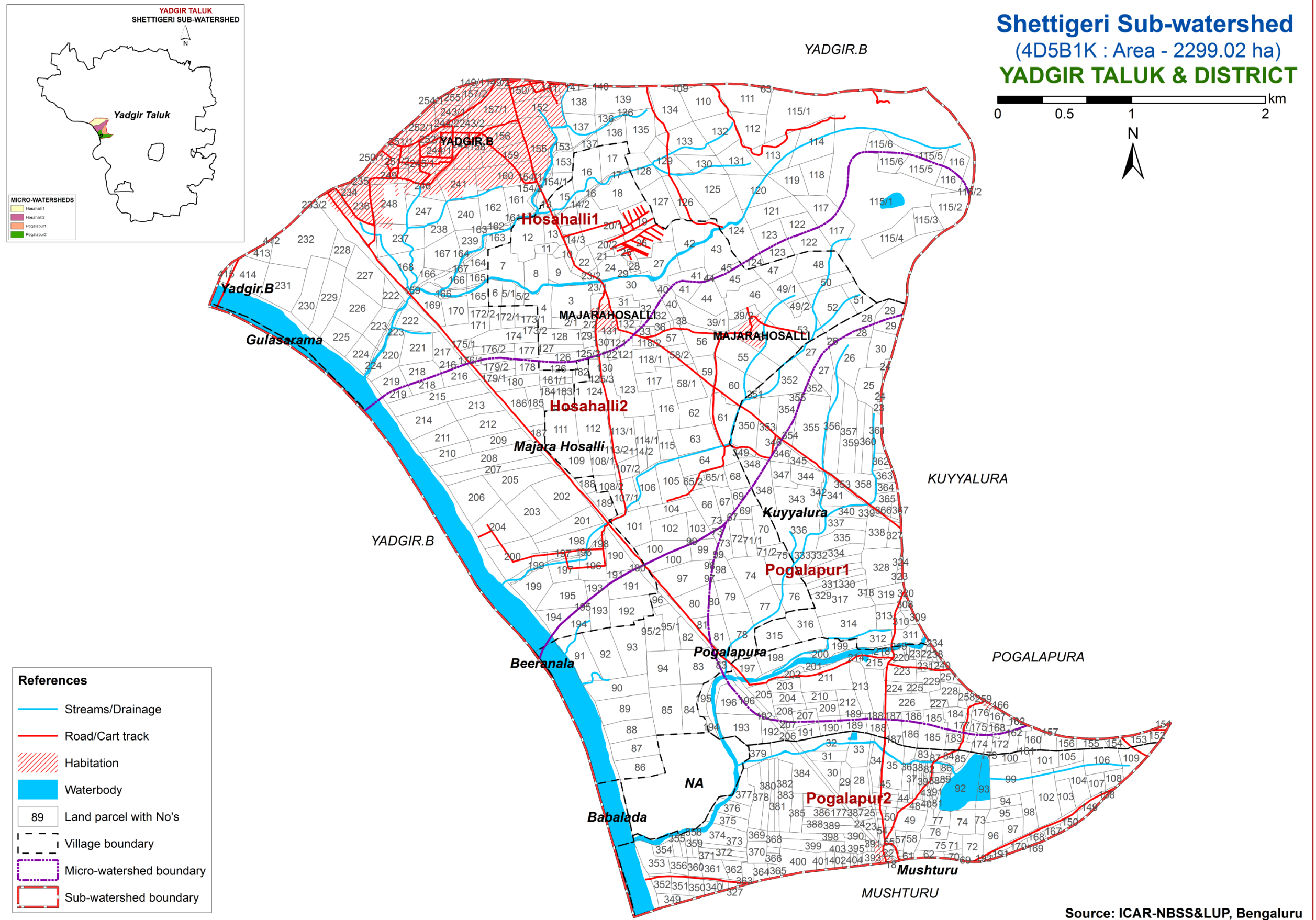
# 3. Survey Methodology

## Sequence of activities in generation of LRI

- Traversing the watershed using cadastral maps and imagery as base
- Identifying landforms, geology, land use and other features
- Selecting fields representing land units
- Opening profiles to 2 m depth
- Studying soil and site characteristics
- Grouping similar areas based on their soil-site characteristics into land management units
- Preparation of crop, soil and water conservation plan
- Socio-economic evaluation

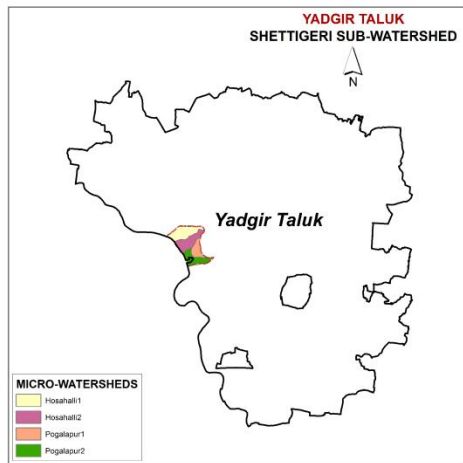
The required site and soil characteristics are described and recorded on a standard proforma by following the protocols and guidelines given in the soil survey manual and field guide. Collection of soil samples from representative pedons for laboratory characterization and collection of surface soil samples from selected fields covering most of the management units for macro and micro-nutrient analysis is being carried out (320m grid intervals). Further processing of data at chemical lab and GIS lab are carried out to generate various thematic maps for each of the study area.

# 3.1. Database Used - Cadastral map

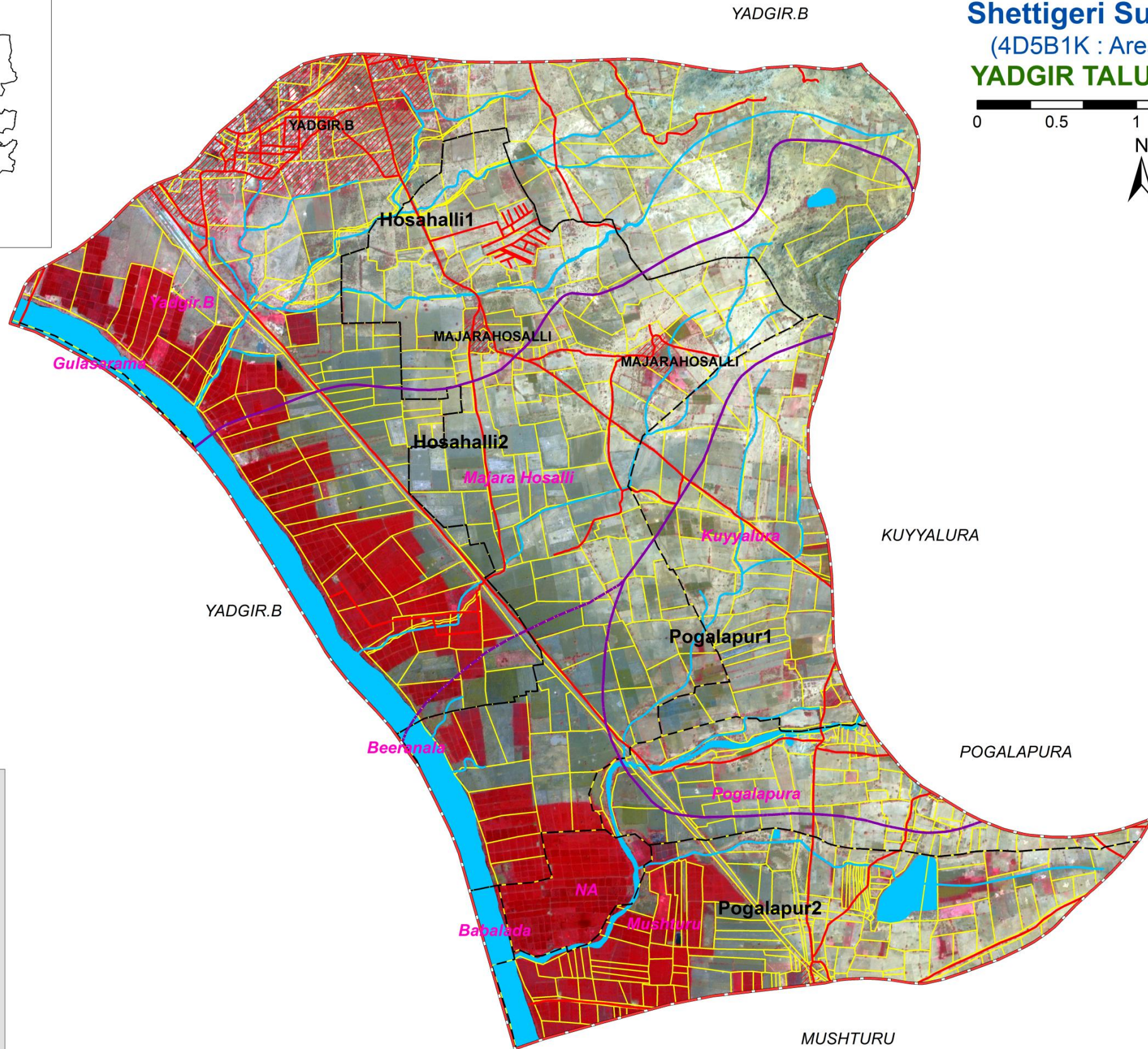
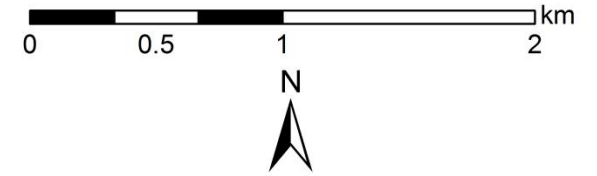




### 3.2. Database Used - Satellite Image



### SATELLITE IMAGE Shettigeri Sub-watershed (4D5B1K : Area - 2299.02 ha) YADGIR TALUK & DISTRICT



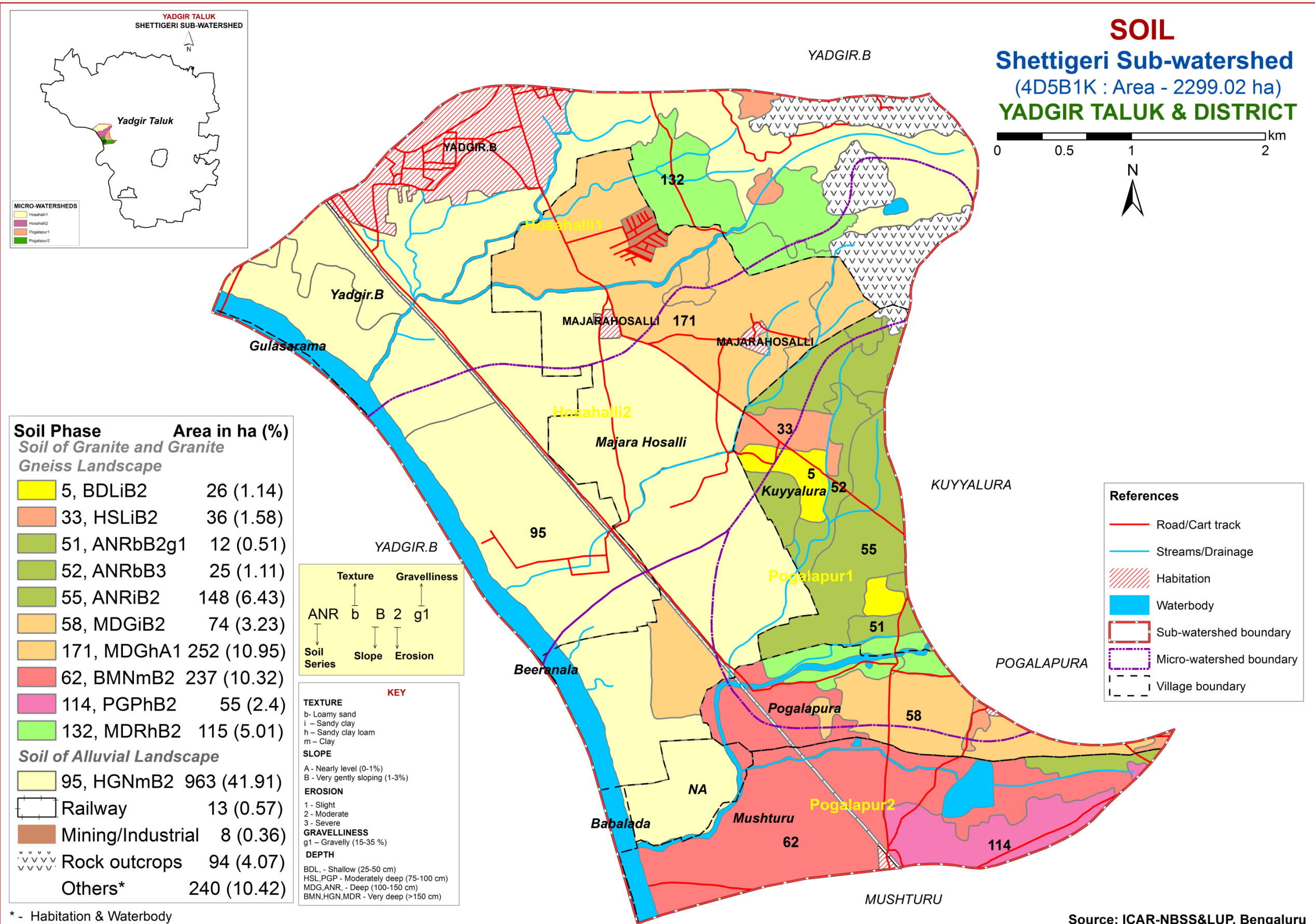
#### References

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Land parcel's
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Source: Cartosat 1 Imagery, 2011



# 4. The Soils

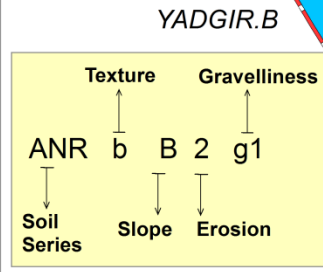


**SOIL**  
**Shettigeri Sub-watershed**  
 (4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**

0 0.5 1 2 km

N

Soil Phase	Area in ha (%)
<b>Soil of Granite and Granite Gneiss Landscape</b>	
5, BDLiB2	26 (1.14)
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Railway	13 (0.57)
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Others*	240 (10.42)



**KEY**

**TEXTURE**  
 b- Loamy sand  
 i - Sandy clay  
 h - Sandy clay loam  
 m - Clay

**SLOPE**  
 A - Nearly level (0-1%)  
 B - Very gently sloping (1-3%)

**EROSION**  
 1 - Slight  
 2 - Moderate  
 3 - Severe

**GRAVELLINESS**  
 g1 - Gravelly (15-35 %)

**DEPTH**  
 BDL, - Shallow (25-50 cm)  
 HSL,PGP - Moderately deep (75-100 cm)  
 MDG,ANR, - Deep (100-150 cm)  
 BMN,HGN,MDR - Very deep (>150 cm)

**References**

- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Sub-watershed boundary
- Micro-watershed boundary
- Village boundary

\* - Habitation & Waterbody

#### 4.1 Mapping unit description of Shettigeri (4D5B1K) Sub-watershed in Yadgir Taluk, Yadgir district

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
<b>Soils of Granite and Granite gneiss Landscape</b>				
	BMN		Bhimanahalli soils are very deep (>150 cm), moderately well drained, have very dark gray, calcareous cracking clay black soils occurring on very gently sloping uplands under cultivation	<b>237 (10.32)</b>
62		BMNmB2	Clay surface, slope 1-3%, moderate erosion	237 (10.32)
	MDR		Madhwara soils are very deep (>150 cm), well drained, have very dark gray to very dark brown, slightly calcareous sandy clay loam soils occurring on nearly level to very gently sloping uplands under cultivation	<b>115 (5.01)</b>
132		MDRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	115 (5.01)
	ANR		Anur soils are deep (100-150 cm), moderately well drained, have dark gray to dark brown, calcareous sodic clay soils occurring on very gently to gently sloping uplands under cultivation	<b>185 (8.05)</b>
51		ANRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	12 (0.51)
52		ANRbB3	Loamy sand surface, slope 1-3%, severe erosion	25 (1.11)
55		ANRiB2	Sandy clay surface, slope 1-3%, moderate erosion	148 (6.43)
	MDG		Mundargi soils are deep (100-150 cm), well drained, have brown to dark yellowish brown, sandy clay loam soils occurring on very gently sloping uplands under cultivation	<b>326 (14.18)</b>
171		MDGhA1	Sandy clay loam surface, slope 0-1%, slight erosion	252 (10.95)
58		MDGiB2	Sandy clay surface, slope 1-3%, moderate erosion	74 (3.23)
	HSL		Hosalli soils are moderately deep (75-100 cm), moderately well drained, have yellowish brown to dark yellowish brown, slightly calcareous sandy clay soils occurring on very gently sloping uplands under cultivation	<b>36 (1.58)</b>
33		HSLiB2	Sandy clay surface, slope 1-3%, moderate erosion	36 (1.58)
	PGP		Poglapur soils are moderately deep (75-100 cm), well drained, have dark brown, dark reddish brown to yellowish red sandy clay soils occurring on very gently sloping uplands under cultivation	<b>55 (2.4)</b>
114		PGPhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	55 (2.4)
	BDL		Badiyala soils are shallow (25-50 cm), well drained, have dark brown to very dark brown and dark yellowish brown, slightly calcareous sandy loam soils occurring on very gently to gently sloping uplands under cultivation	<b>26 (1.14)</b>
5		BDLiB2	Sandy clay surface, slope 1-3%, moderate erosion	26 (1.14)

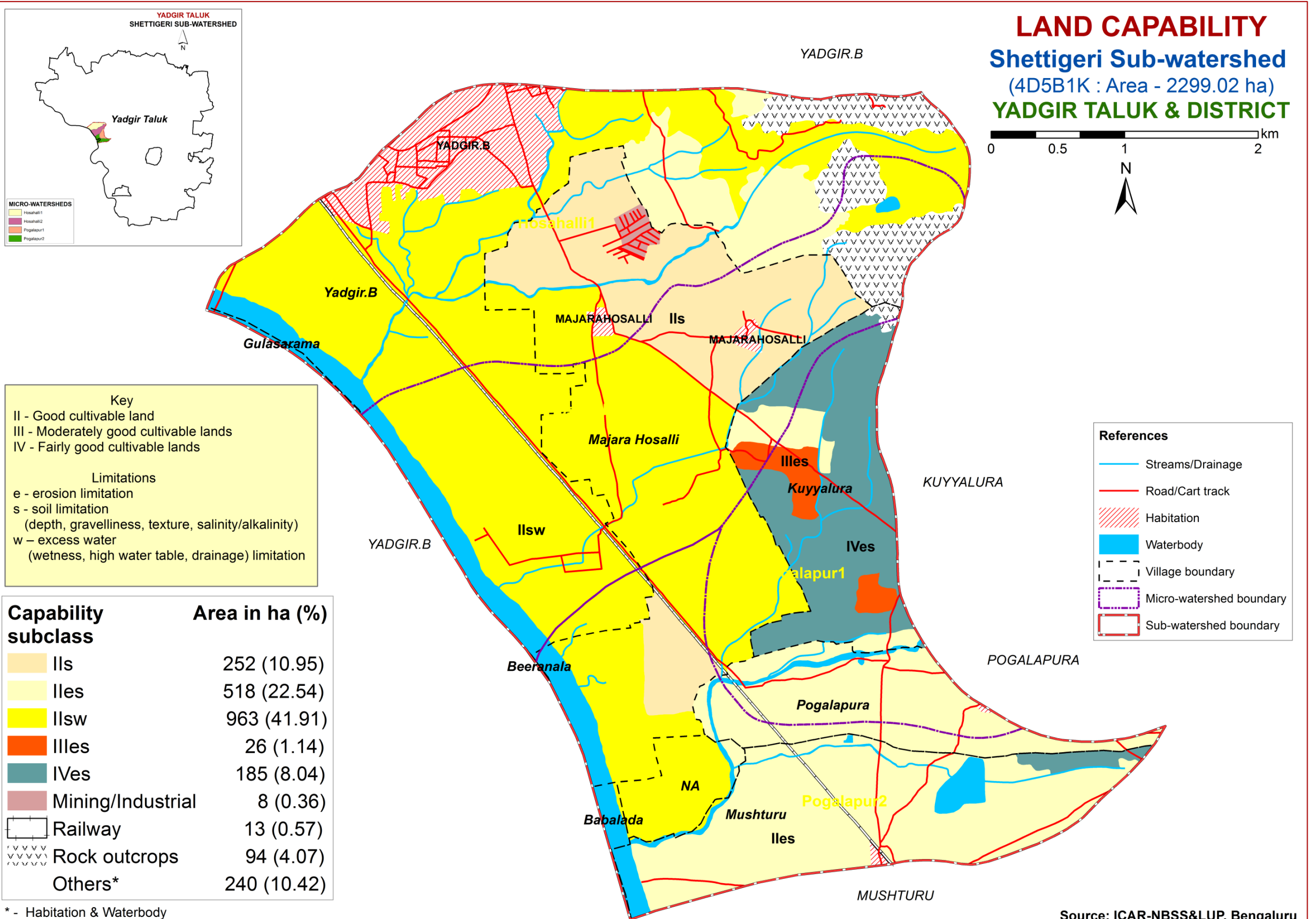


Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
<b>Soils of Alluvial Landscape</b>				
			Hegganakera soils are very deep (>150 cm), moderately well drained, have very dark gray to dark grayish brown, slightly calcareous cracking clay soils occurring on very gently sloping plains under cultivation	<b>963 (41.91)</b>
95		HGNmB2	Clay surface, slope 1-3%, moderate erosion	963 (41.91)
		Railway	Railway line	<b>13 (0.57)</b>
		Mining/Industrial	Mining/Industrial area	<b>8 (0.36)</b>
		Rock outcrops	Rock lands, both massive and bouldery with little or no soil	<b>94 (4.07)</b>
		Others	Habitation and waterbody	<b>240 (10.42)</b>

\* Soil map unit numbers are continuous for the taluk, not for the sub-watershed

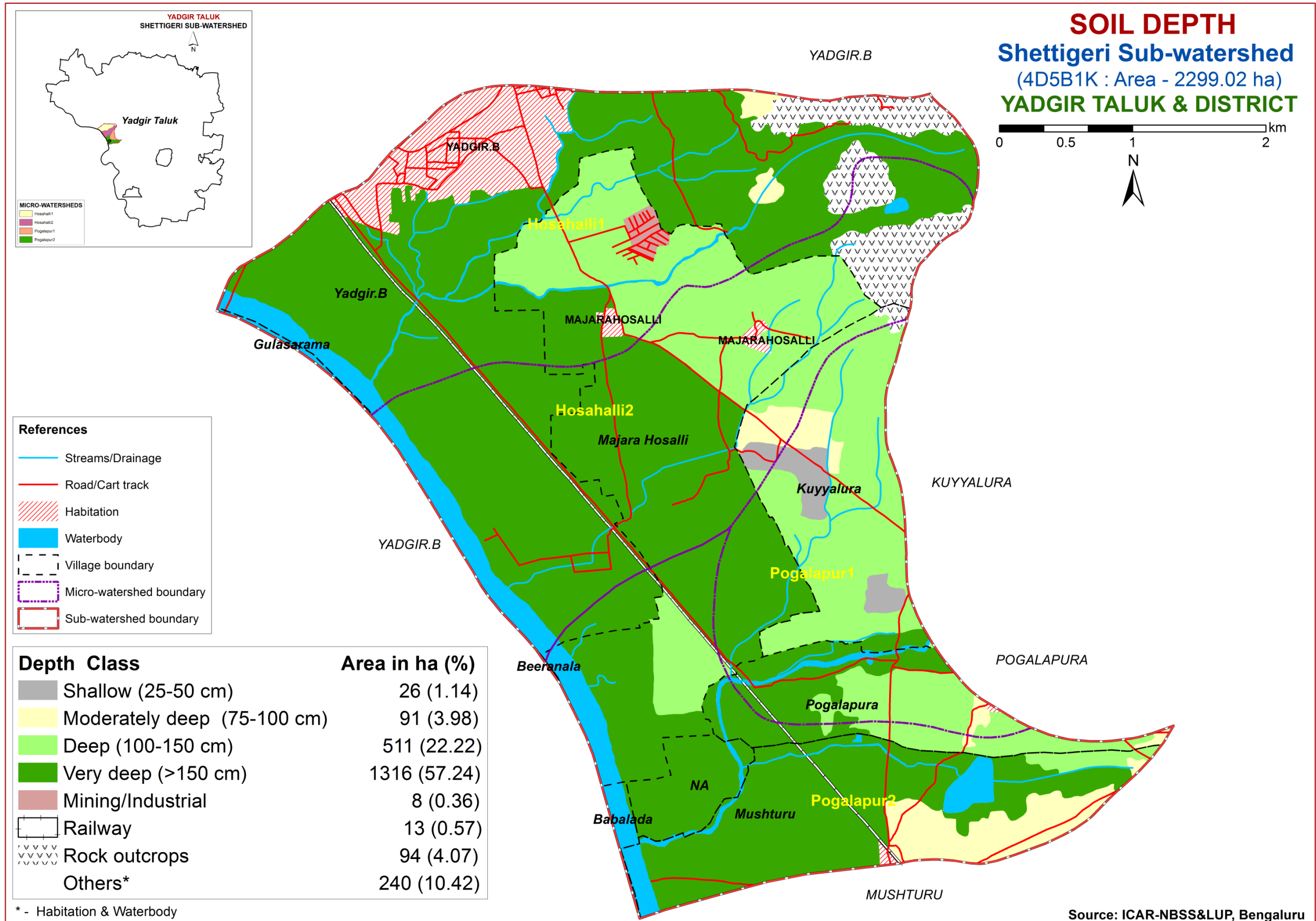
# 5. Soil Survey Interpretations

## 5.1. Land Capability Classification



Source: ICAR-NBSS&LUP, Bengaluru

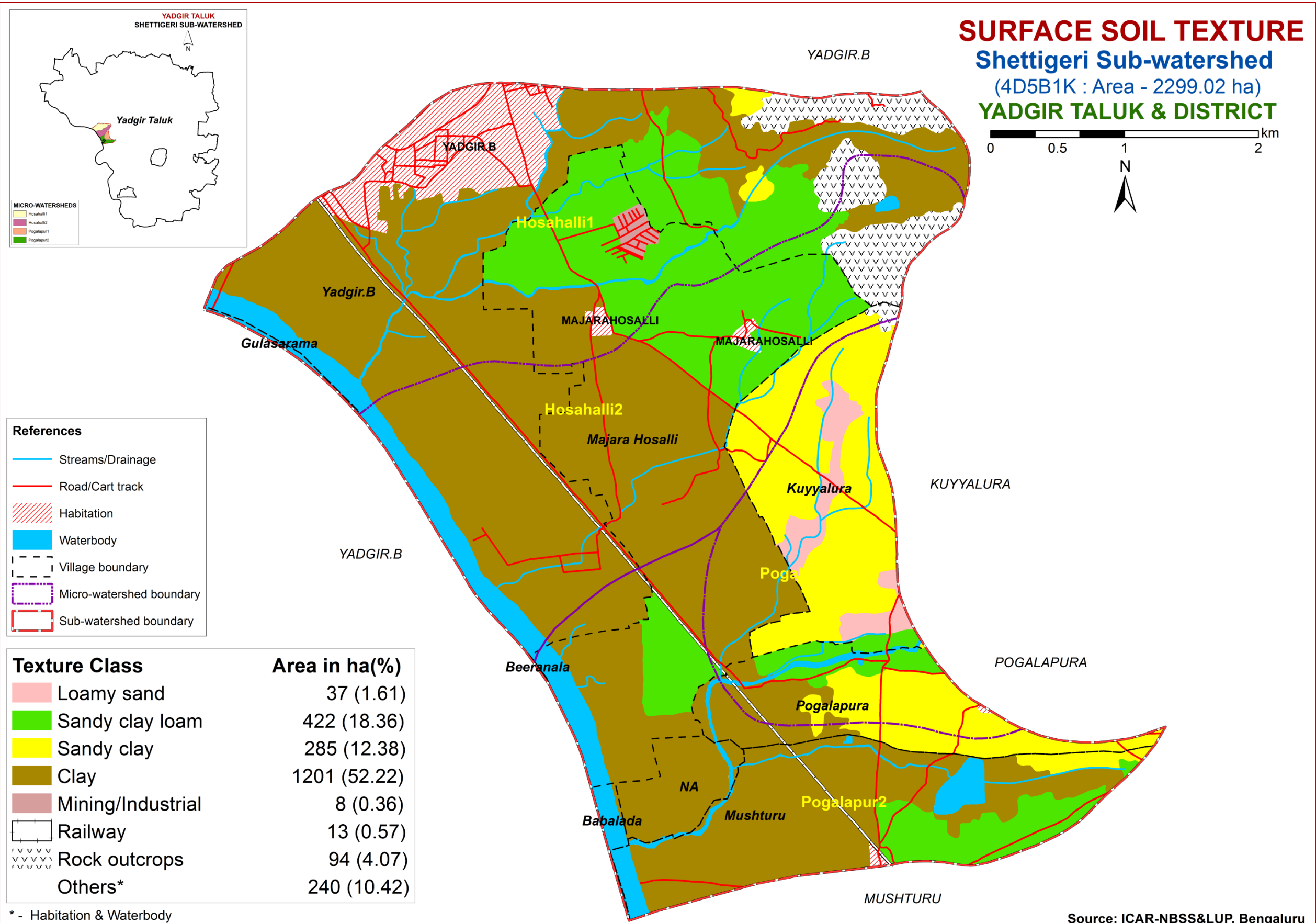
## 5.2. Soil Depth



Source: ICAR-NBSS&LUP, Bengaluru

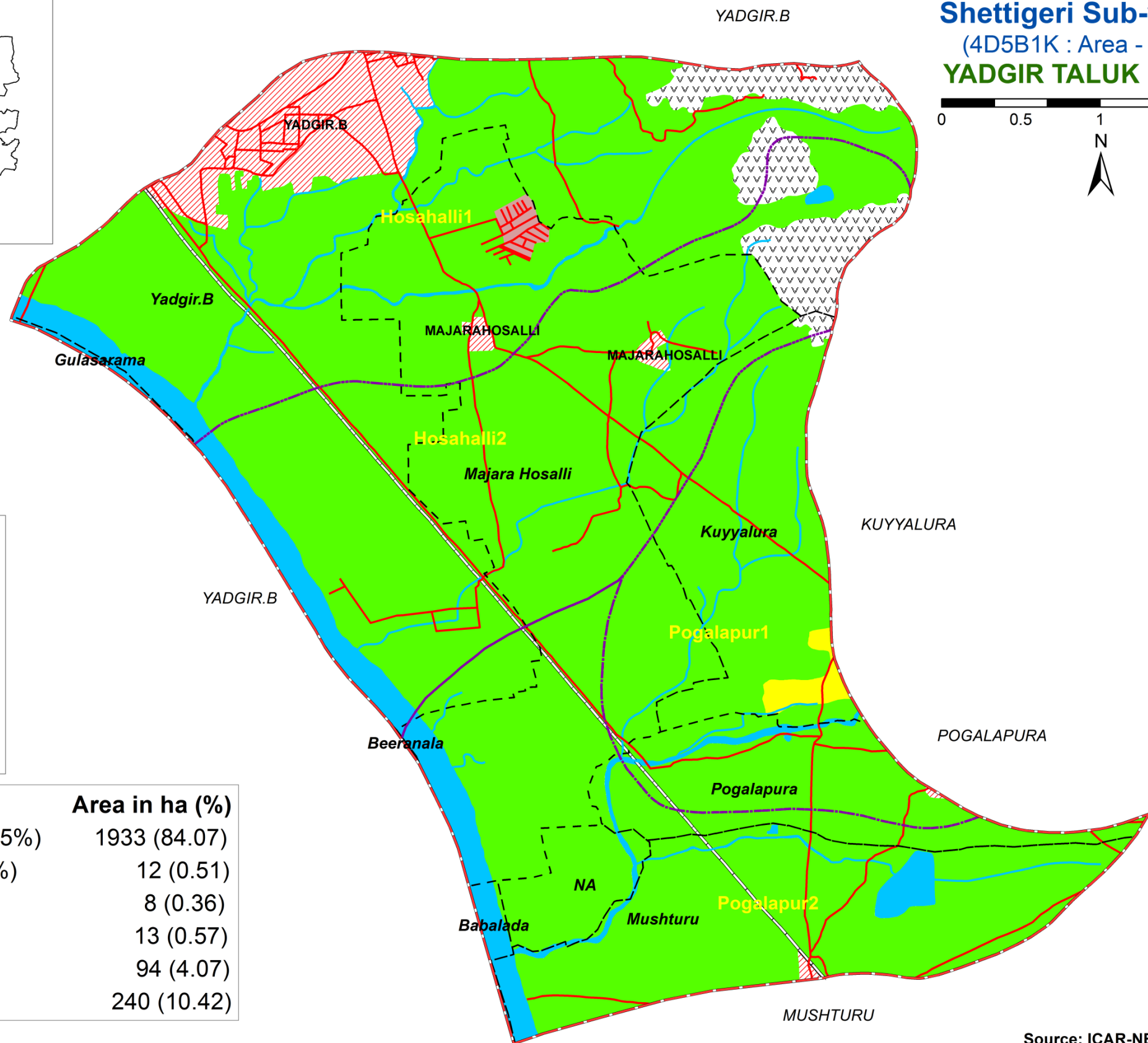
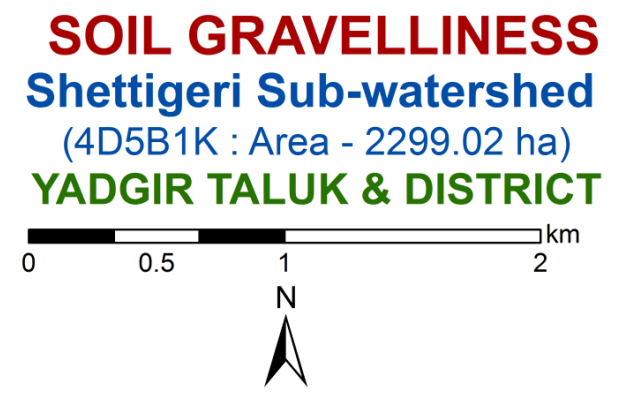
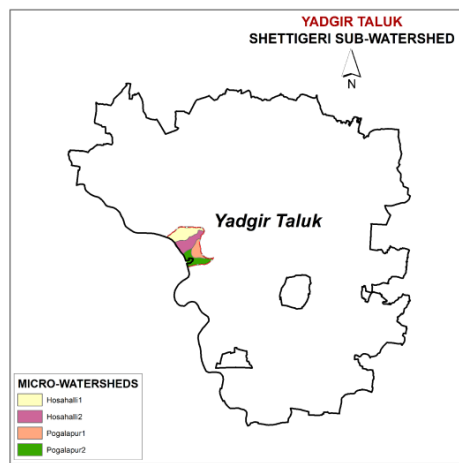


### 5.3. Surface Soil Texture



Source: ICAR-NBSS&LUP, Bengaluru

# 5.4. Surface Soil Gravelliness



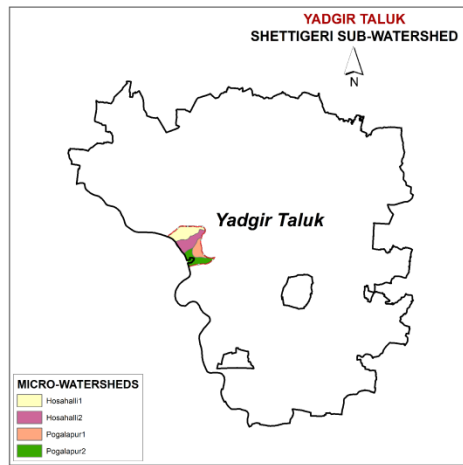
- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

Gravelly Class	Area in ha (%)
Non gravelly (<15%)	1933 (84.07)
Gravelly (15-35%)	12 (0.51)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Rock outcrops	94 (4.07)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 5.5. Available Water Capacity



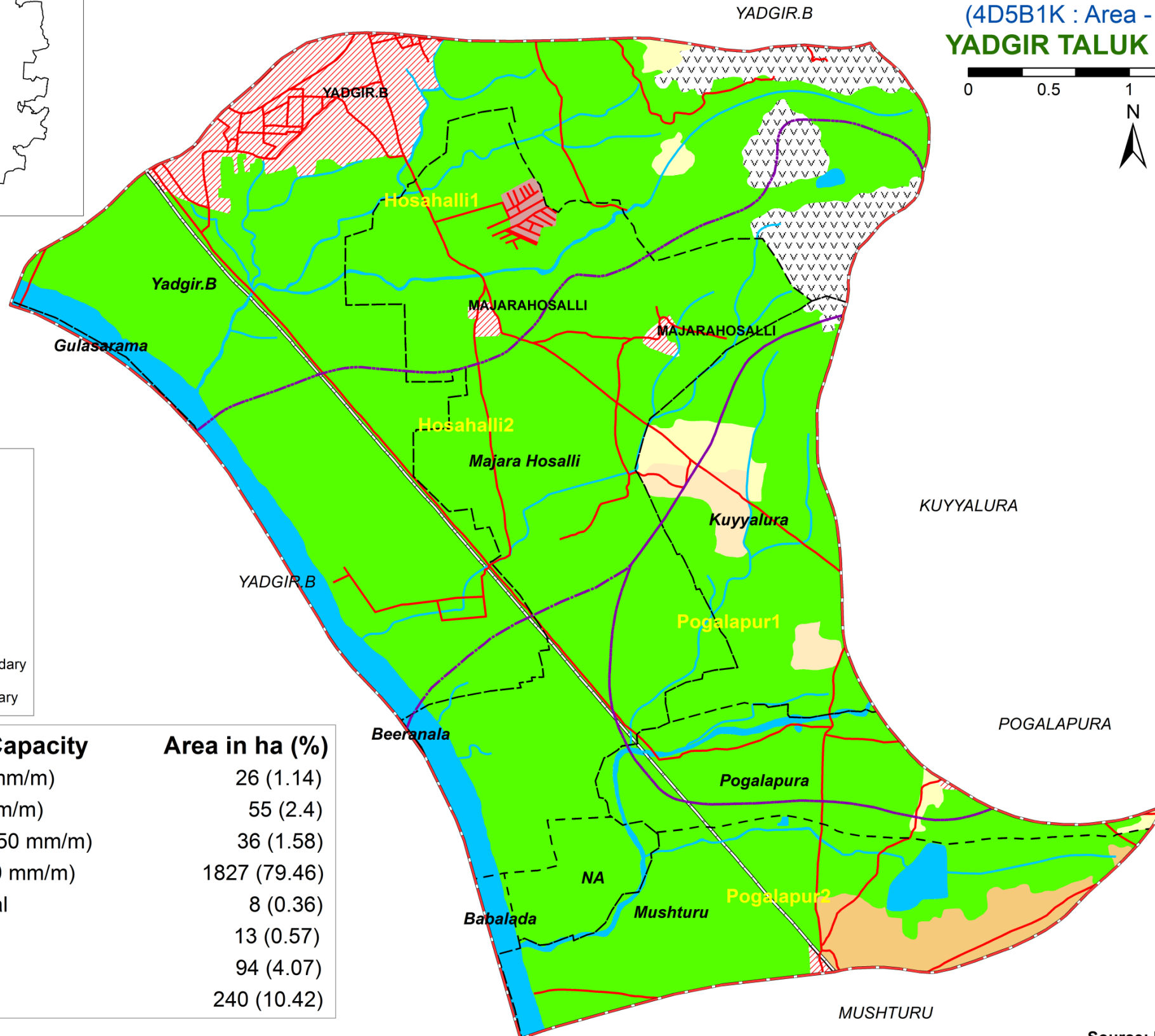
## AVAILABLE WATER CAPACITY

Shettigeri Sub-watershed

(4D5B1K : Area - 2299.02 ha)

YADGIR TALUK & DISTRICT

0 0.5 1 2 km



- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	26 (1.14)
Low (51-100 mm/m)	55 (2.4)
Medium (101-150 mm/m)	36 (1.58)
Very high (>200 mm/m)	1827 (79.46)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Rock outcrops	94 (4.07)
Others*	240 (10.42)

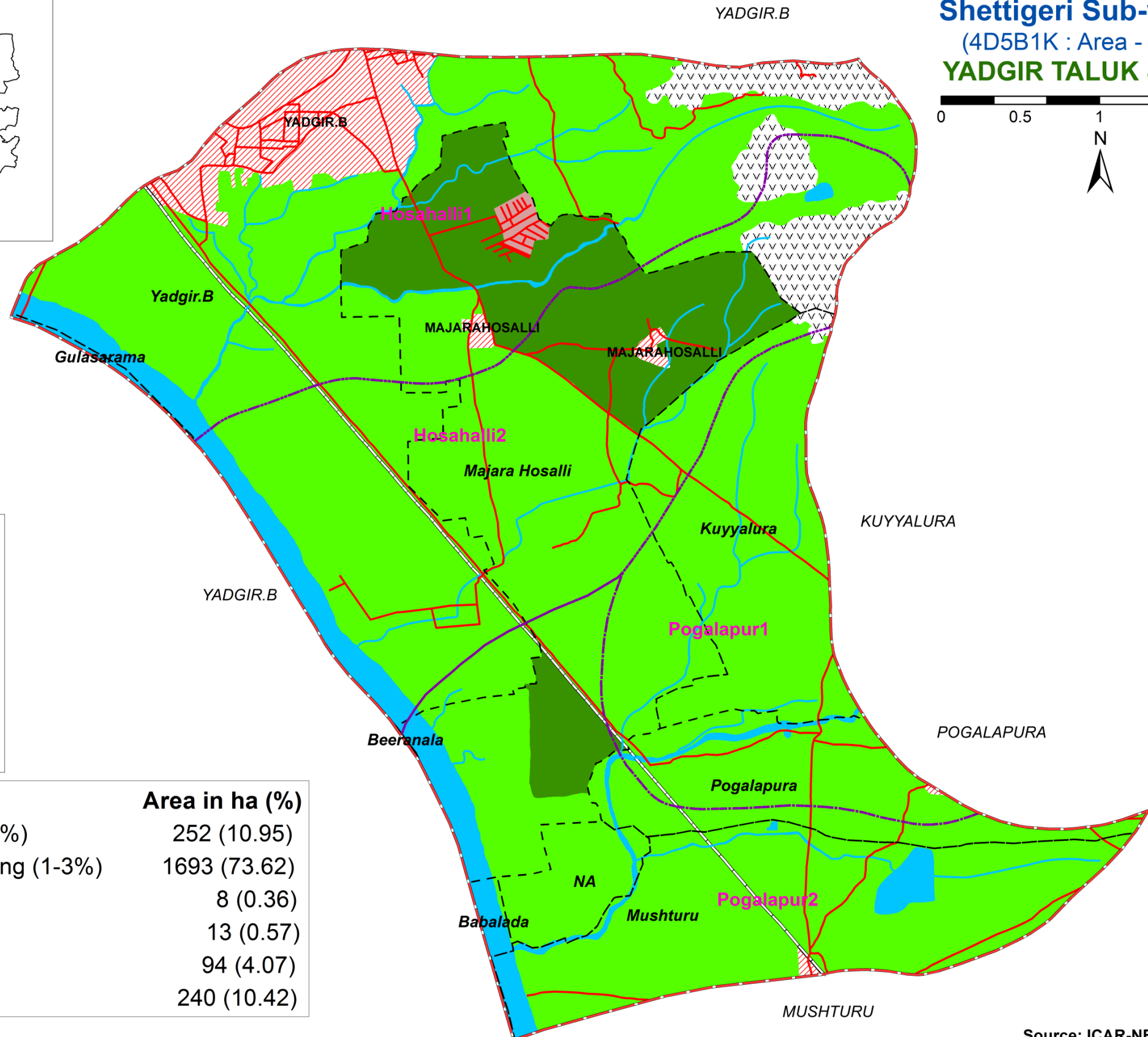
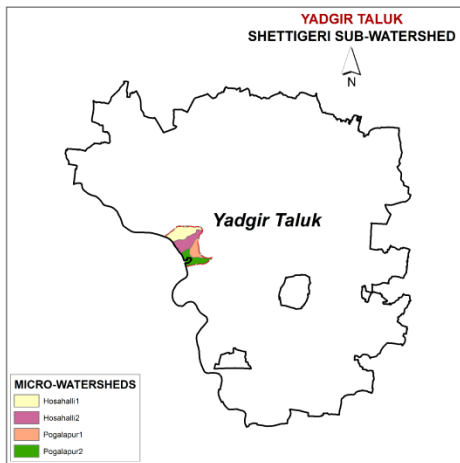
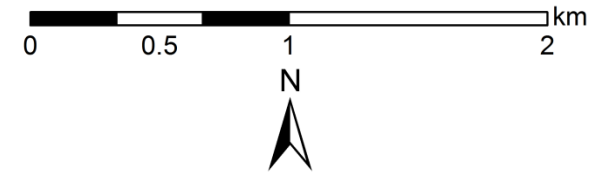
\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru



# 5.6.Slope

## SLOPE Shettigeri Sub-watershed (4D5B1K : Area - 2299.02 ha) YADGIR TALUK & DISTRICT



- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

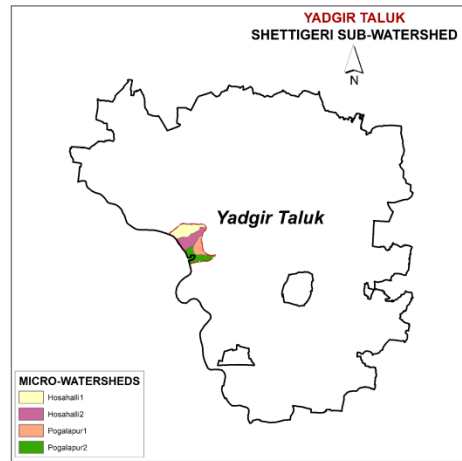
Slope Class	Area in ha (%)
Nearly level (0-1%)	252 (10.95)
Very gently sloping (1-3%)	1693 (73.62)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Rock outcrops	94 (4.07)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru



# 5.7. Soil Erosion

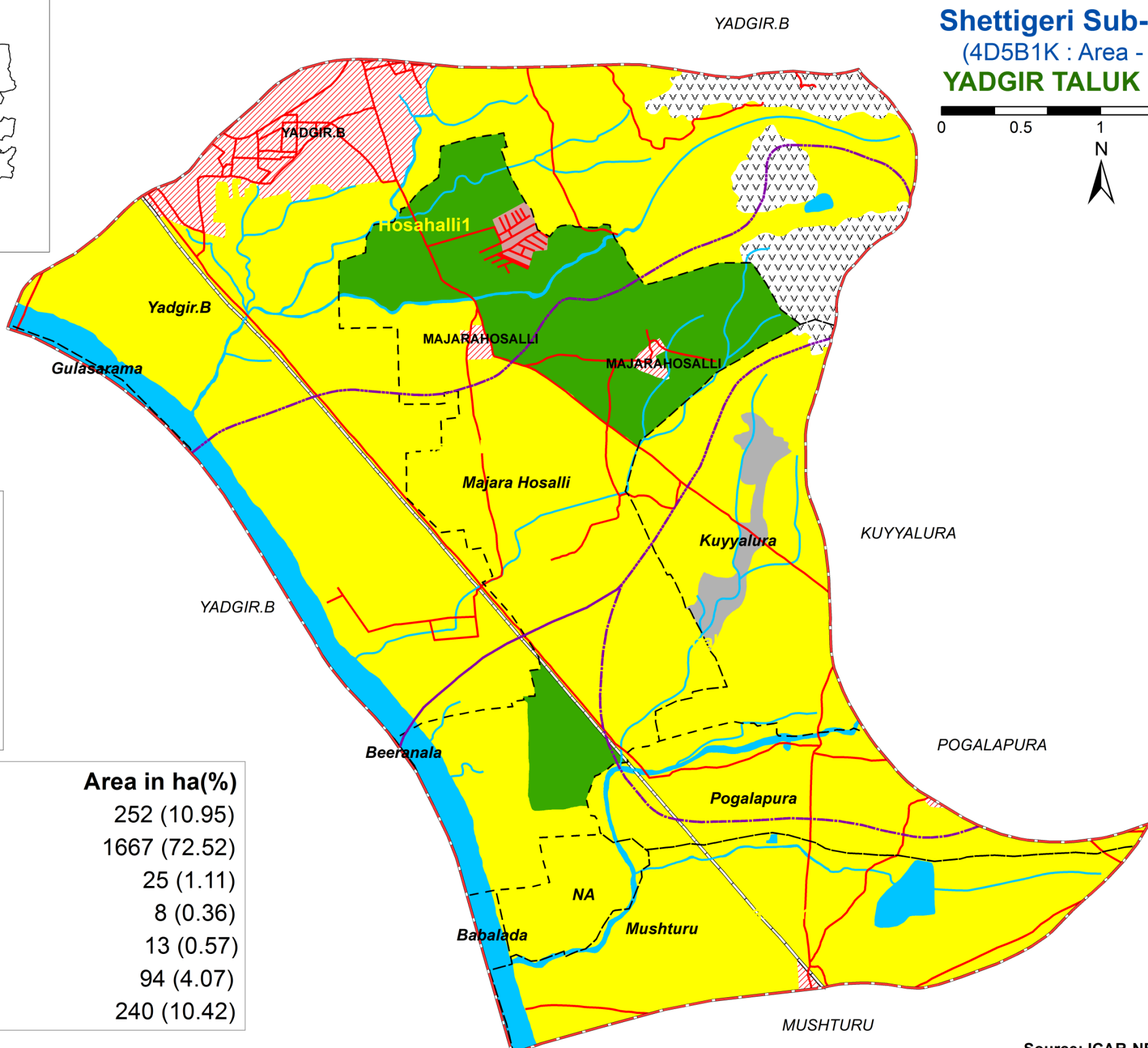
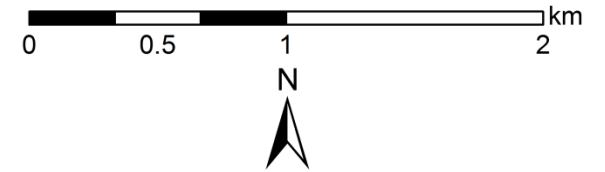


## SOIL EROSION

### Shettigeri Sub-watershed

(4D5B1K : Area - 2299.02 ha)

### YADGIR TALUK & DISTRICT



- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

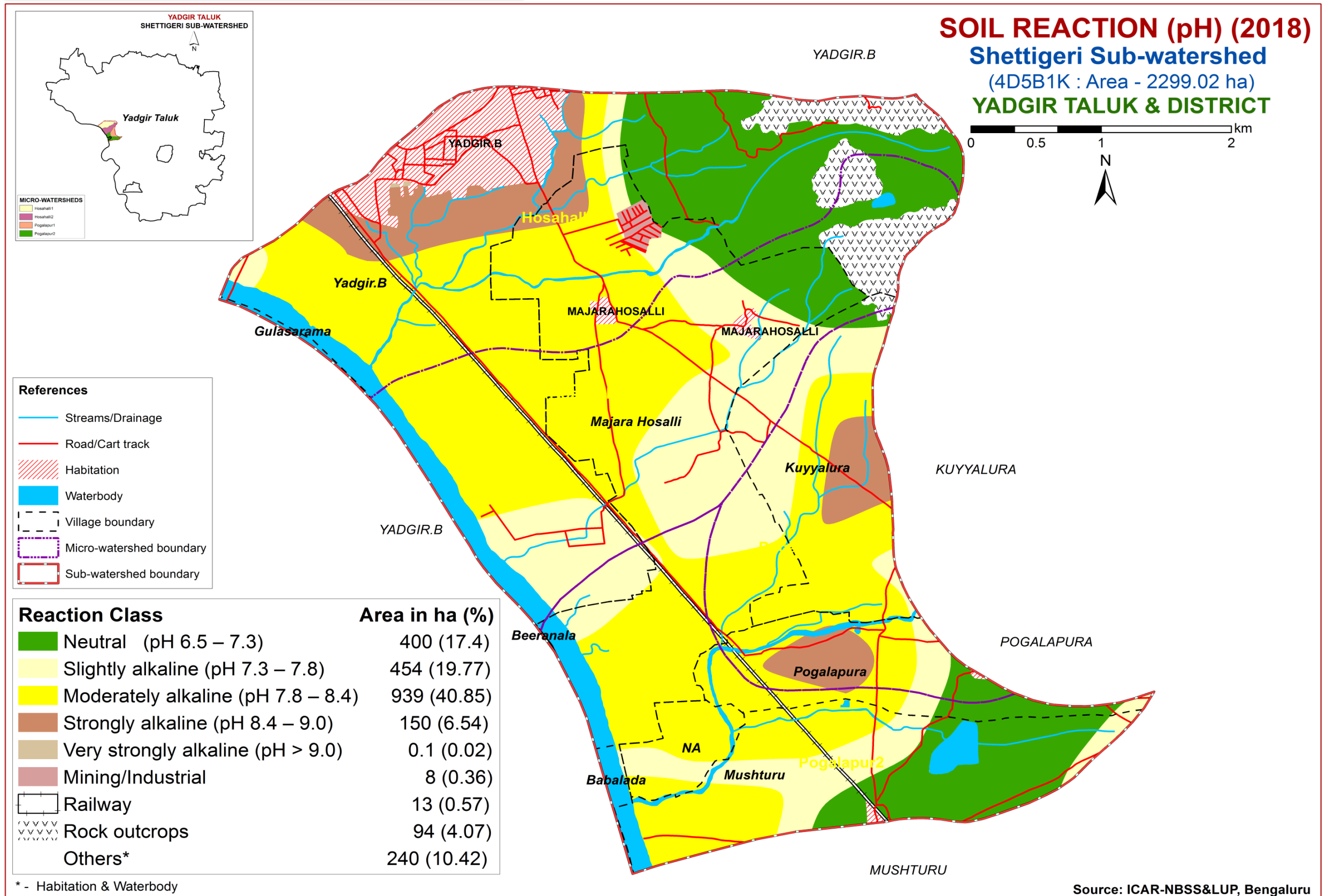
Erosion Class	Area in ha(%)
Slight	252 (10.95)
Moderate	1667 (72.52)
Severe	25 (1.11)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Rock outcrops	94 (4.07)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 6. Soil Fertility Status

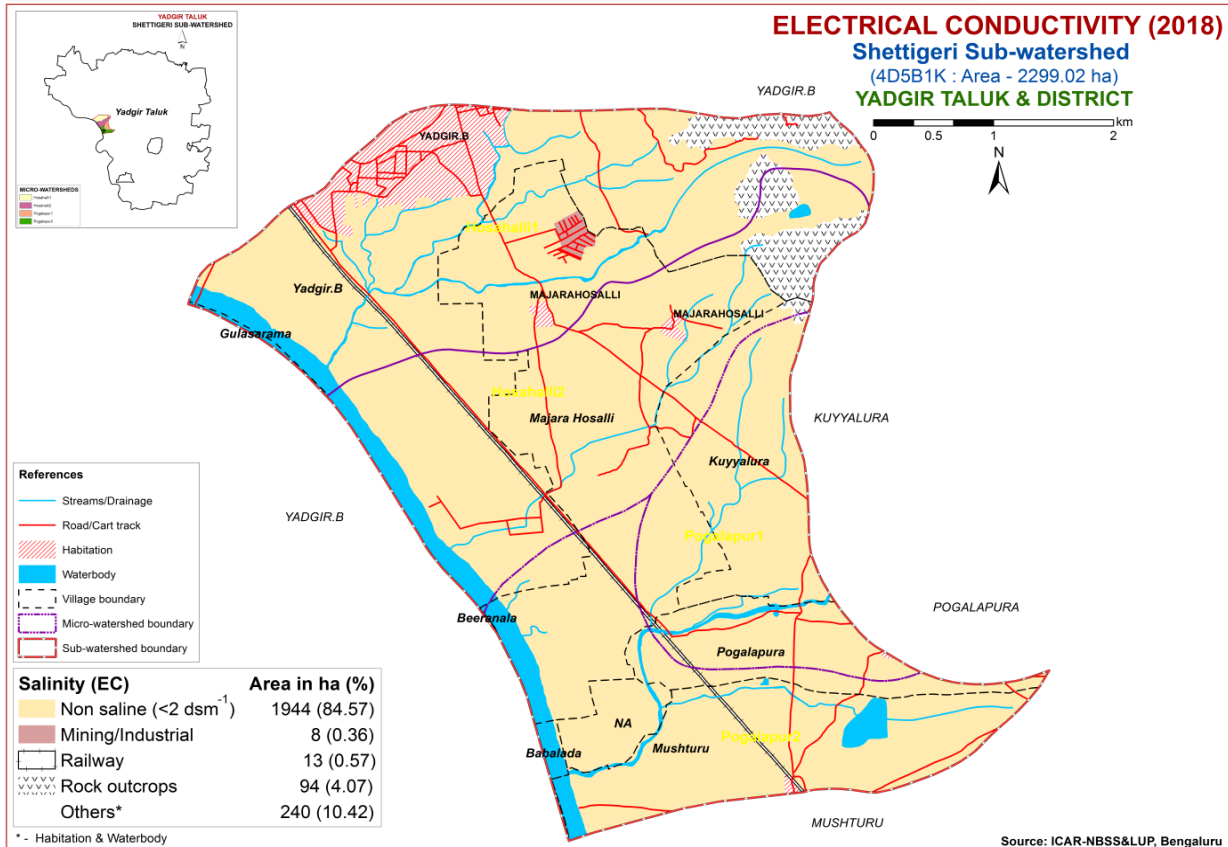
## 6.1. Soil Reaction (pH)



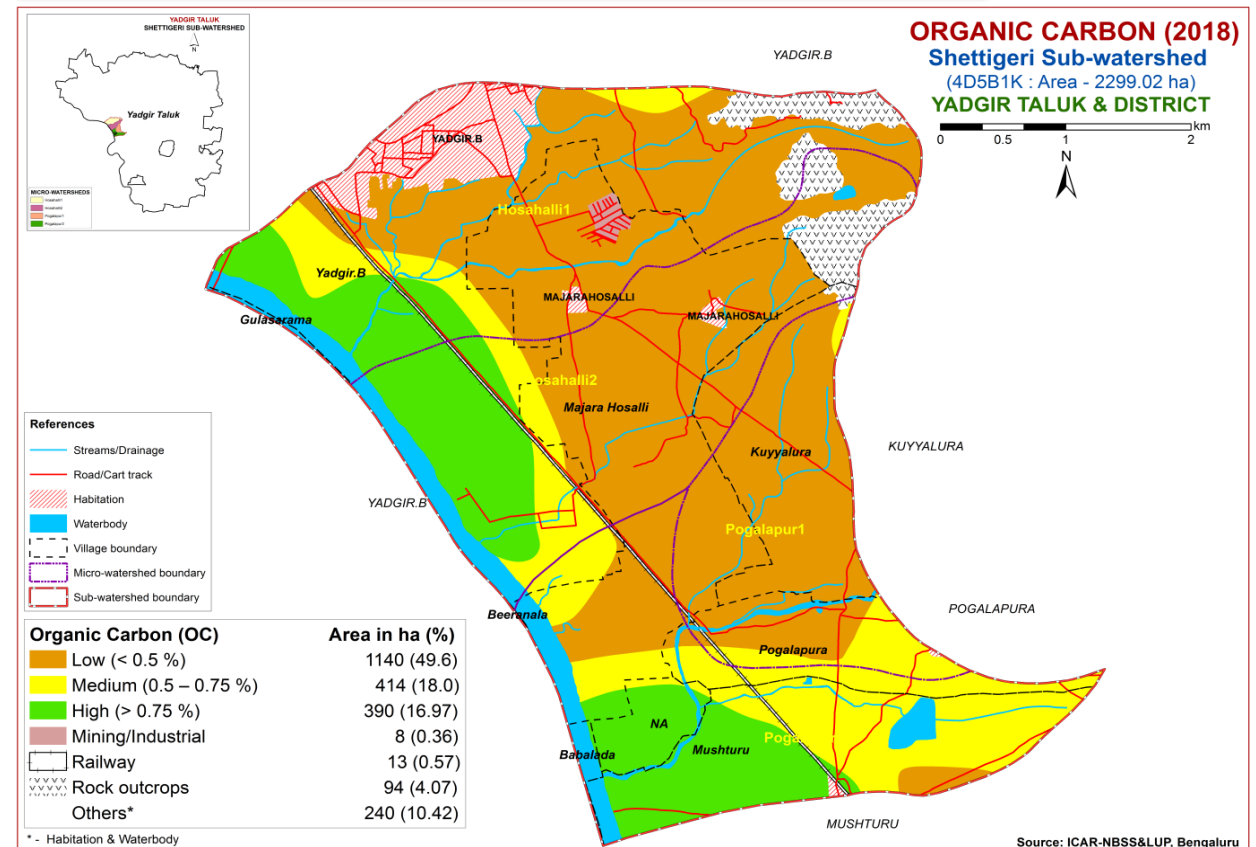
Source: ICAR-NBSS&LUP, Bengaluru



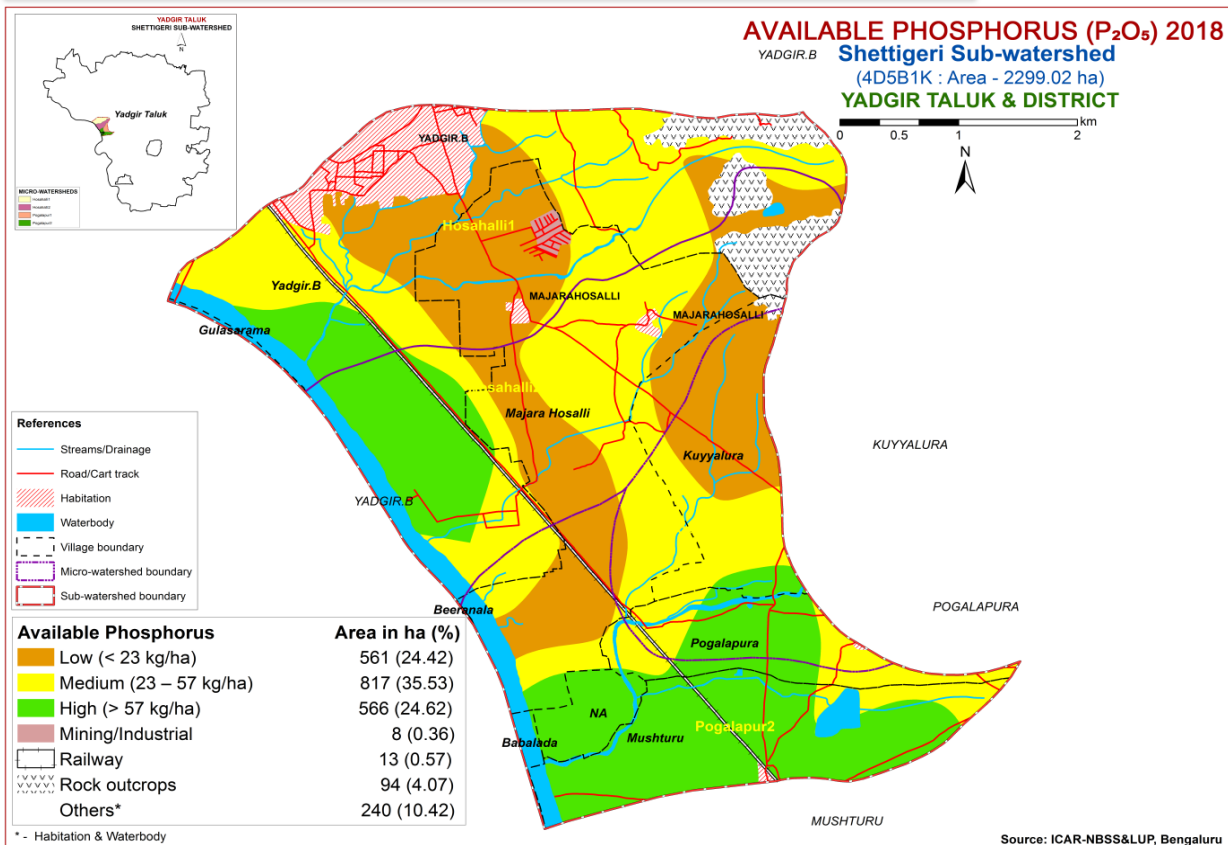
## 6.2. Electrical Conductivity (EC)



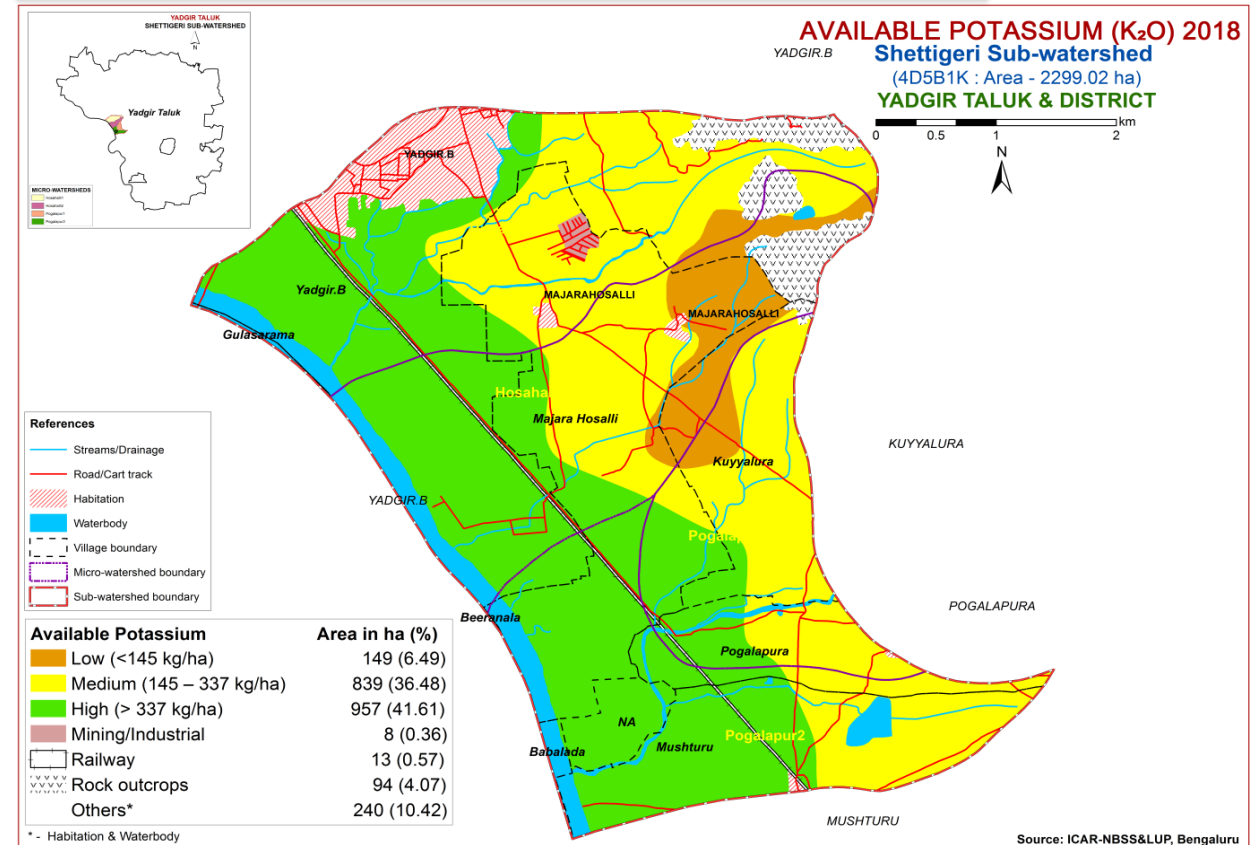
## 6.3. Organic Carbon



## 6.4. Available Phosphorus (P<sub>2</sub>O<sub>5</sub>)

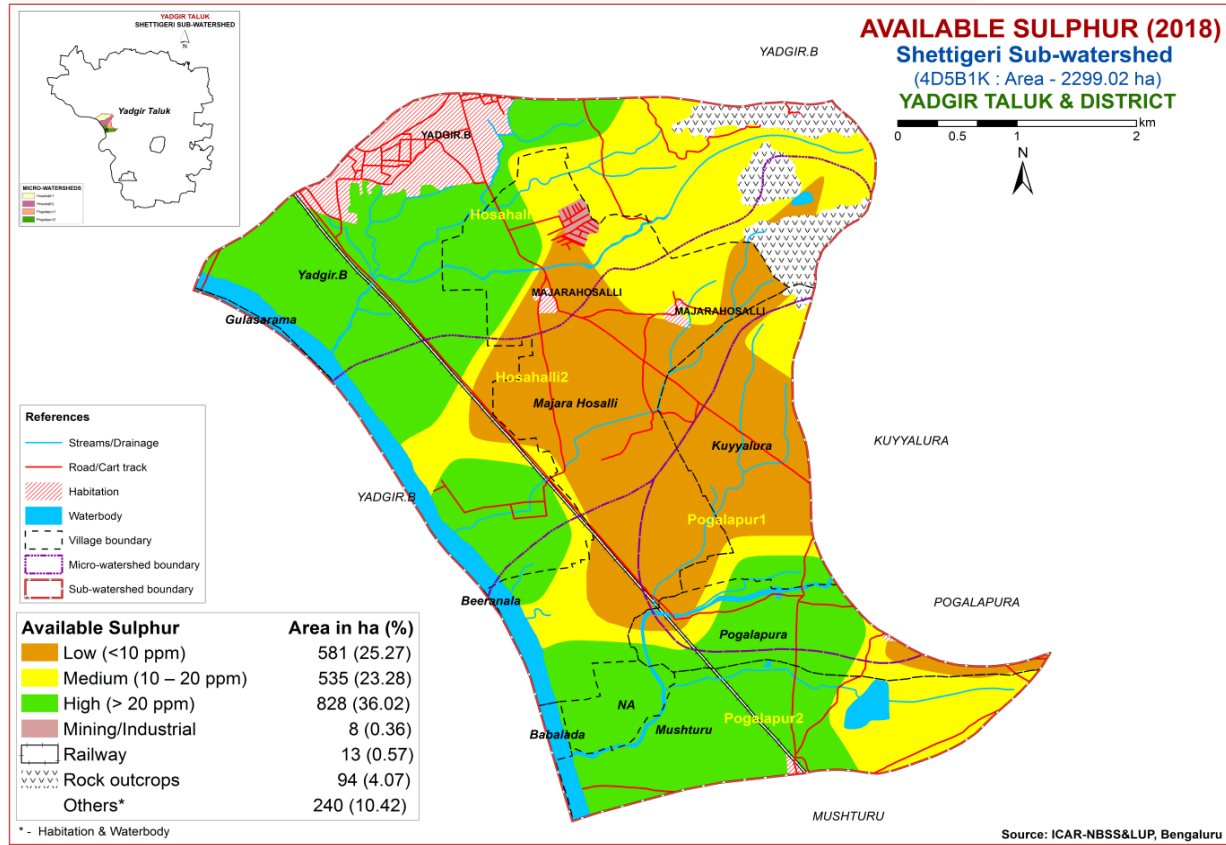


## 6.5. Available Potassium (K<sub>2</sub>O)

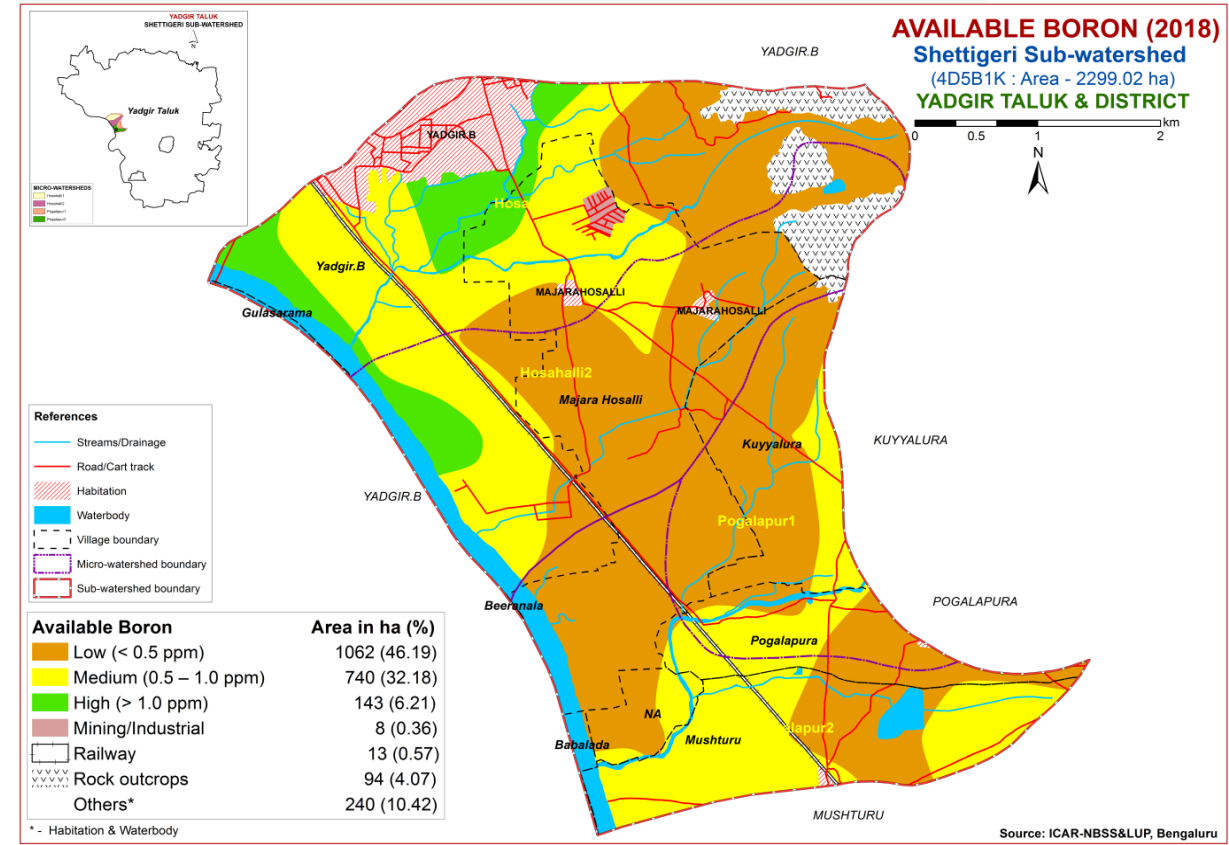




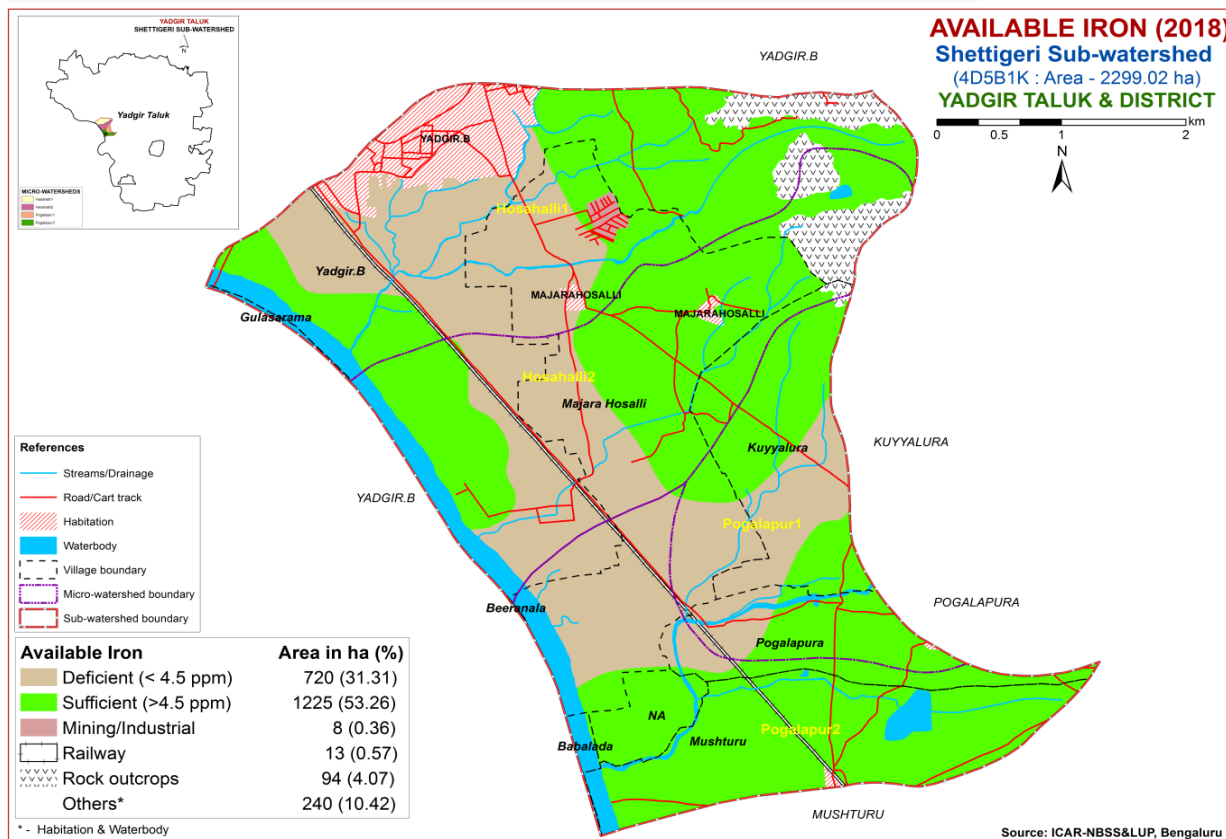
## 6.6. Available Sulphur



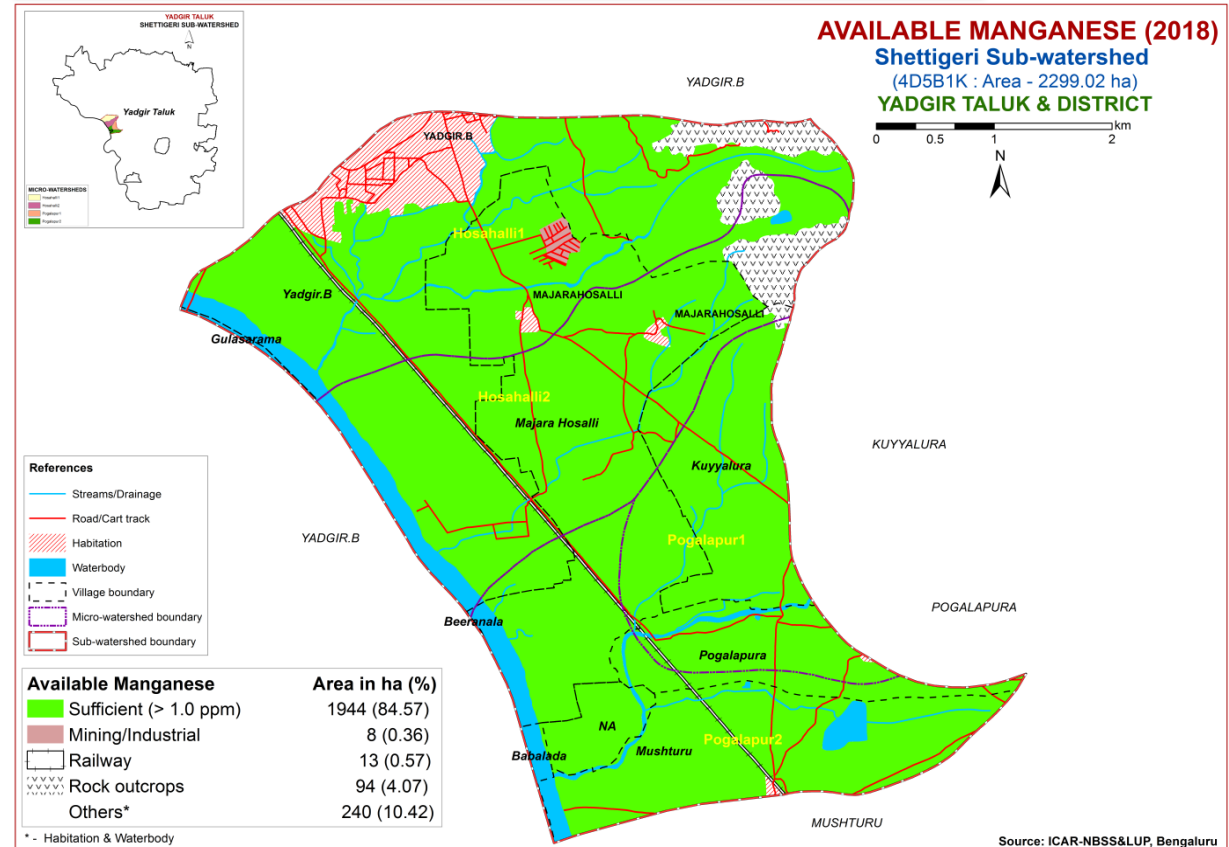
## 6.7. Available Boron



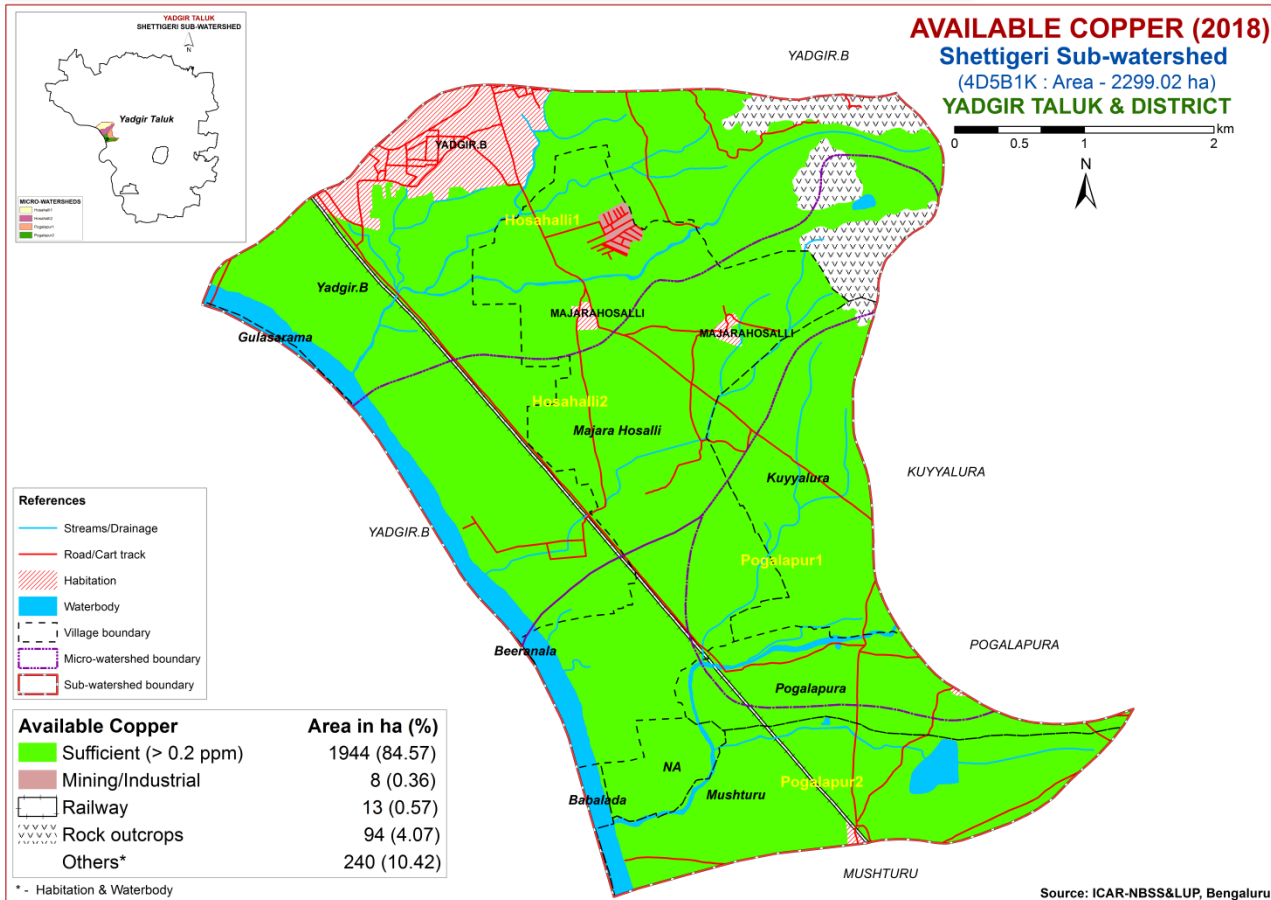
## 6.8. Available Iron



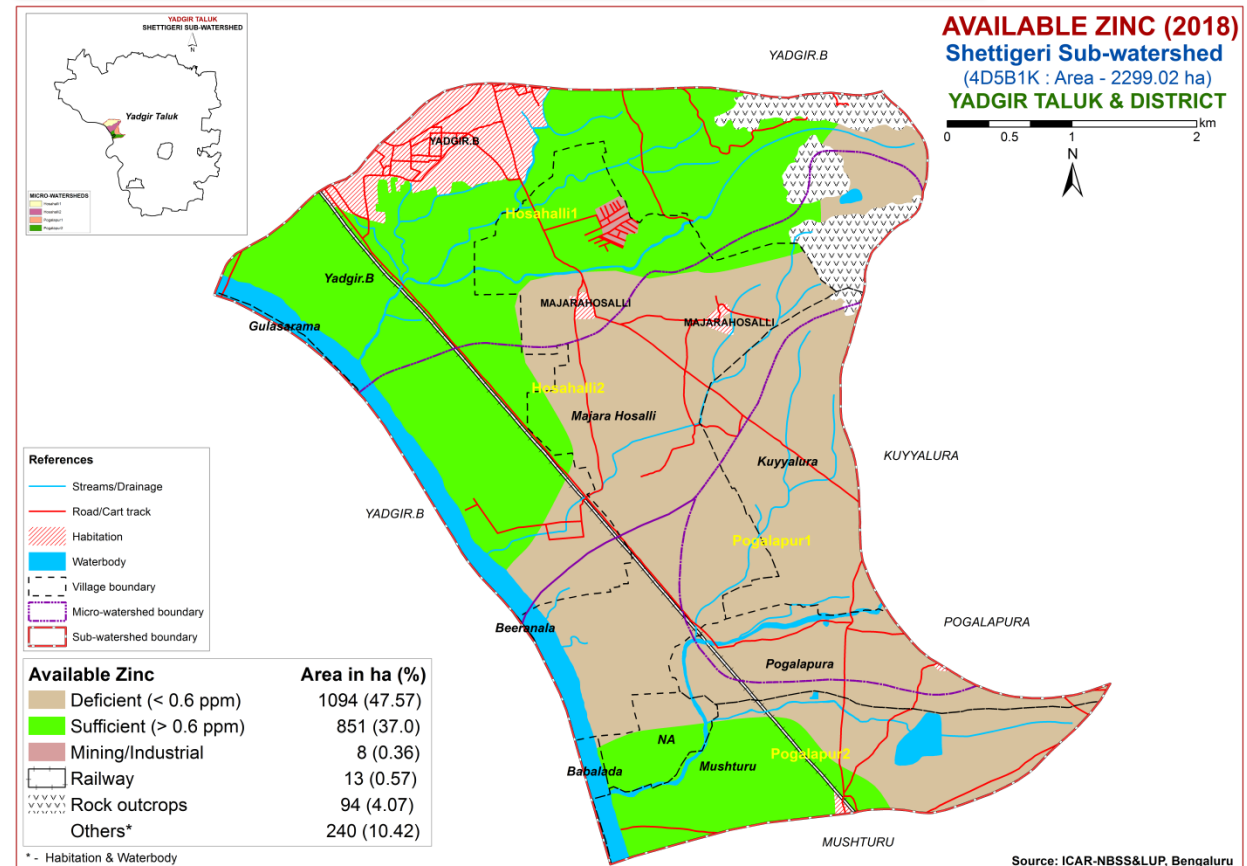
## 6.9. Available Manganese



## 6.10. Available Copper



## 6.11. Available Zinc



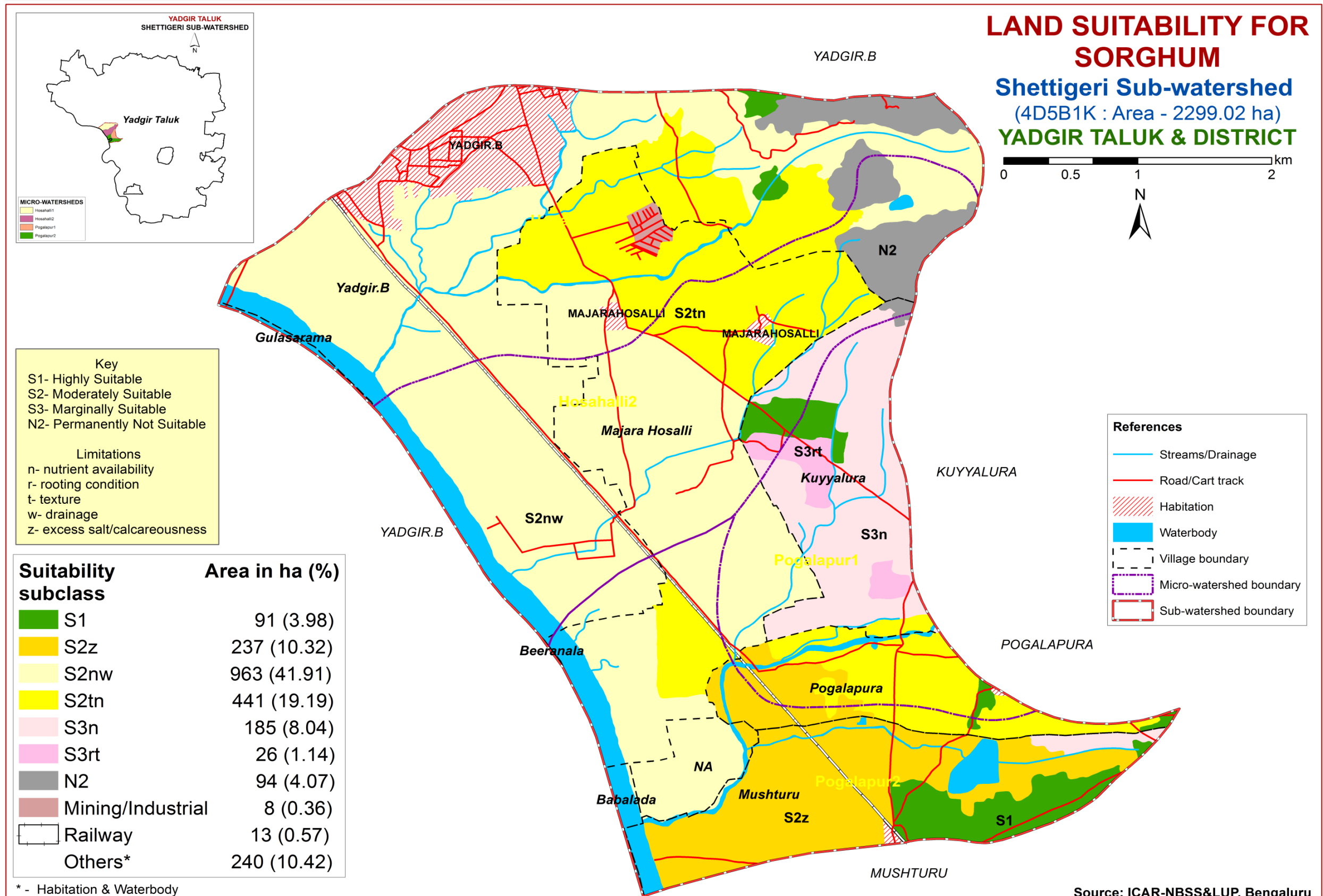
## 6.12. Correcting the Soil Nutrient Deficiencies

1. Reclamation of Salt affected soils
  - a) When the soil is having neutral pH (6.5-7.5), no need of adding amendments (lime or gypsum)
  - b) If the soil pH is <6.5, apply burnt lime to soil as per specifically recommended dosage and again after 2 years proper change has to be made based on soil test results.
  - c) If the soil pH is 7.5-8.5 due to excess calcium content, drain out the excess calcium from the soil with good quality irrigation water.
  - d) If the soil pH is more than 8.5 due to higher sodium content in soil, apply specifically recommended dose of gypsum & drain out the excess salts with good quality irrigation water.
2. In case of low & high content of major nutrients in the soil, follow the modifications as given below:
  - N: P: K (N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O) **For low N content**, add 25 % extra to the Recommended Dose of Fertilisers (RDF).  
**For high N content**, reduce 25% from the RDF and apply to soil.  
Eg:- if 100kg N, then we have to apply
    - 100+25% for deficient soil.
    - 100% for medium available N content soil.
    - 100-25% for higher N content soil.
  - Follow the same in case of P & K.
3. Use or Incorporation of biofertilizers like Rhizobium, Azotobacter, Azospirillum, Phosphate Solubilizing Bacteria and mycorrhiza enhances normal available nutrients in soil to the plants and also reduce the input cost of cultivation.
4. For calcium deficient soil, apply N-fertilizers like calcium ammonium nitrate; Gypsum can also supply calcium (CaSO<sub>4</sub> · 2H<sub>2</sub>O)
5. Apply 405kg MgSO<sub>4</sub> per ha to the magnesium deficient soil. In case of perennial horticulture crops apply 150-200g/ plant.
6. In sulphur deficient acid soils (Humid region) apply phosphorus (in the form of) through SSP & use sulphur coated urea to the crops.
7. Apply 30-50kg ferrous sulfate (FeSO<sub>4</sub>) per ha to the iron deficient soils. In case of perennial Horticulture crops apply 3-5g/ litre FeSO<sub>4</sub>/plant as foliar spray.
8. Apply 30-40kg/ha – manganese sulfate (MnSO<sub>4</sub>) as soil application to the manganese deficient soils. In case of perennial Horticulture crops apply 3-5 g/litre MnSO<sub>4</sub> /plant as foilar application.
9. Apply Zinc – 10-25 kg/ha –ZnSO<sub>4</sub> – soil application to the Zinc deficient soils. In case of perennial Horticulture crops apply 3-5g/ litre – foliar application.
10. Apply Copper – 5-10 kg /ha – copper sulfate (CuSO<sub>4</sub>) soil application for the copper deficient soils and for Perennial horticultural crops 3-5g/ litre – CuSO<sub>4</sub>/plant as foliar application.
11. Apply borax 8-10 kg/ha in boron deficient soils and for Perennial horticultural crops as foliar application – 1g / litre.
12. Apply molybdenum – ammonium molybdate 200-250 gm/ha for Molybdenum deficient soils or dissolve 1g / litre ammonium molybdate for Foliar spray.
13. Soil sampling and testing needs to be done at every 2-3 years interval.



# 7. Land Suitability for Major Crops

## 7.1. Land Suitability for Sorghum

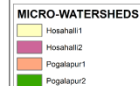
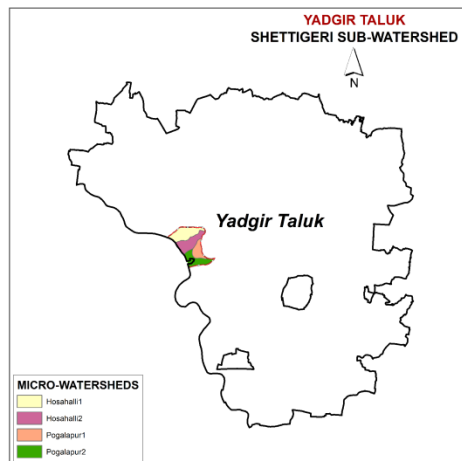
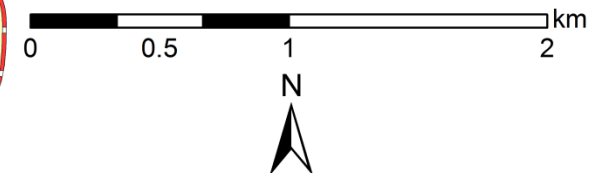


Source: ICAR-NBSS&LUP, Bengaluru

# 7.2. Land Suitability for Maize

## LAND SUITABILITY FOR MAIZE

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

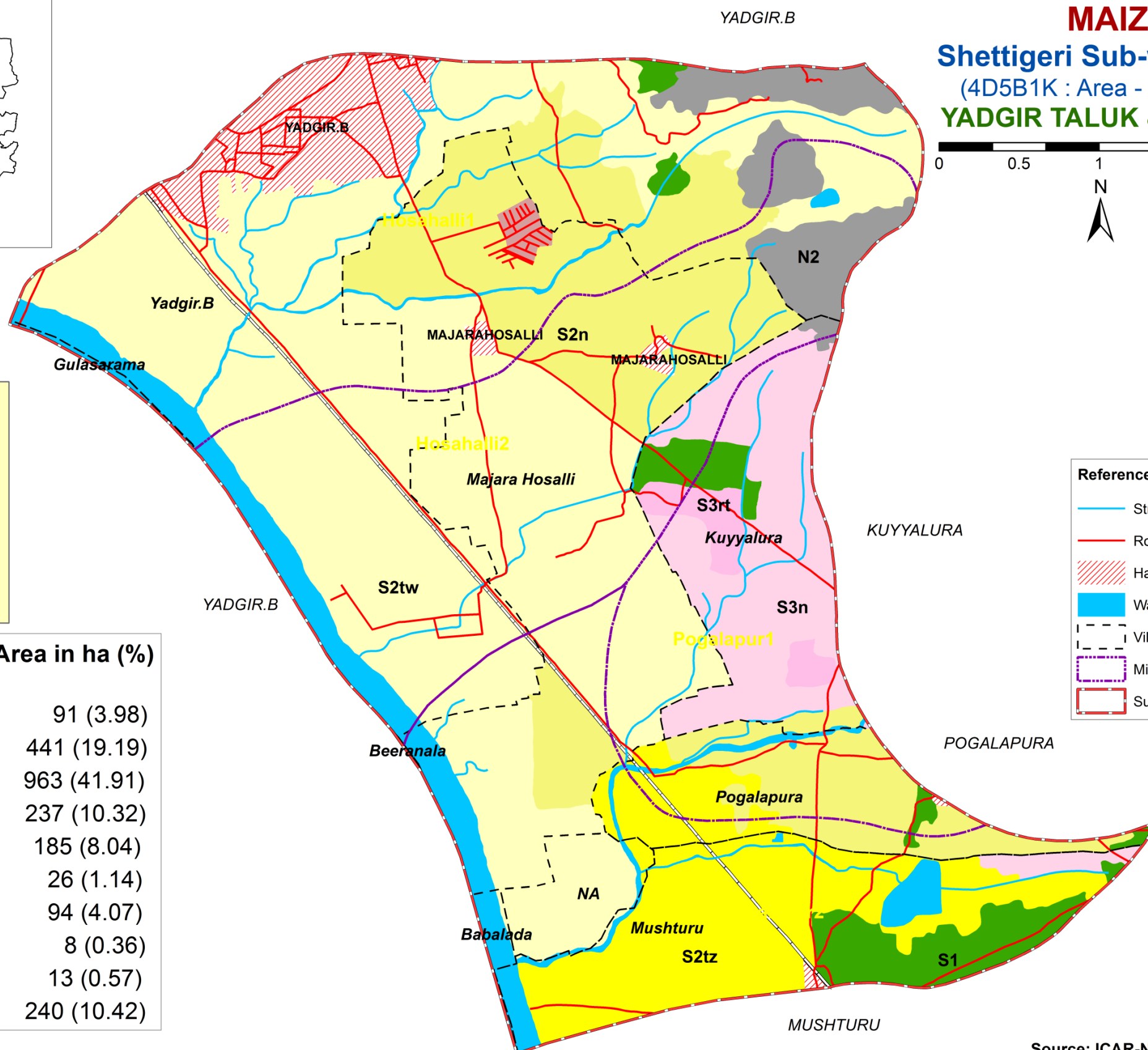
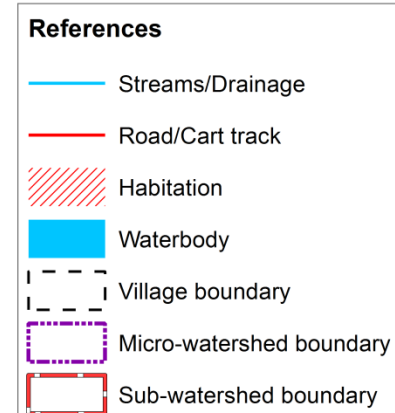


**Key**  
S1- Highly Suitable  
S2- Moderately Suitable  
S3- Marginally Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
w- drainage  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2n	441 (19.19)
S2tw	963 (41.91)
S2tz	237 (10.32)
S3n	185 (8.04)
S3rt	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody



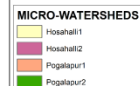
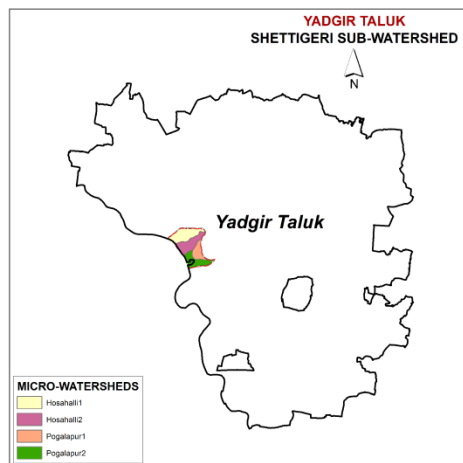
Source: ICAR-NBSS&LUP, Bengaluru

# 7.3. Land Suitability for Redgram

## LAND SUITABILITY FOR REDGRAM

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

0 0.5 1 2 km

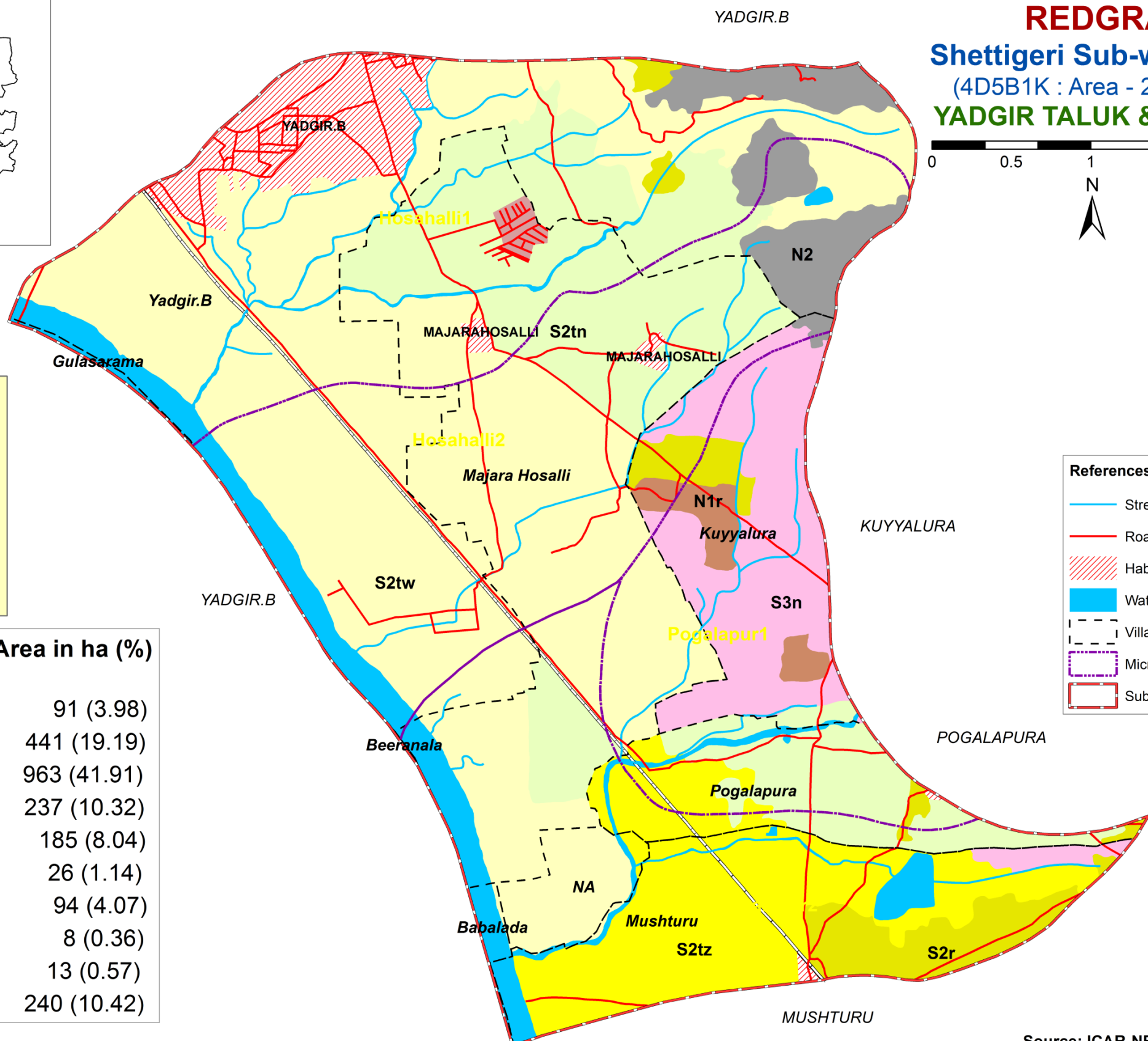
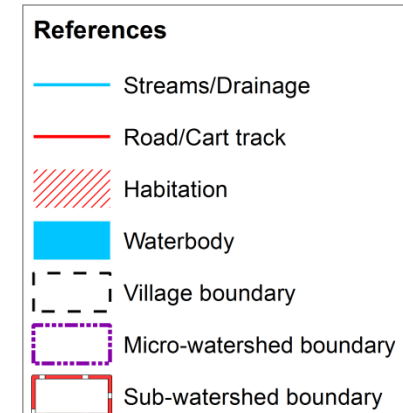


**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
w- drainage  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2tn	441 (19.19)
S2tw	963 (41.91)
S2tz	237 (10.32)
S3n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody



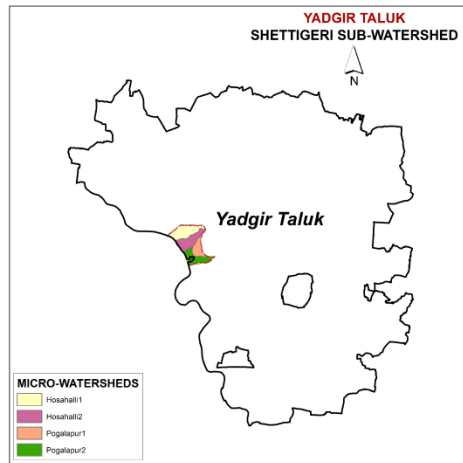
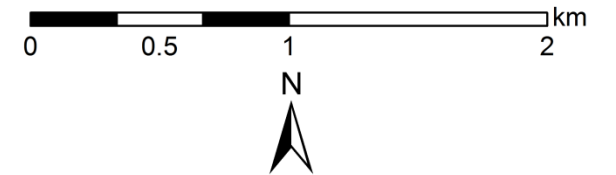
Source: ICAR-NBSS&LUP, Bengaluru



# 7.4. Land Suitability for Bajra

## LAND SUITABILITY FOR BAJRA

**Shettigeri Sub-watershed**  
(4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**



**Key**  
S1- Highly Suitable  
S2- Moderately Suitable  
S3- Marginally Suitable  
N2- Permanently Not Suitable

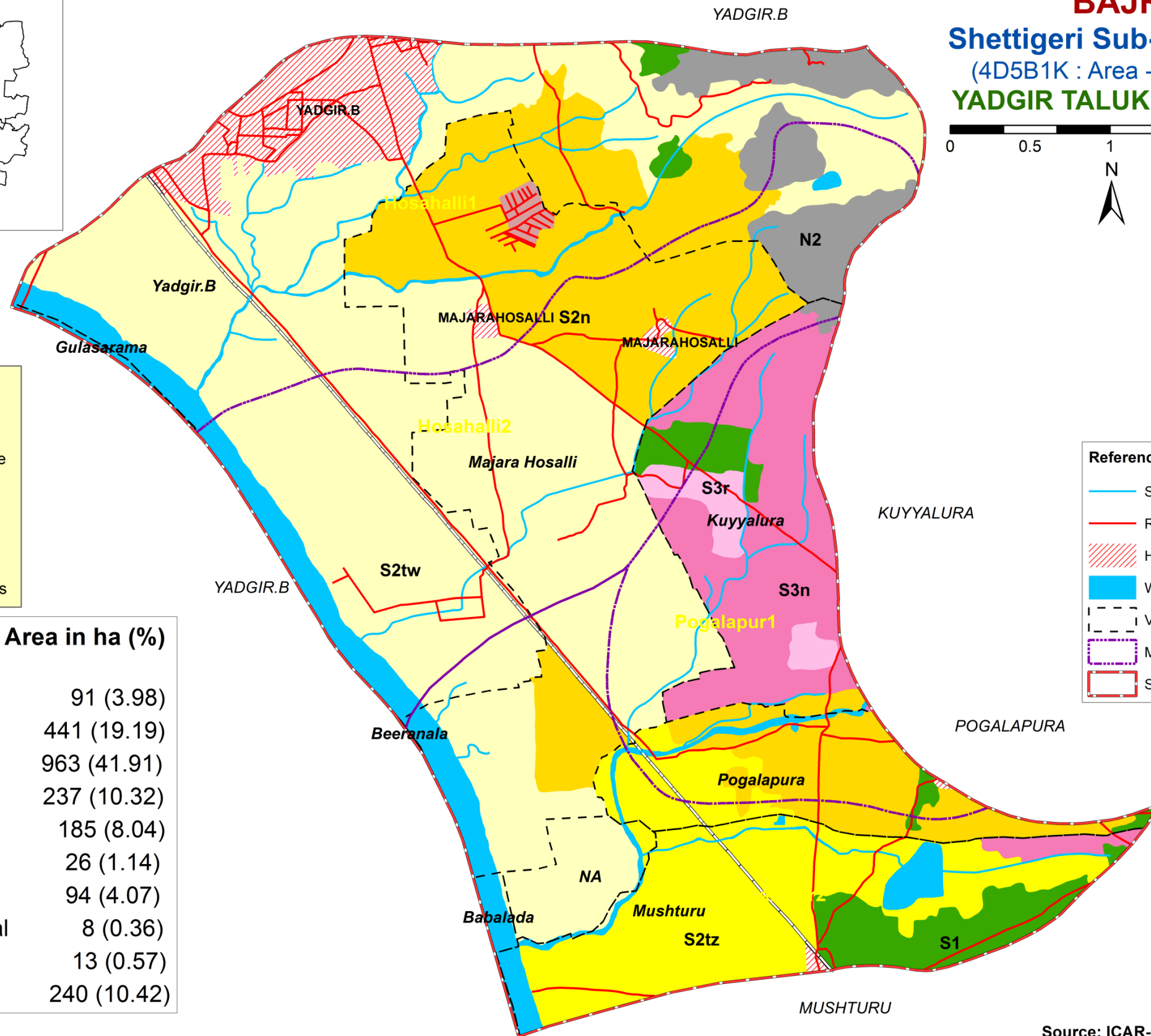
**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
w- drainage  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2n	441 (19.19)
S2tw	963 (41.91)
S2tz	237 (10.32)
S3n	185 (8.04)
S3r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary



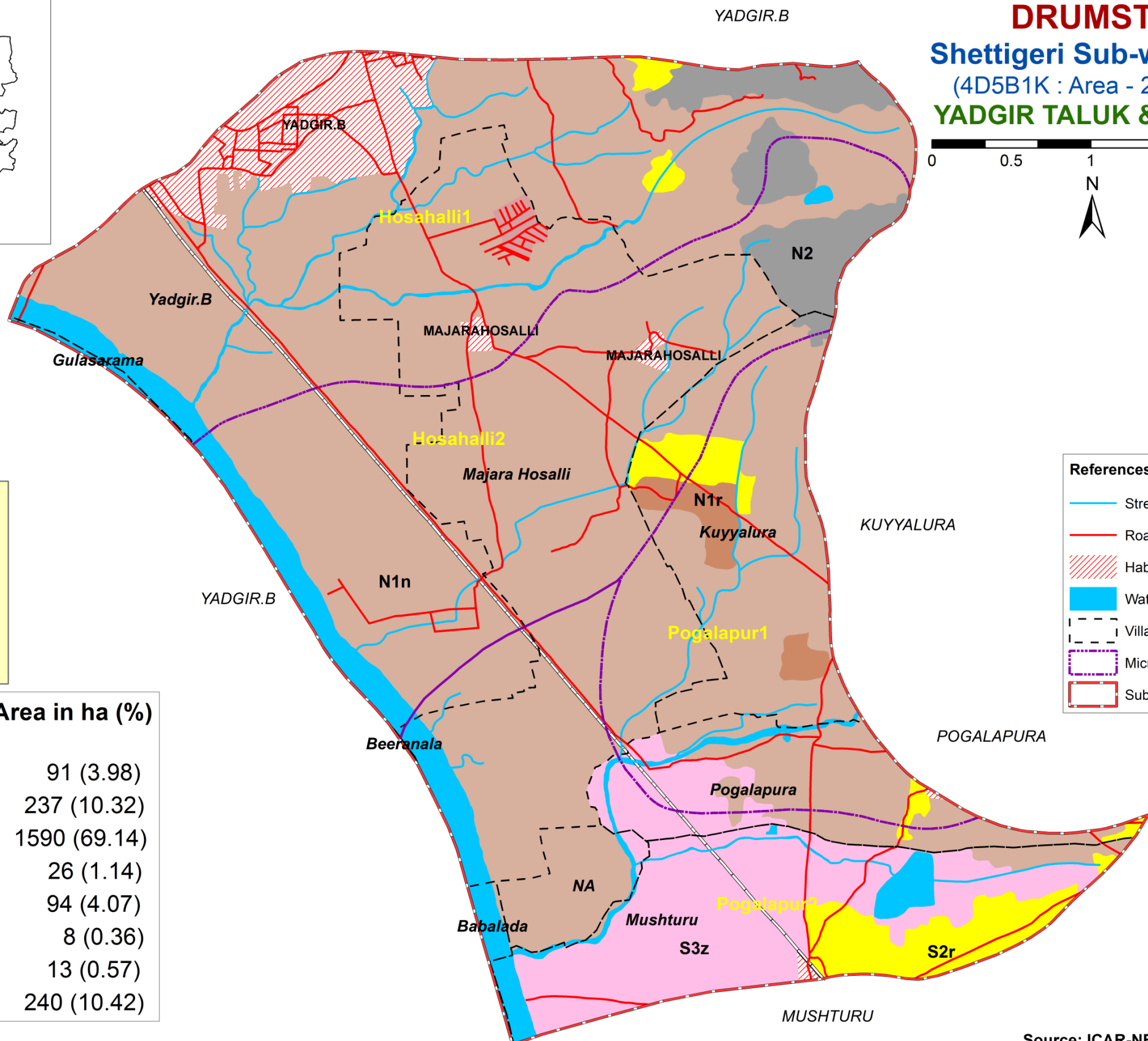
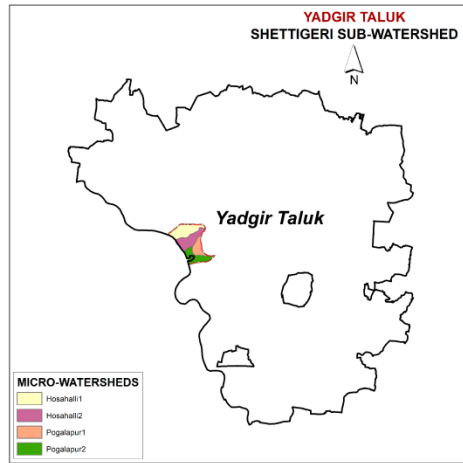
Source: ICAR-NBSS&LUP, Bengaluru

# 7.5. Land Suitability for Drumstick

## LAND SUITABILITY FOR DRUMSTICK

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

0 0.5 1 2 km



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S3z	237 (10.32)
N1n	1590 (69.14)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

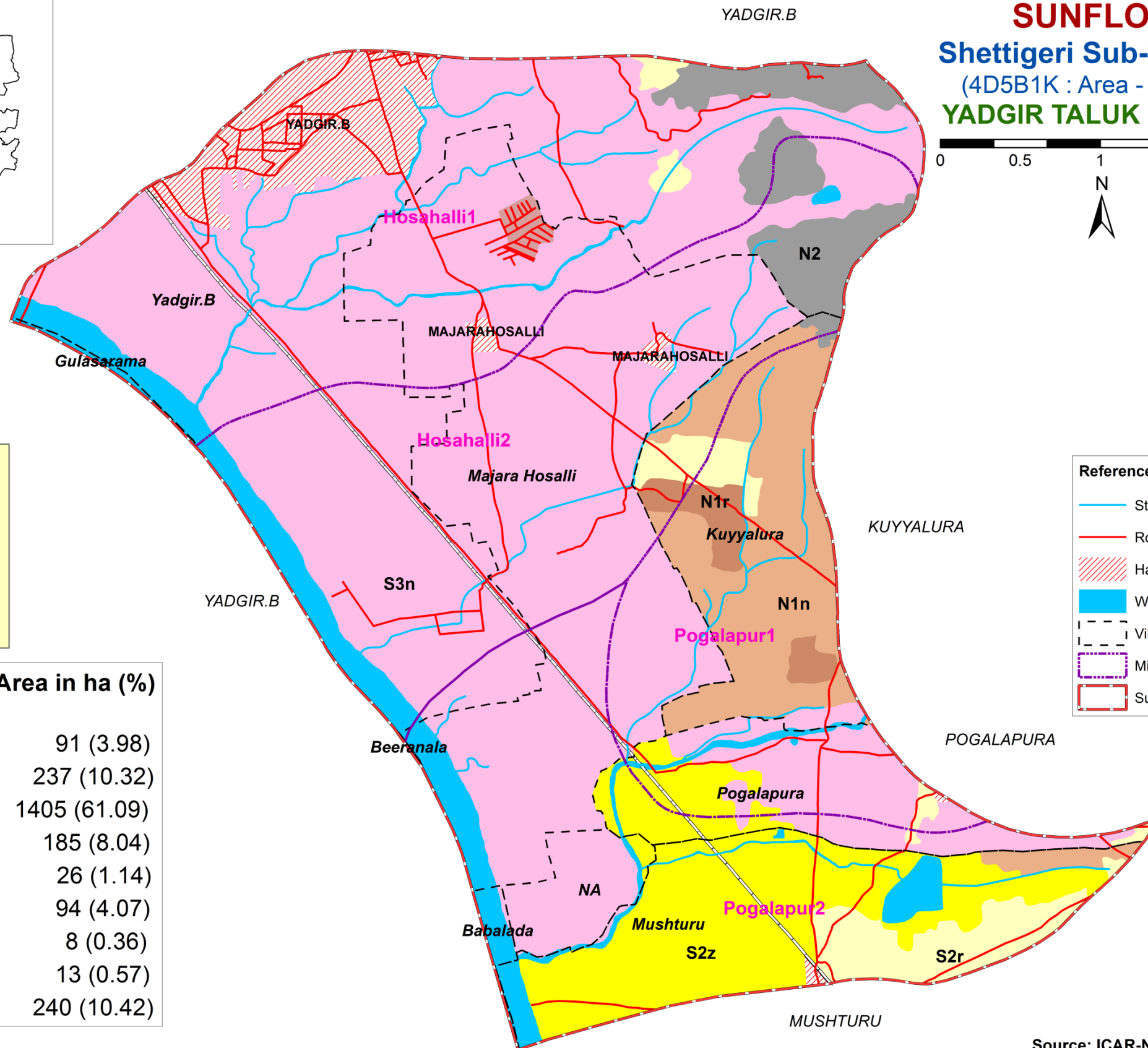
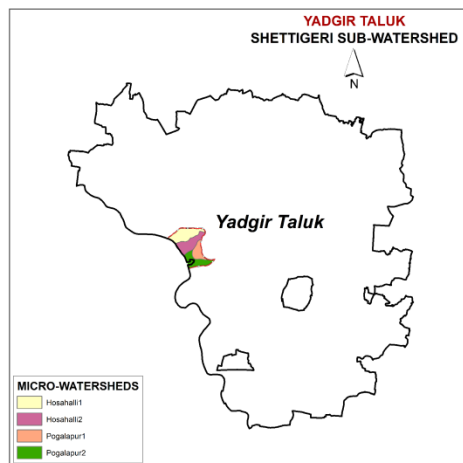
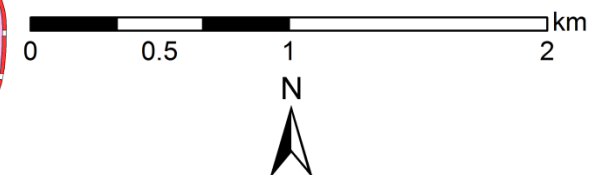
\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.6. Land Suitability for Sunflower

## LAND SUITABILITY FOR SUNFLOWER

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2z	237 (10.32)
S3n	1405 (61.09)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

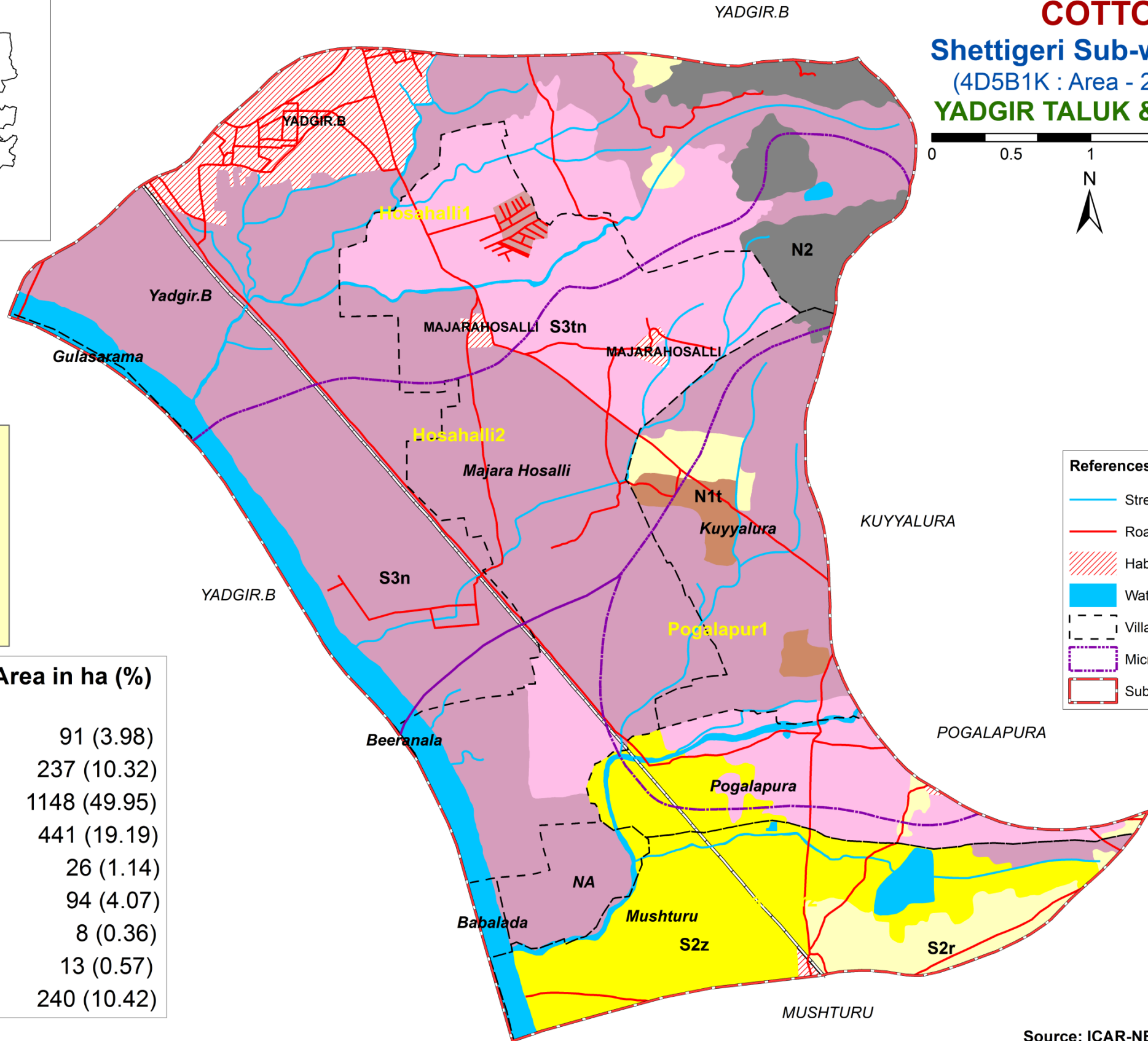
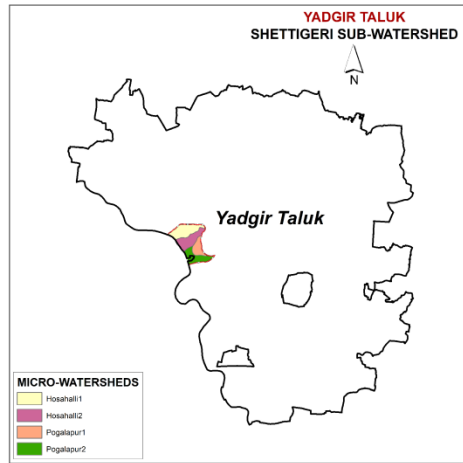


# 7.7. Land Suitability for Cotton

## LAND SUITABILITY FOR COTTON

**Shettigeri Sub-watershed**  
(4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**

0 0.5 1 2 km



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2z	237 (10.32)
S3n	1148 (49.95)
S3tn	441 (19.19)
N1t	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

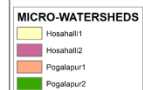
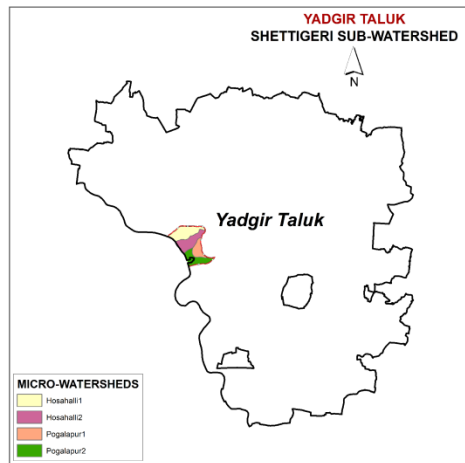
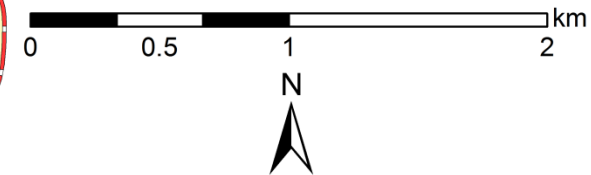
\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.8. Land Suitability for Bengalgram

## LAND SUITABILITY FOR BENGALGRAM

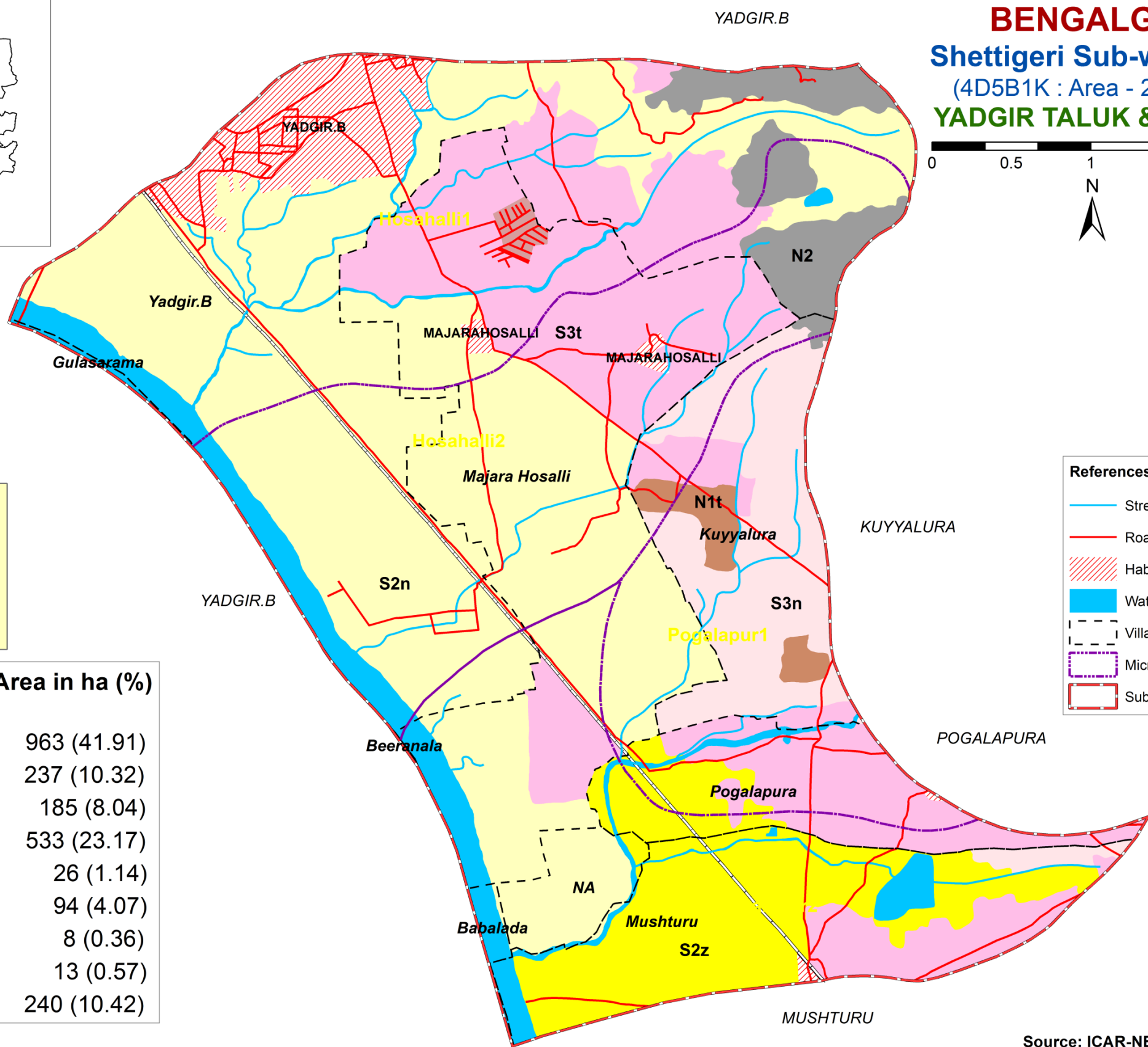
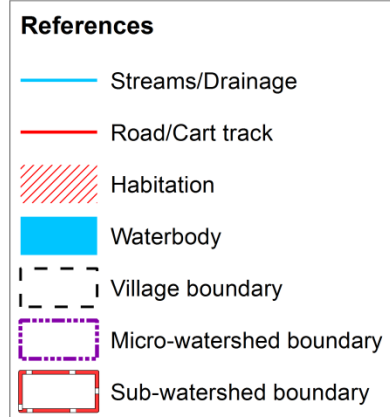
Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
 S2- Moderately Suitable  
 S3- Marginally Suitable  
 N1- Currently Not Suitable  
 N2- Permanently Not Suitable  
 n- nutrient availability  
 t- texture  
 z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S2n	963 (41.91)
S2z	237 (10.32)
S3n	185 (8.04)
S3t	533 (23.17)
N1t	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

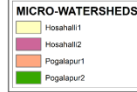
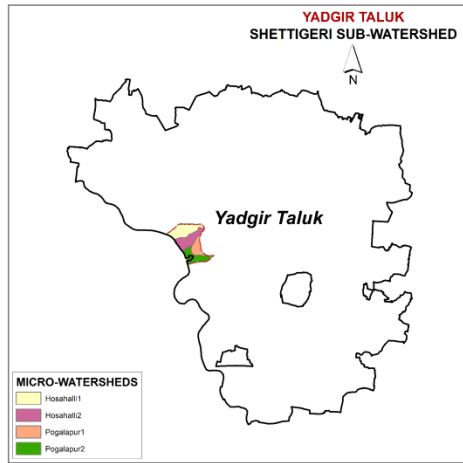
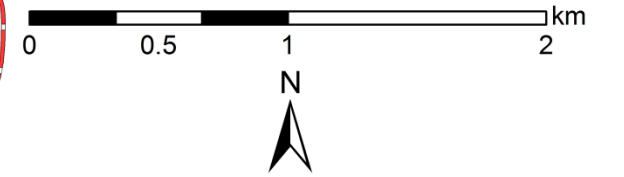


Source: ICAR-NBSS&LUP, Bengaluru

# 7.9. Land Suitability for Groundnut

## LAND SUITABILITY FOR GROUNDNUT

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

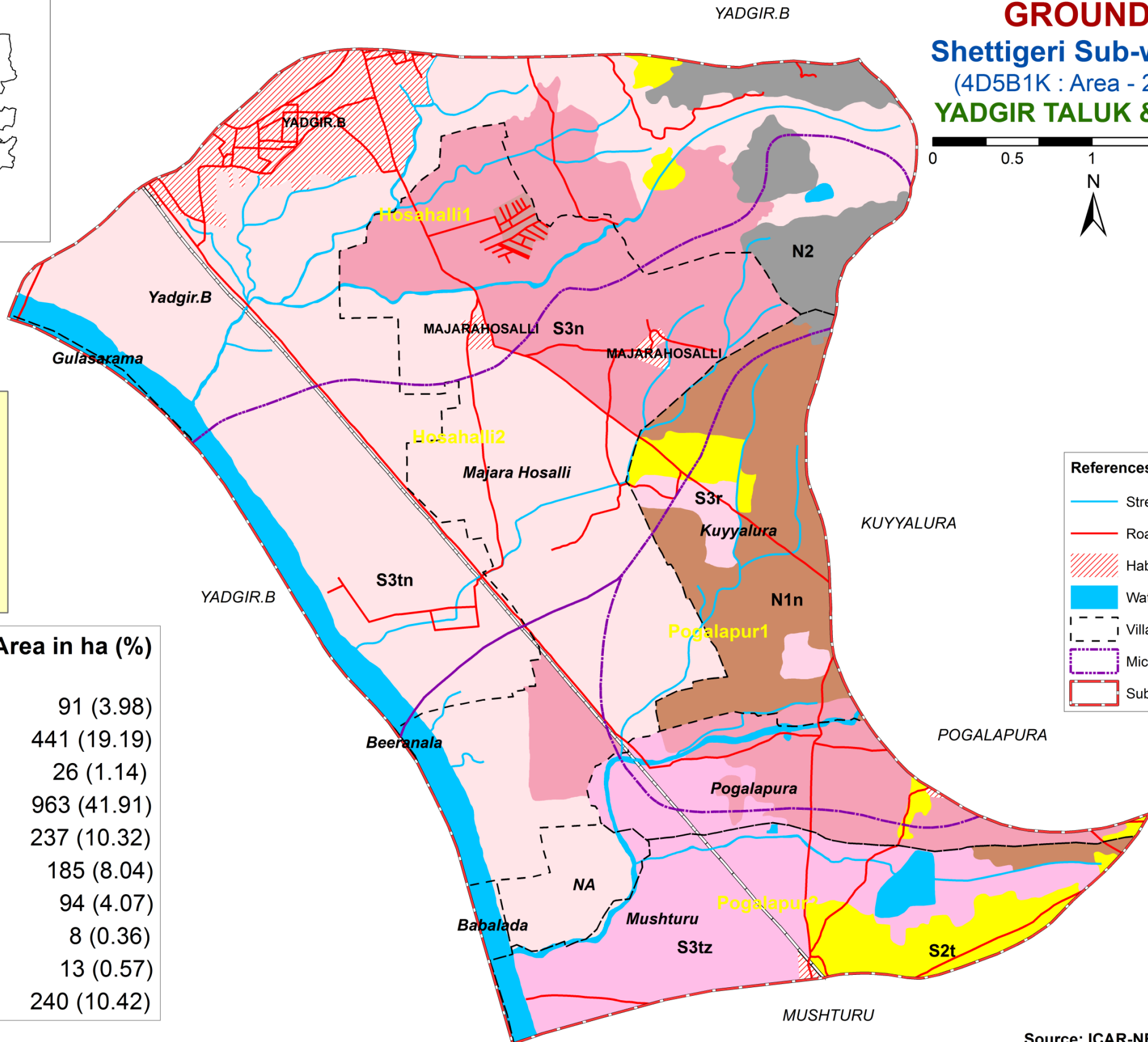
**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S2t	91 (3.98)
S3n	441 (19.19)
S3r	26 (1.14)
S3tn	963 (41.91)
S3tz	237 (10.32)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary



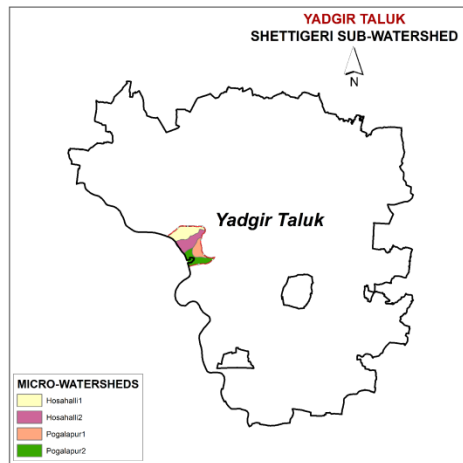
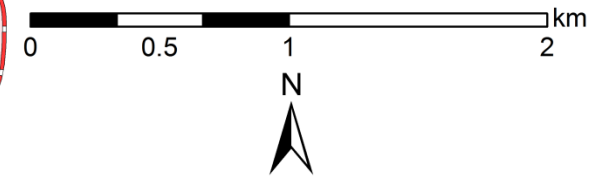
Source: ICAR-NBSS&LUP, Bengaluru



# 7.10. Land Suitability for Chilli

## LAND SUITABILITY FOR CHILLI

**Shettigeri Sub-watershed**  
(4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**



**Key**  
 S1- Highly Suitable  
 S2- Moderately Suitable  
 S3- Marginally Suitable  
 N1- Currently Not Suitable  
 N2- Permanently Not Suitable

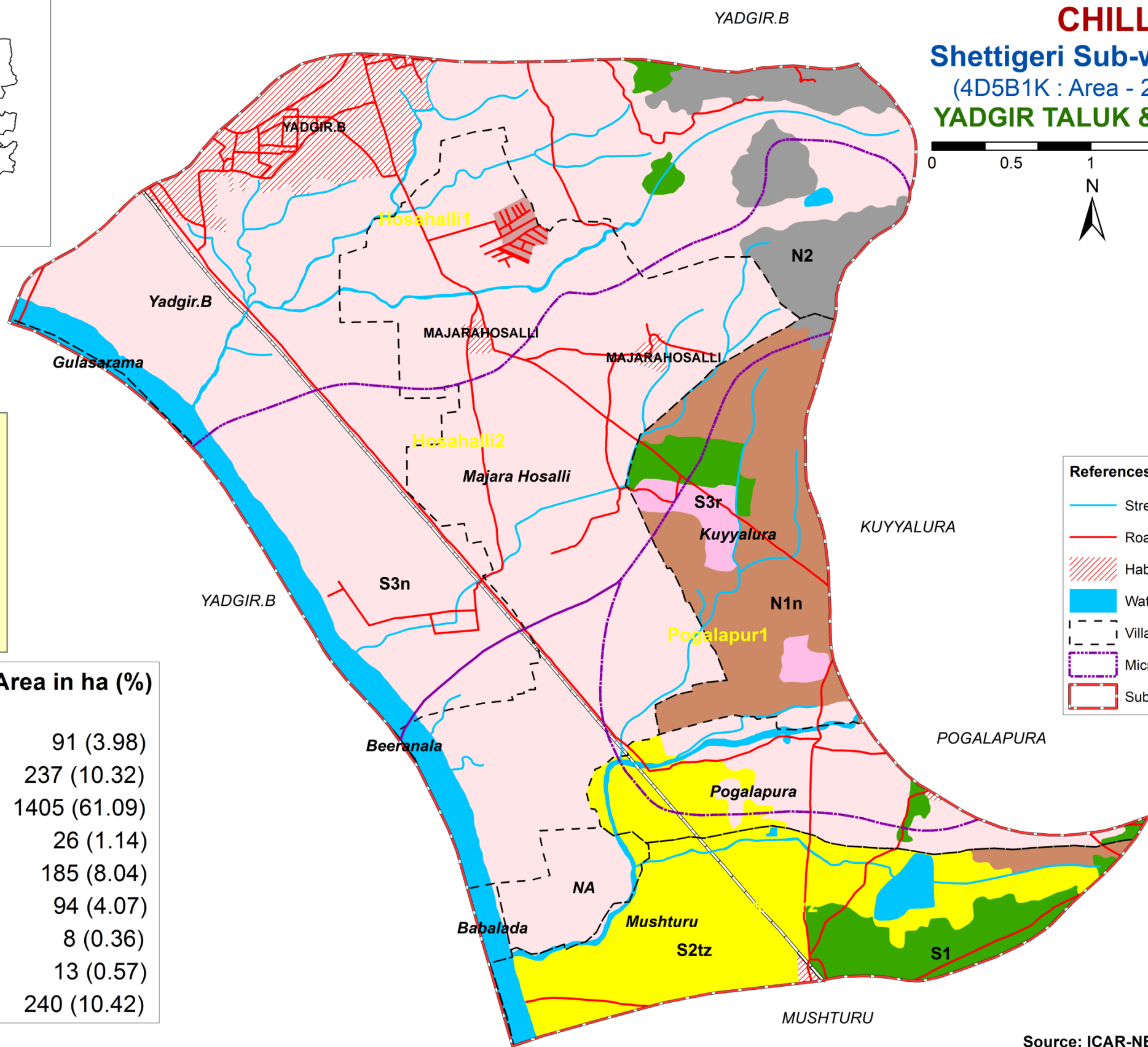
**Limitations**  
 n- nutrient availability  
 r- rooting condition  
 t- texture  
 z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2tz	237 (10.32)
S3n	1405 (61.09)
S3r	26 (1.14)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

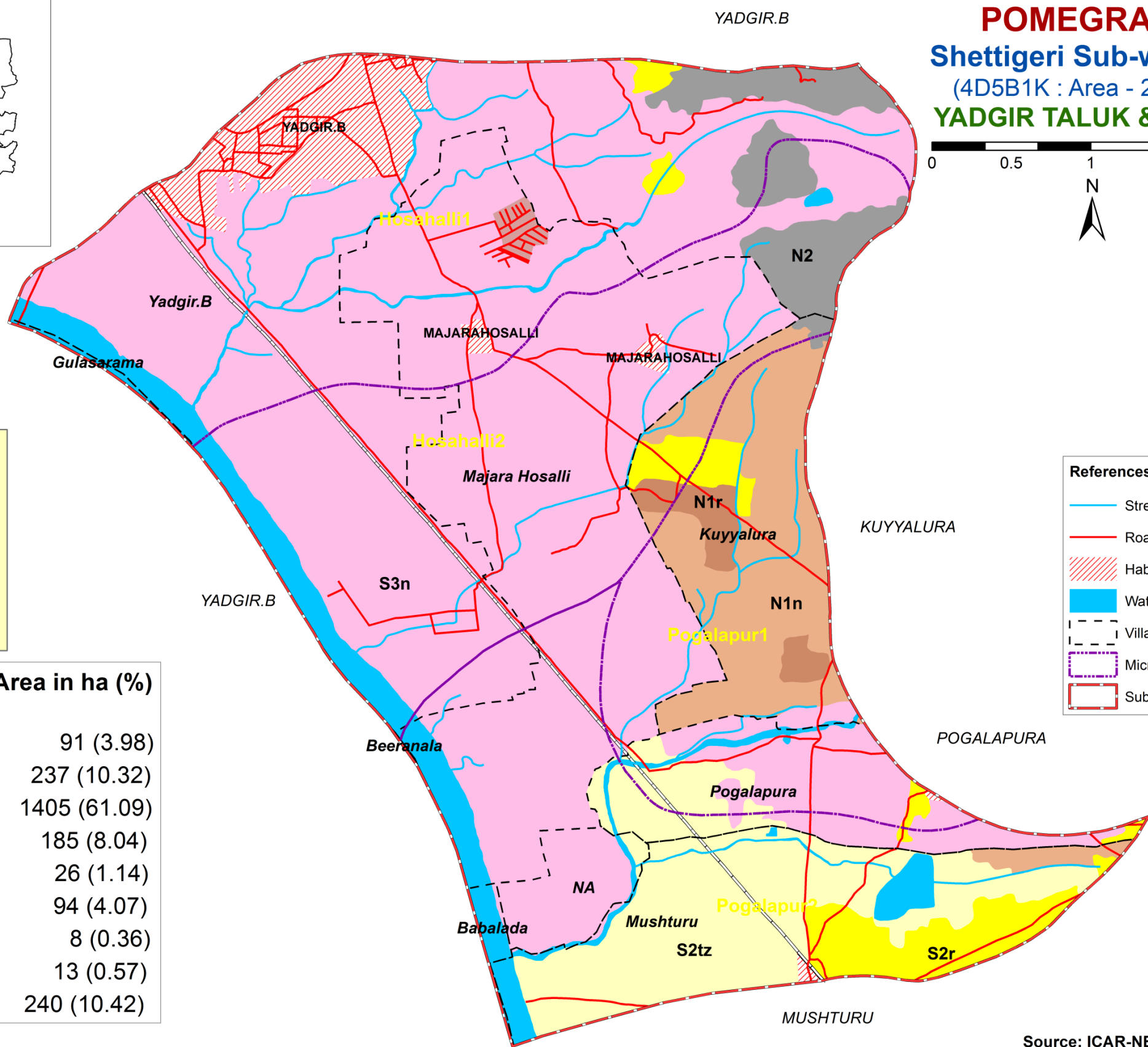
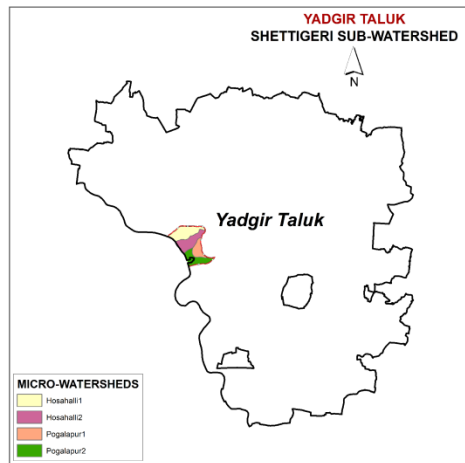
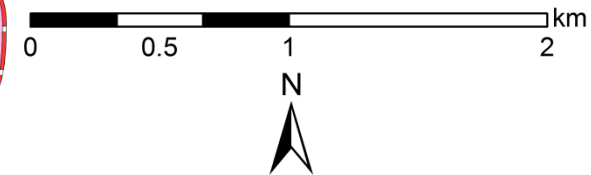


Source: ICAR-NBSS&LUP, Bengaluru

# 7.11. Land Suitability for Pomegranate

## LAND SUITABILITY FOR POMEGRANATE

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2tz	237 (10.32)
S3n	1405 (61.09)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

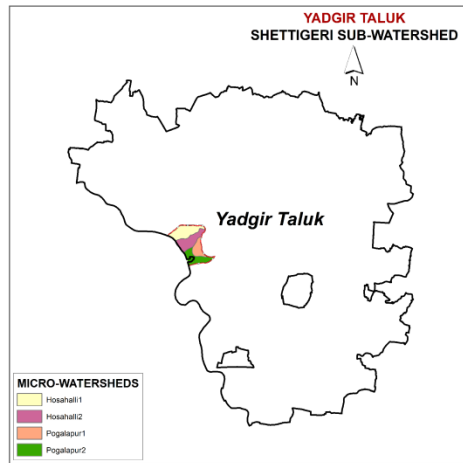
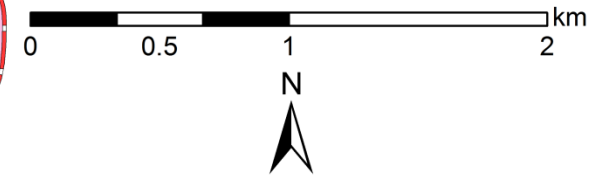
\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.12. Land Suitability for Tomato

## LAND SUITABILITY FOR TOMATO

**Shettigeri Sub-watershed**  
(4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**

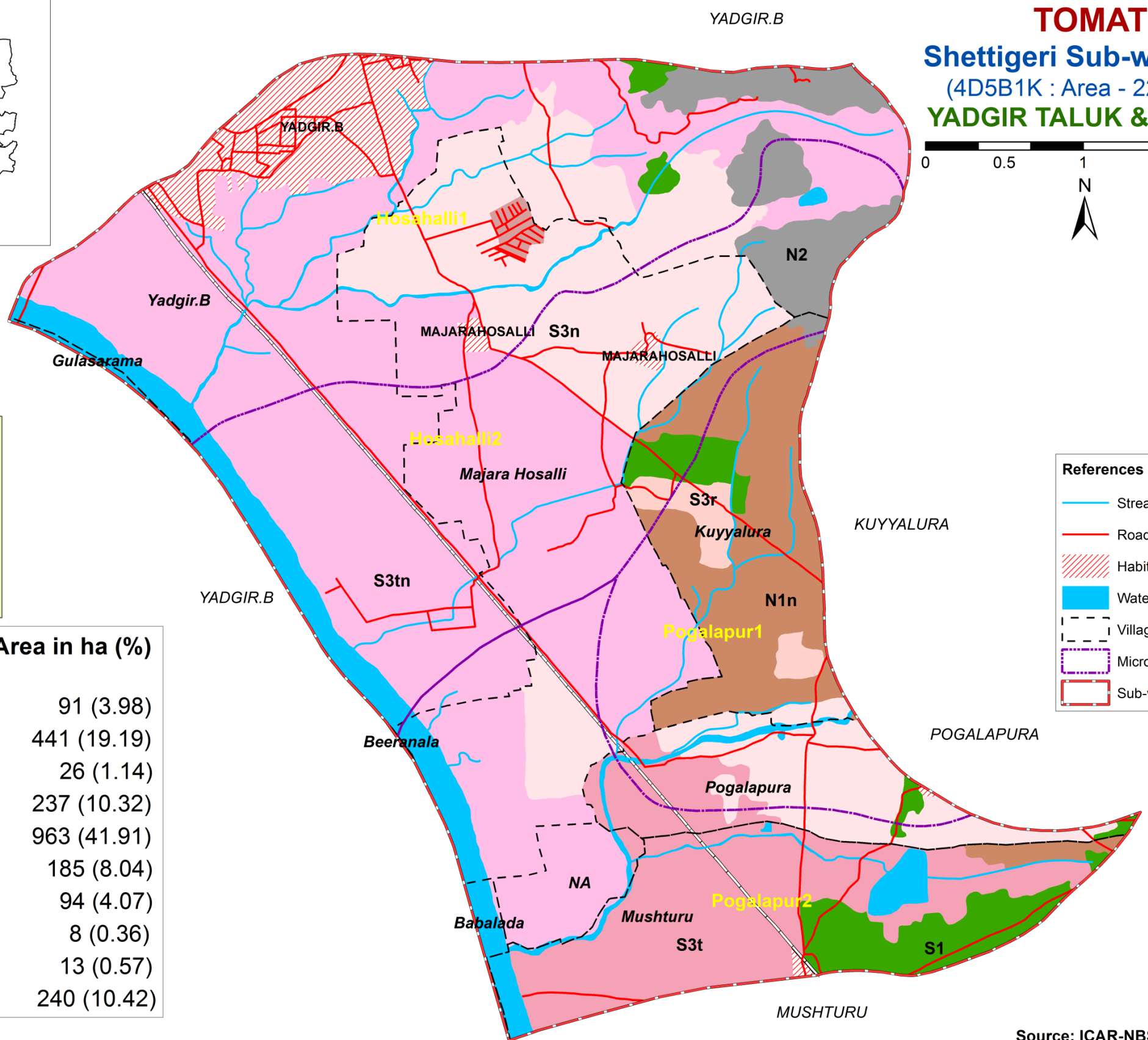
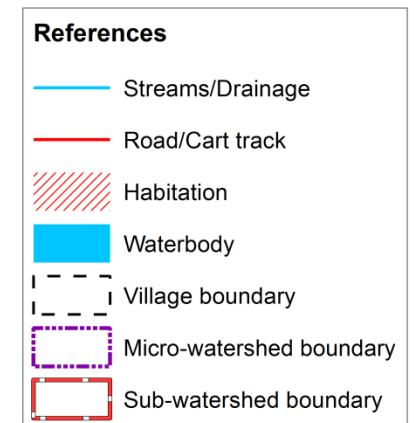


**Key**  
S1- Highly Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S3n	441 (19.19)
S3r	26 (1.14)
S3t	237 (10.32)
S3tn	963 (41.91)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

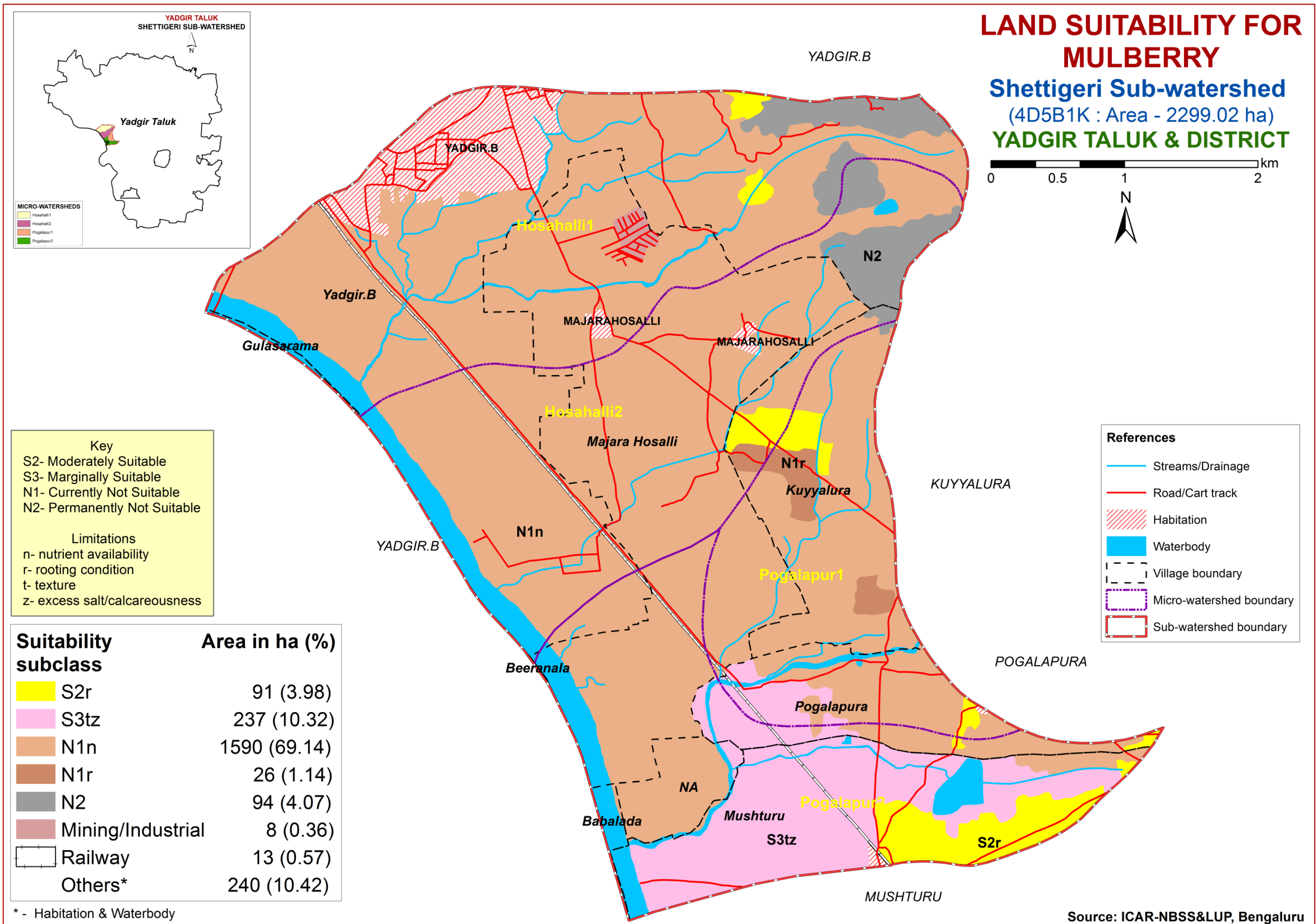
\* - Habitation & Waterbody



Source: ICAR-NBSS&LUP, Bengaluru



# 7.13. Land Suitability for Mulberry

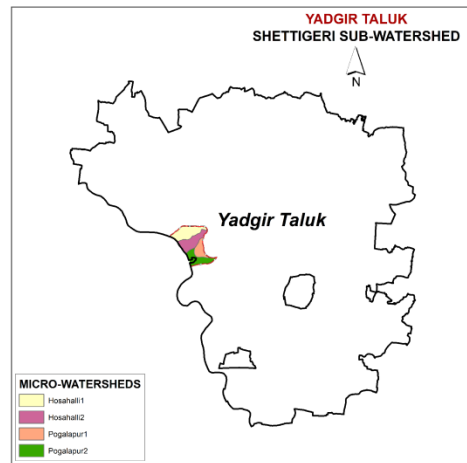
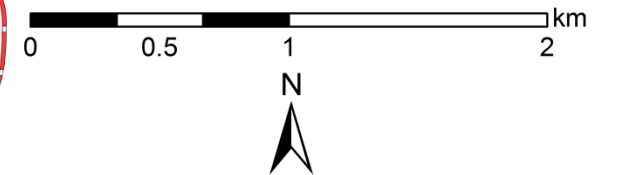


NOTE: Mulberry suitability evaluation only for mulberry leaf, not for silkworm rearing

# 7.14. Land Suitability for Bhendi

## LAND SUITABILITY FOR BHENDI

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
 S1- Highly Suitable  
 S2- Moderately Suitable  
 S3- Marginally Suitable  
 N1- Currently Not Suitable  
 N2- Permanently Not Suitable

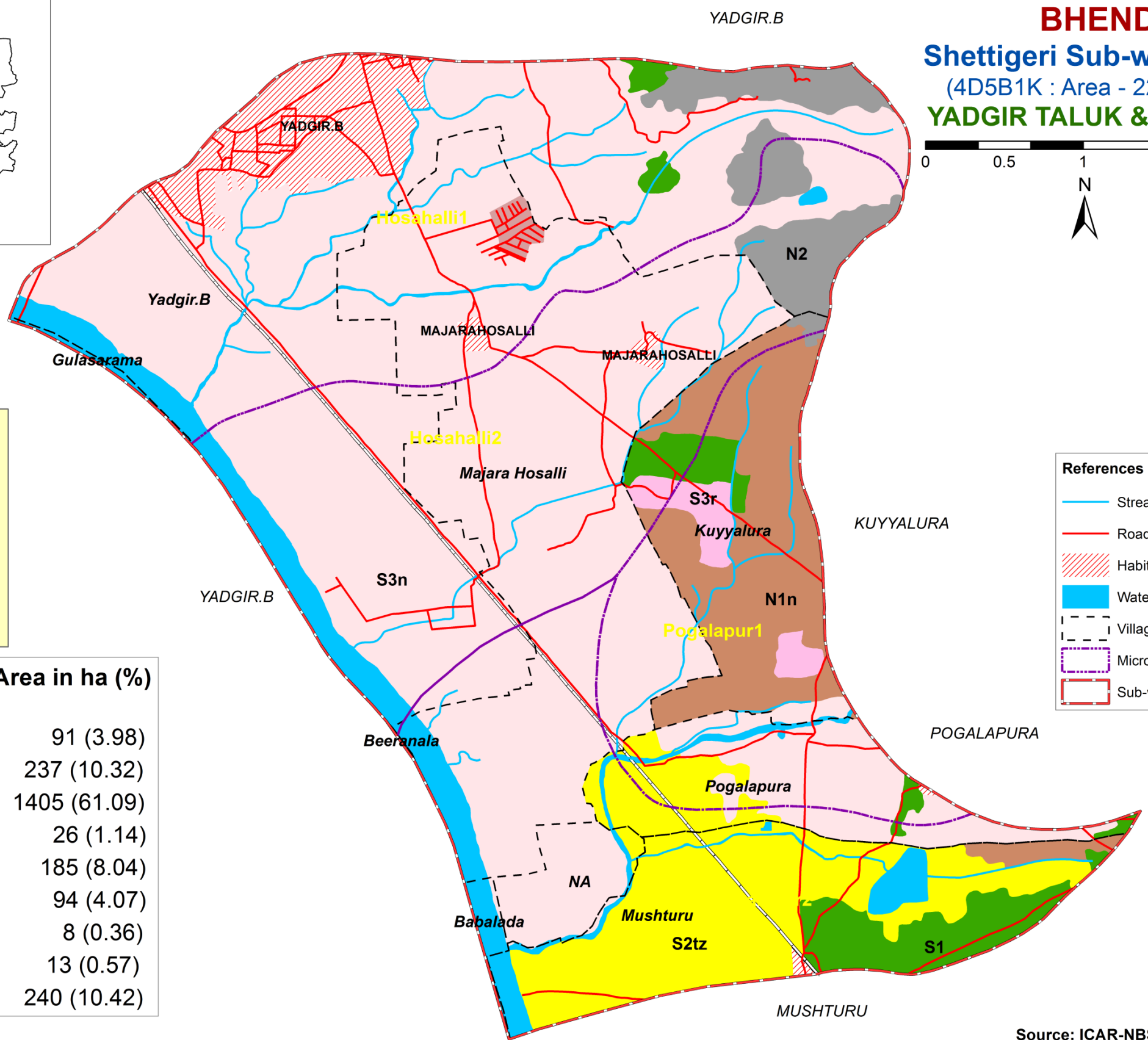
**Limitations**  
 n- nutrient availability  
 r- rooting condition  
 t- texture  
 z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2tz	237 (10.32)
S3n	1405 (61.09)
S3r	26 (1.14)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

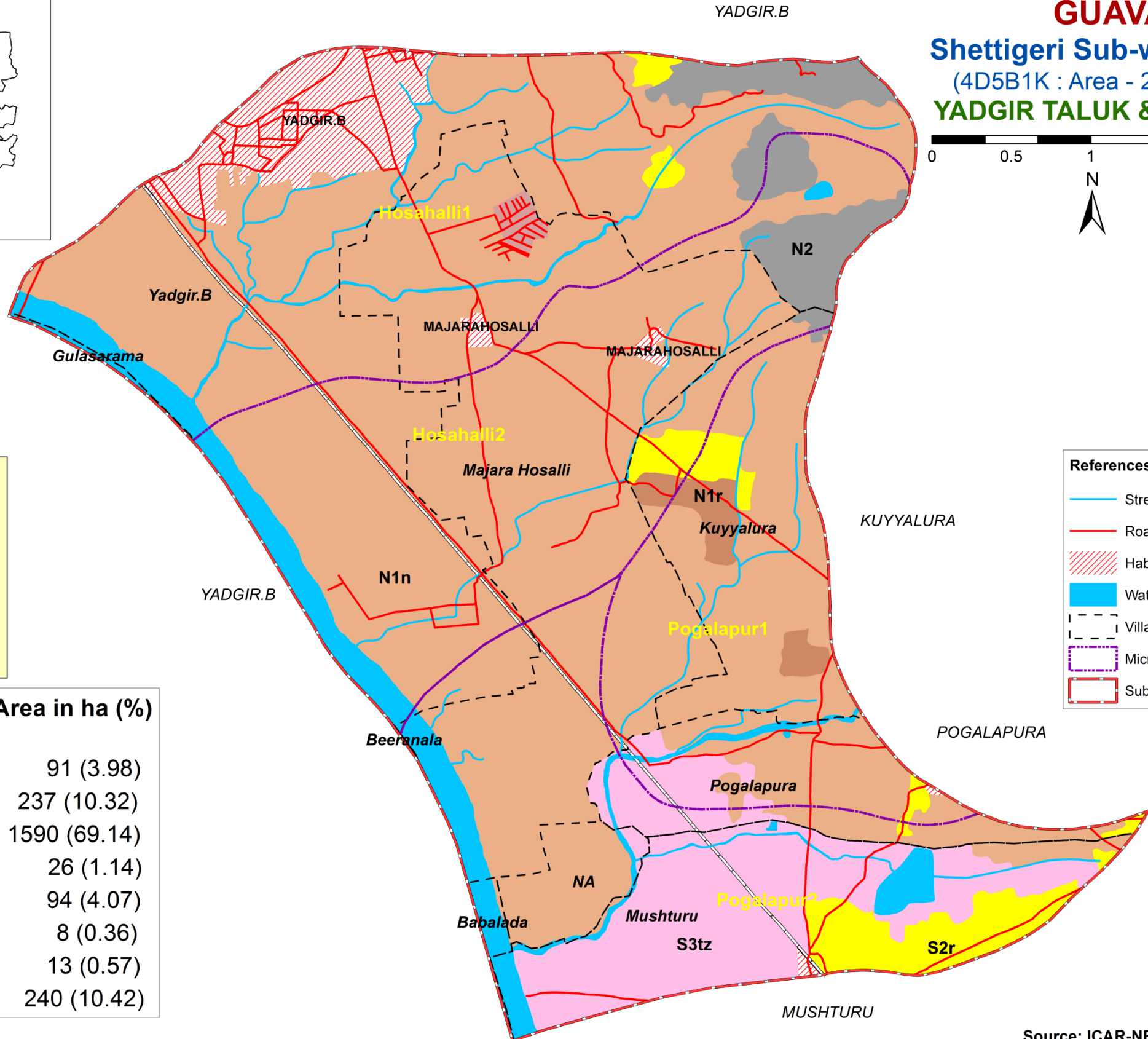
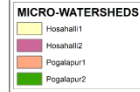
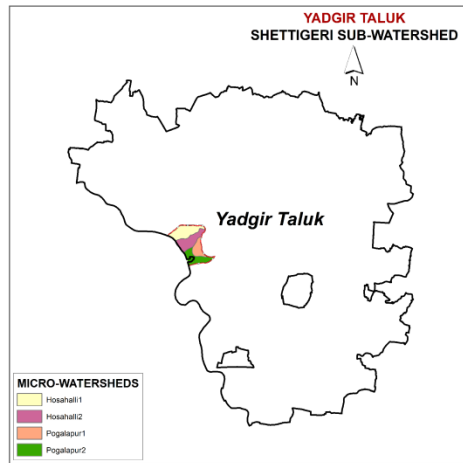
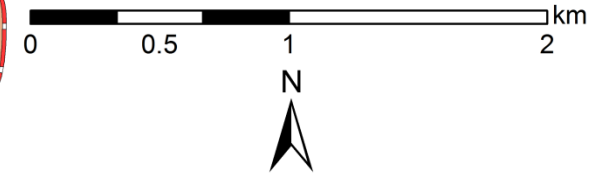


Source: ICAR-NBSS&LUP, Bengaluru

# 7.15. Land Suitability for Guava

## LAND SUITABILITY FOR GUAVA

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S3tz	237 (10.32)
N1n	1590 (69.14)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

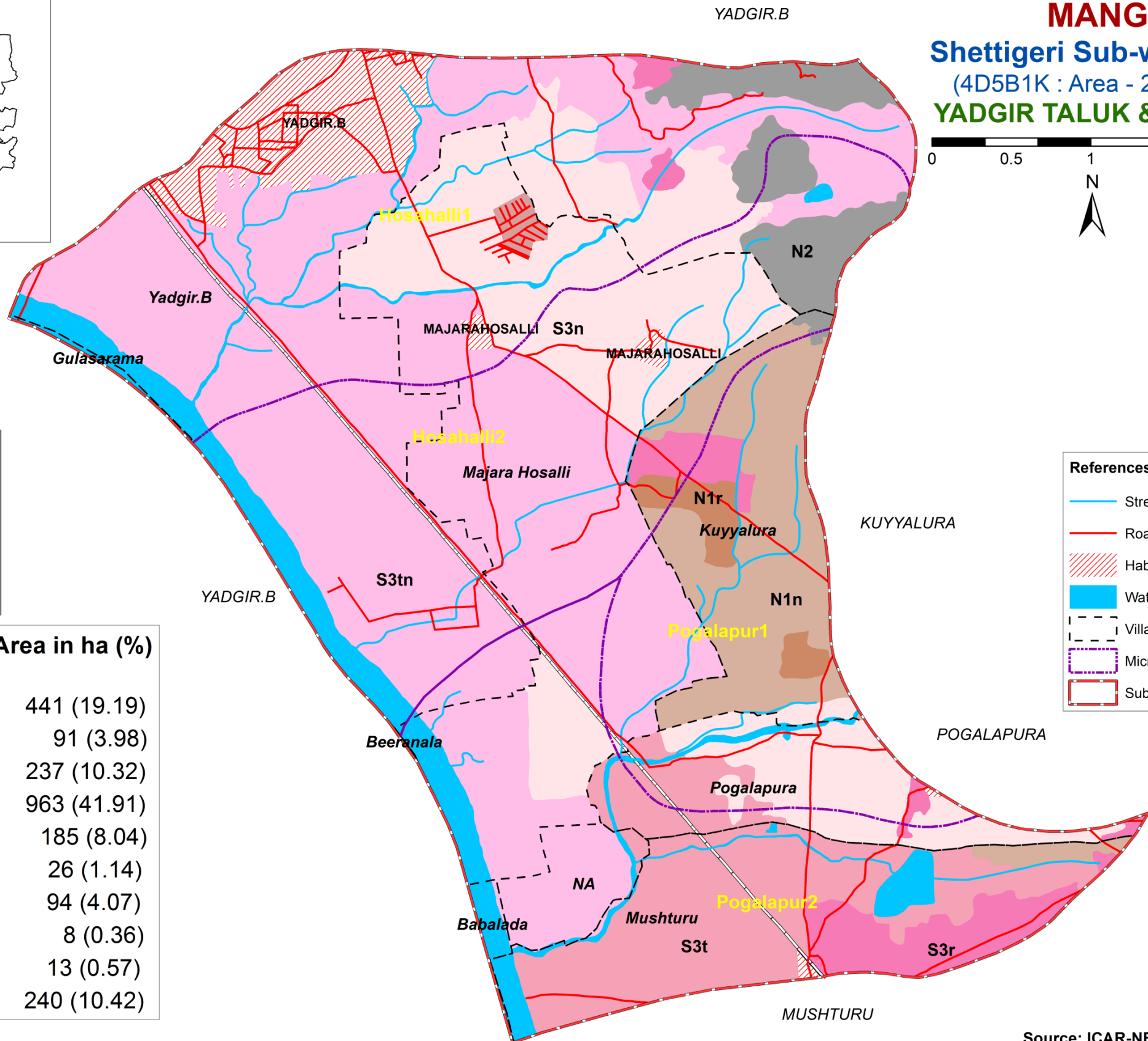
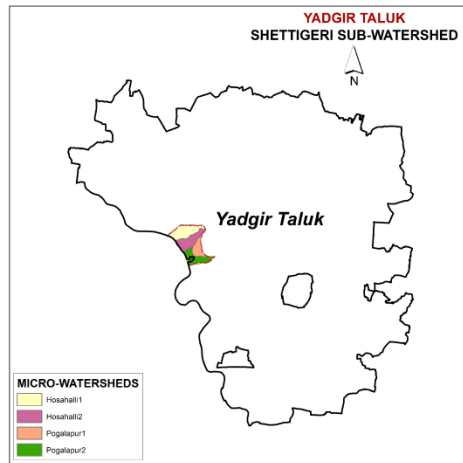
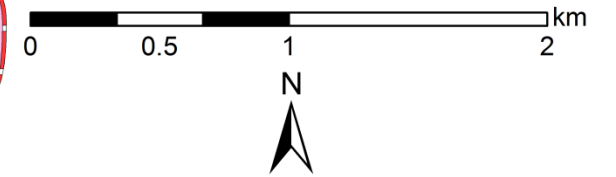
Source: ICAR-NBSS&LUP, Bengaluru



# 7.16. Land Suitability for Mango

## LAND SUITABILITY FOR MANGO

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

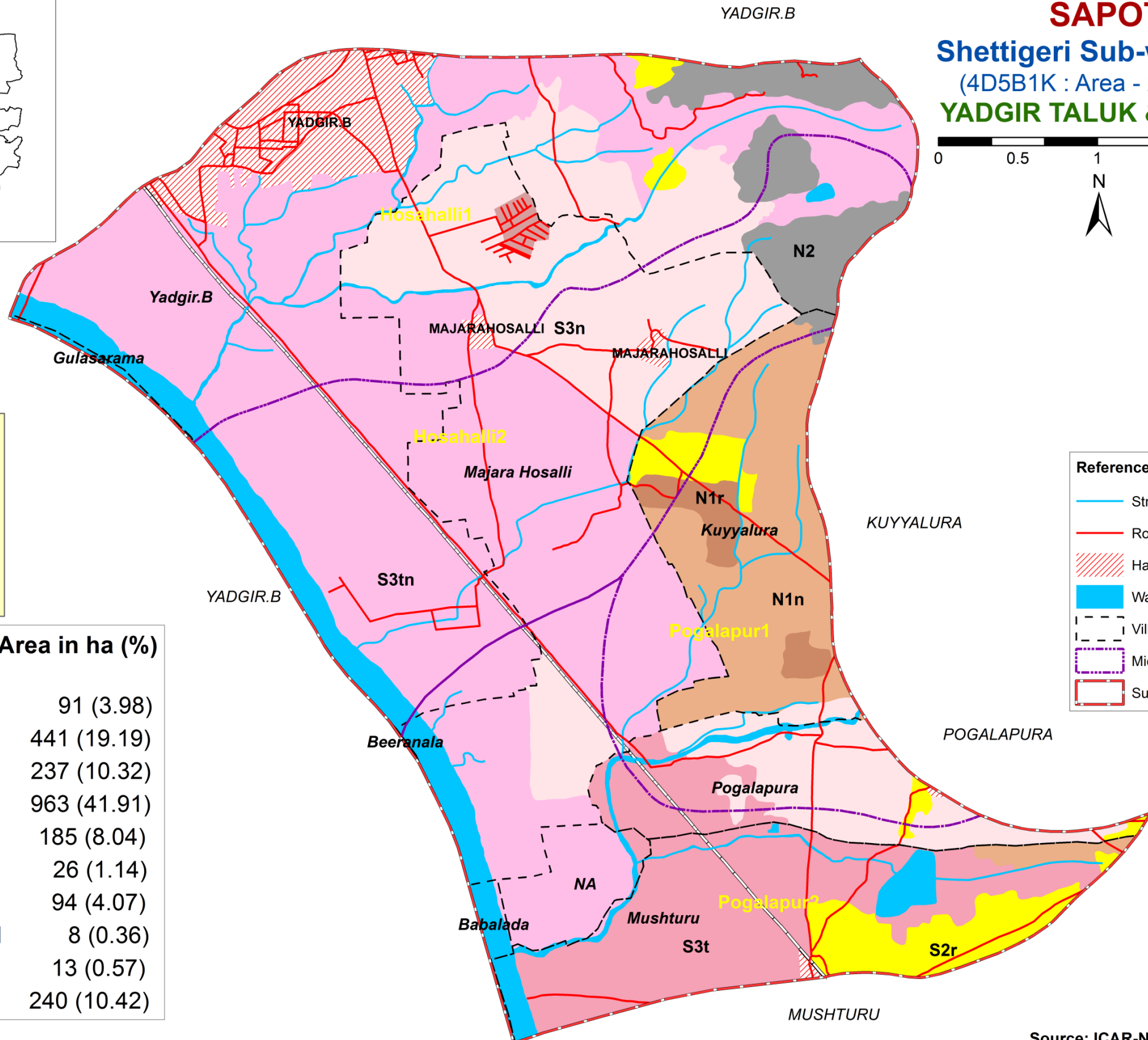
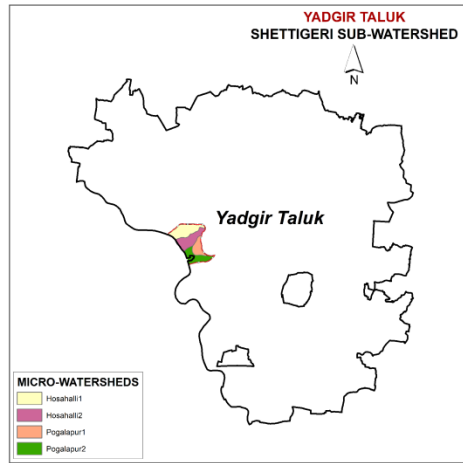
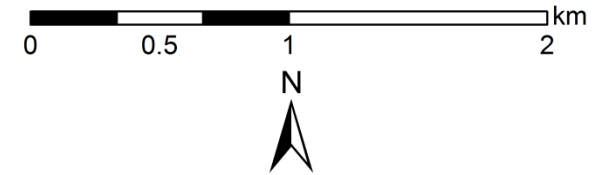
Suitability subclass	Area in ha (%)
S3n	441 (19.19)
S3r	91 (3.98)
S3t	237 (10.32)
S3tn	963 (41.91)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

# 7.17. Land Suitability for Sapota

## LAND SUITABILITY FOR SAPOTA

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S3n	441 (19.19)
S3t	237 (10.32)
S3tn	963 (41.91)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

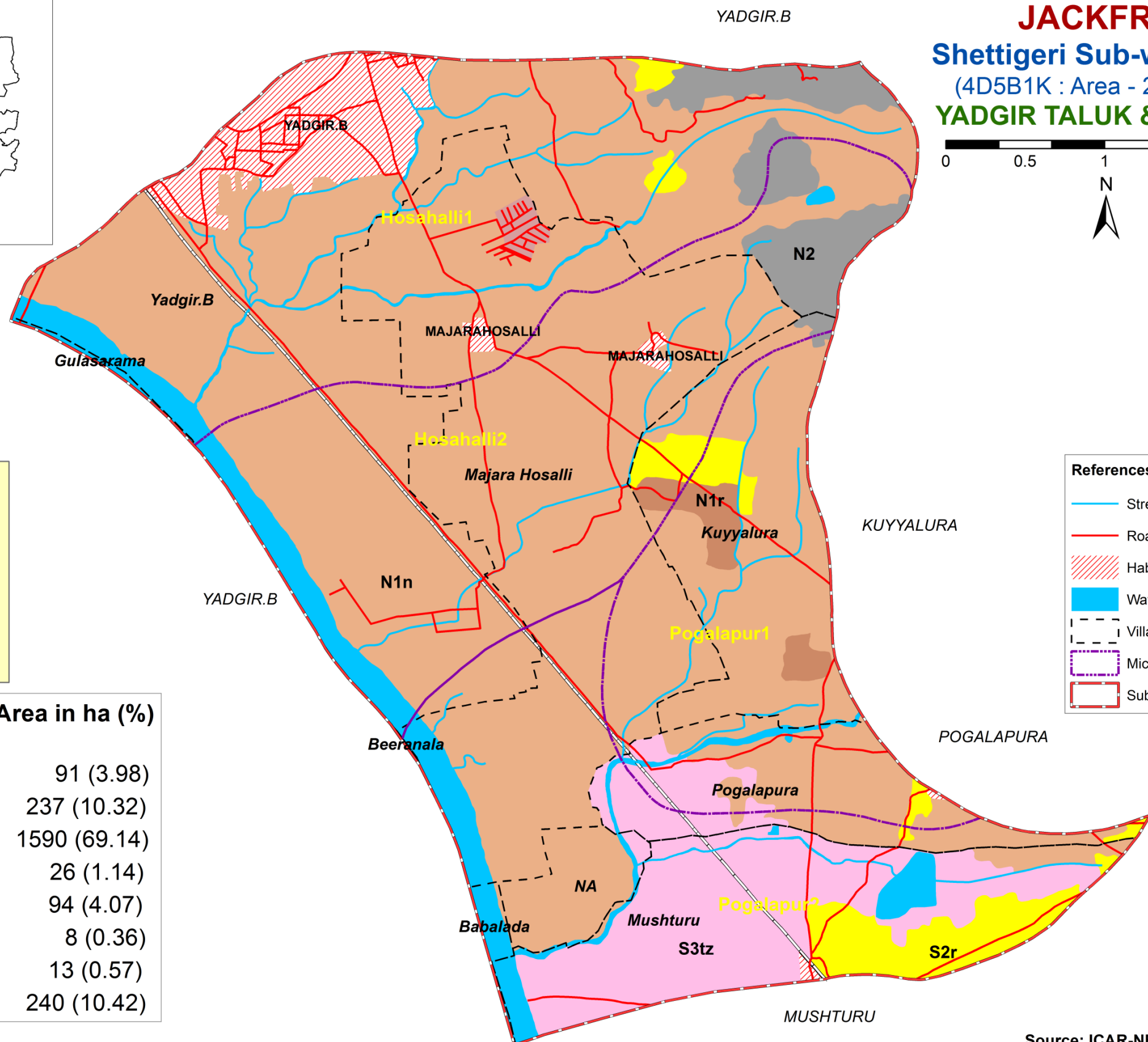
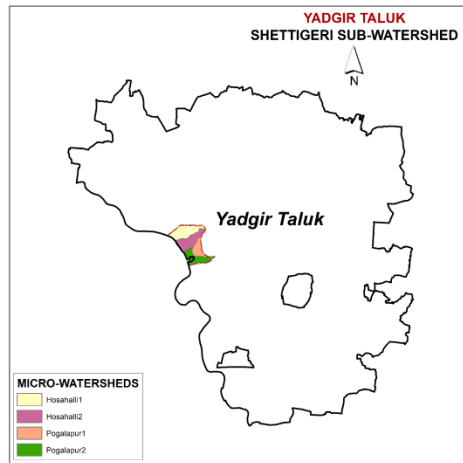
\* - Habitation & Waterbody

# 7.18. Land Suitability for Jackfruit

## LAND SUITABILITY FOR JACKFRUIT

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

0 0.5 1 2 km



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

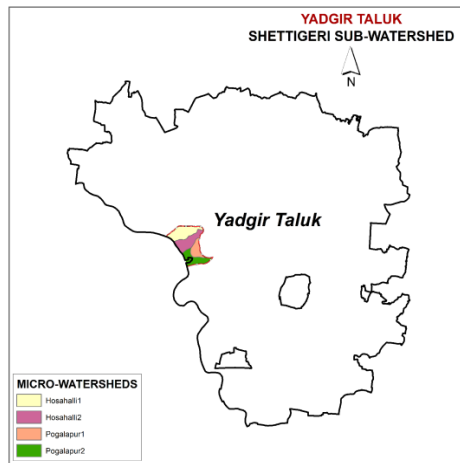
Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S3tz	237 (10.32)
N1n	1590 (69.14)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

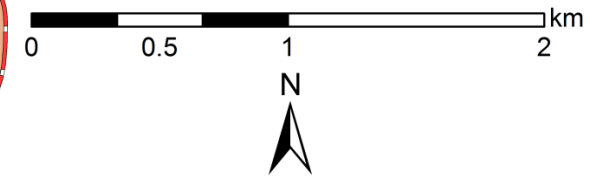


# 7.19. Land Suitability for Jamun



## LAND SUITABILITY FOR JAMUN

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

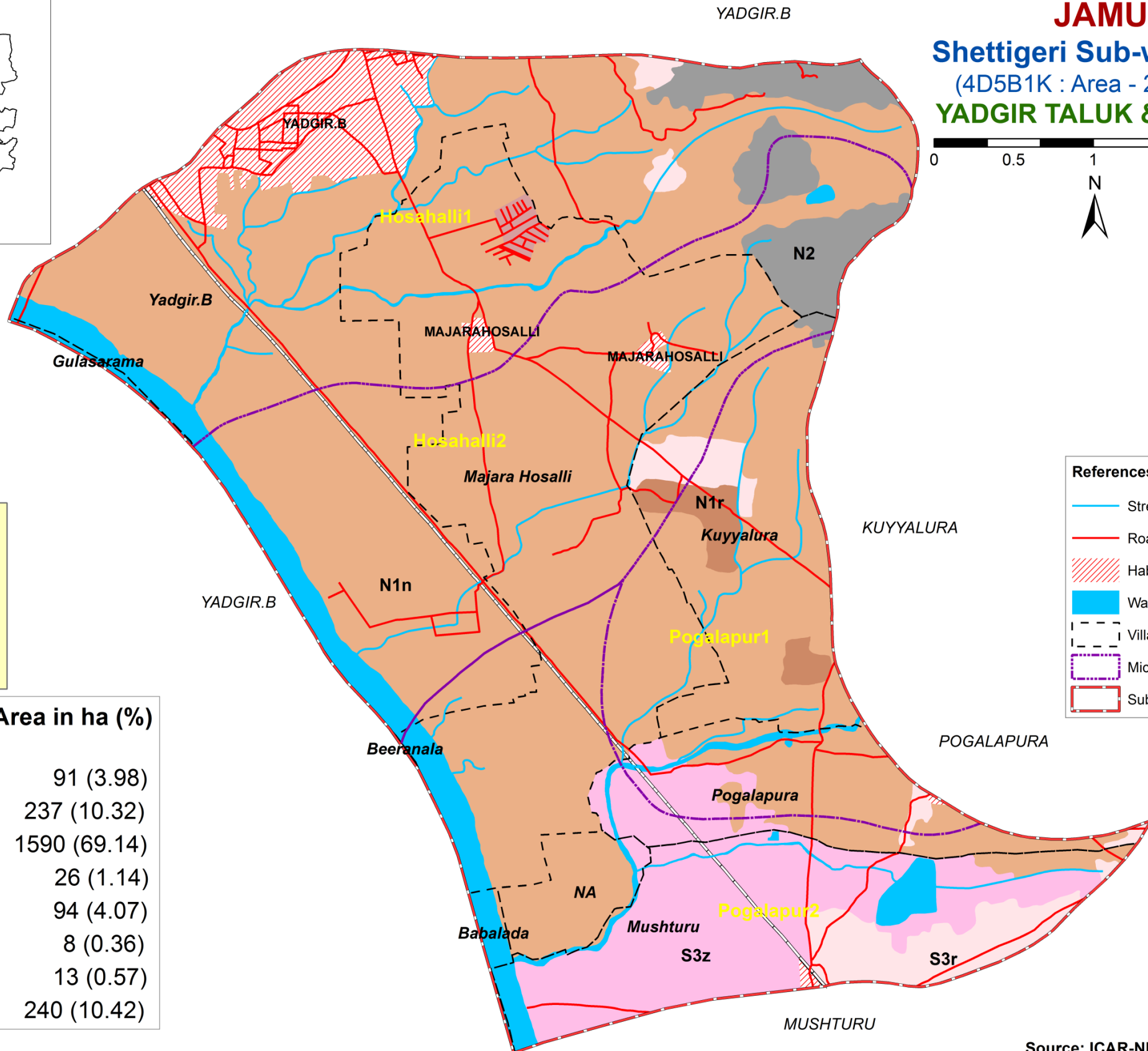
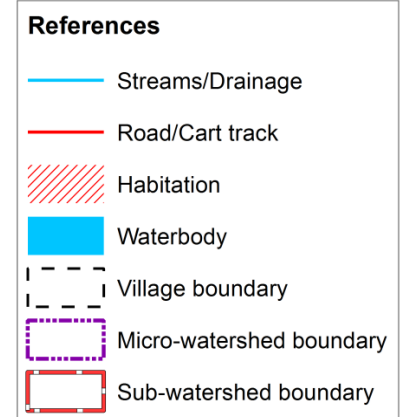


**Key**  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S3r	91 (3.98)
S3z	237 (10.32)
N1n	1590 (69.14)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

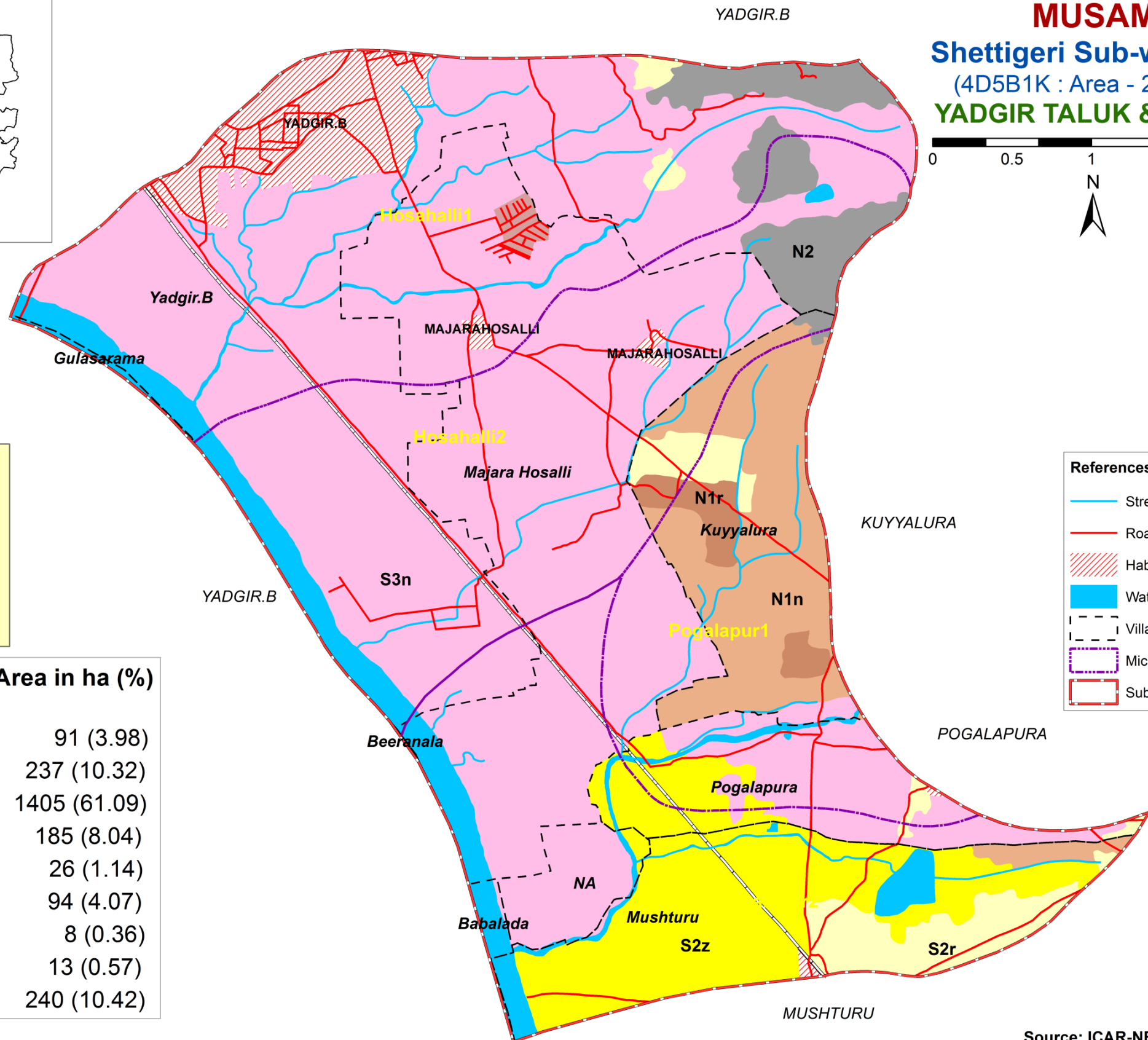
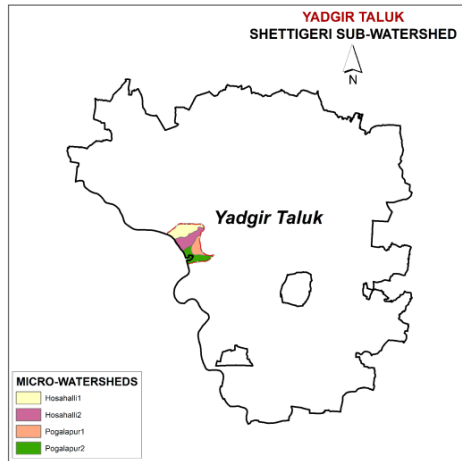
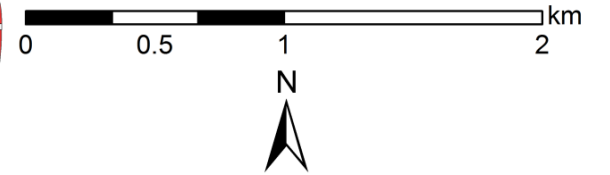


Source: ICAR-NBSS&LUP, Bengaluru

# 7.20. Land Suitability for Musambi

## LAND SUITABILITY FOR MUSAMBI

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2z	237 (10.32)
S3n	1405 (61.09)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

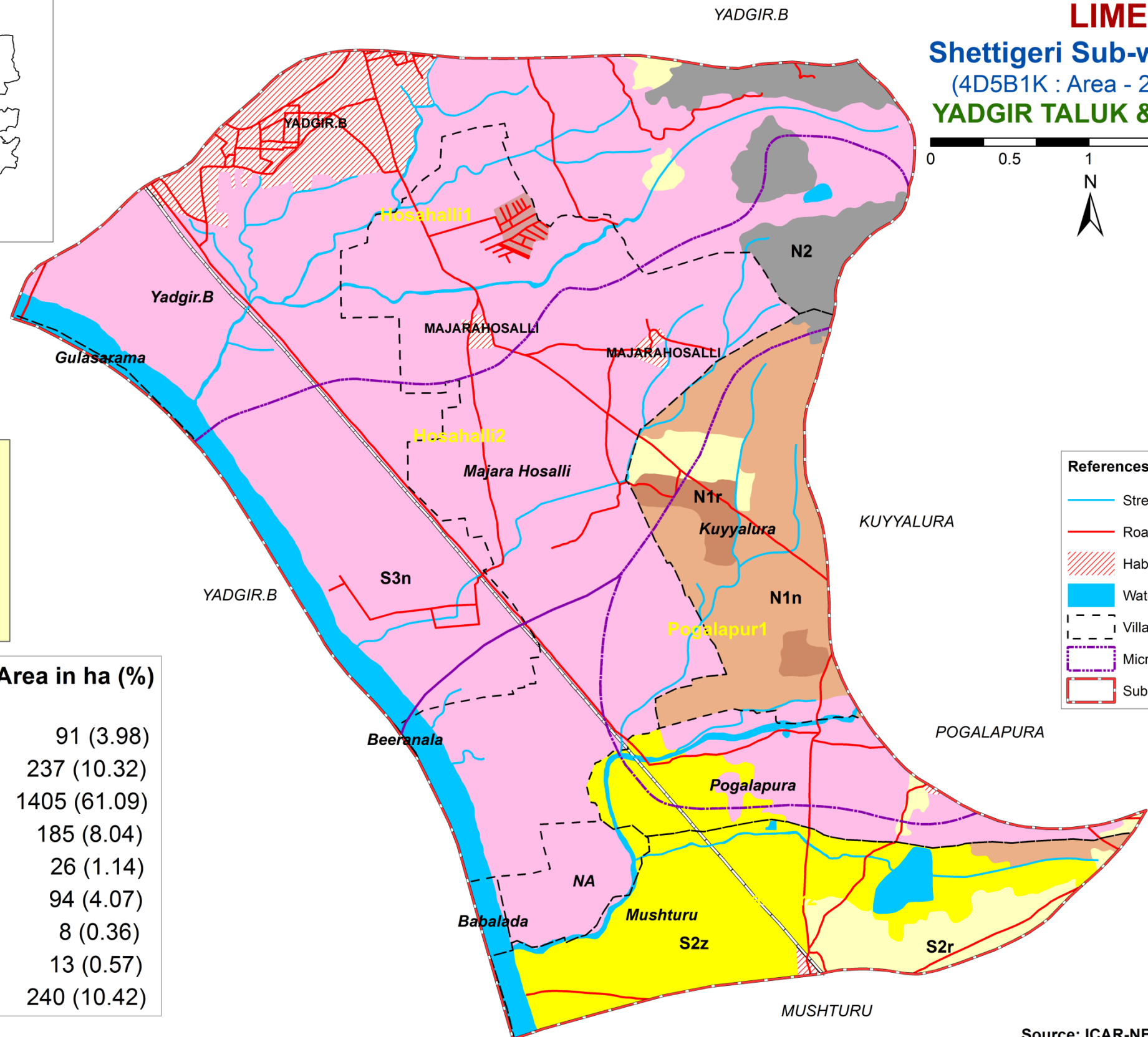
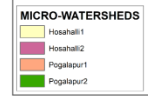
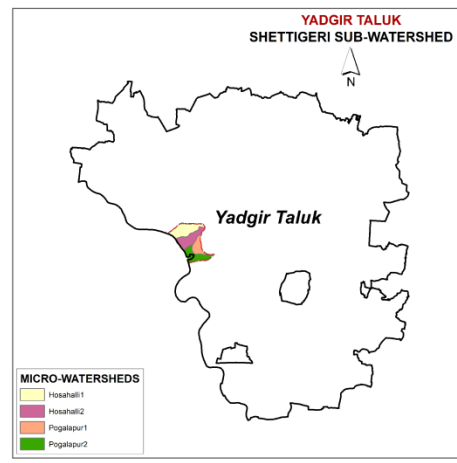
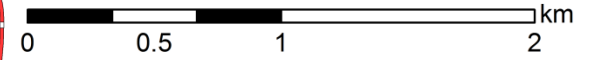
\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.21. Land Suitability for Lime

## LAND SUITABILITY FOR LIME

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S2r	91 (3.98)
S2z	237 (10.32)
S3n	1405 (61.09)
N1n	185 (8.04)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

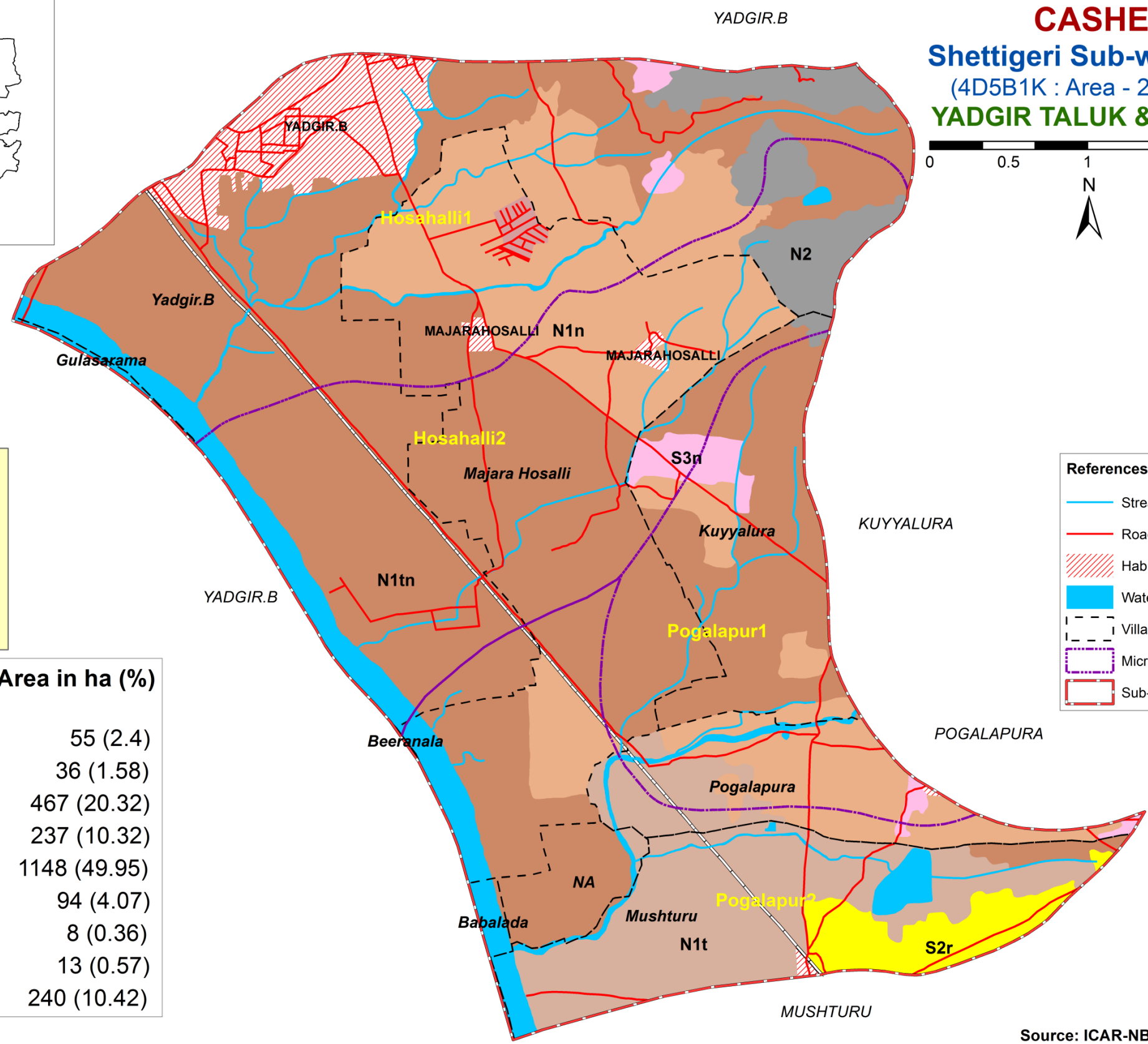
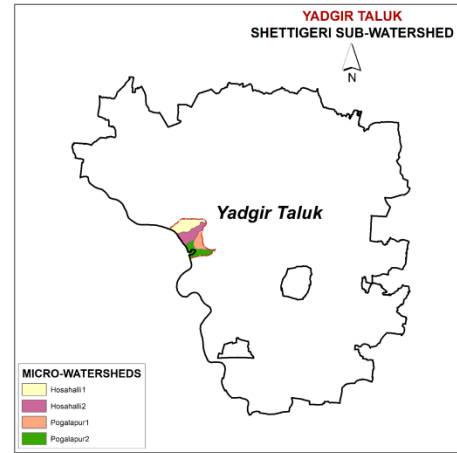


# 7.22. Land Suitability for Cashew

## LAND SUITABILITY FOR CASHEW

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

0 0.5 1 2 km



**Key**  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

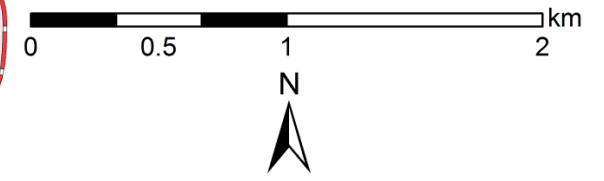
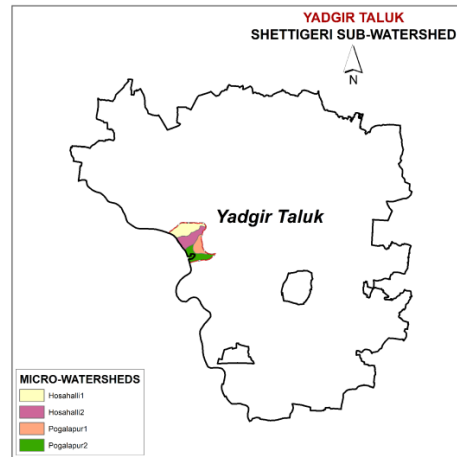
Suitability subclass	Area in ha (%)
S2r	55 (2.4)
S3n	36 (1.58)
N1n	467 (20.32)
N1t	237 (10.32)
N1tn	1148 (49.95)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.23. Land Suitability for Custard Apple

## LAND SUITABILITY FOR CUSTARD APPLE Shettigeri Sub-watershed (4D5B1K : Area - 2299.02 ha) YADGIR TALUK & DISTRICT



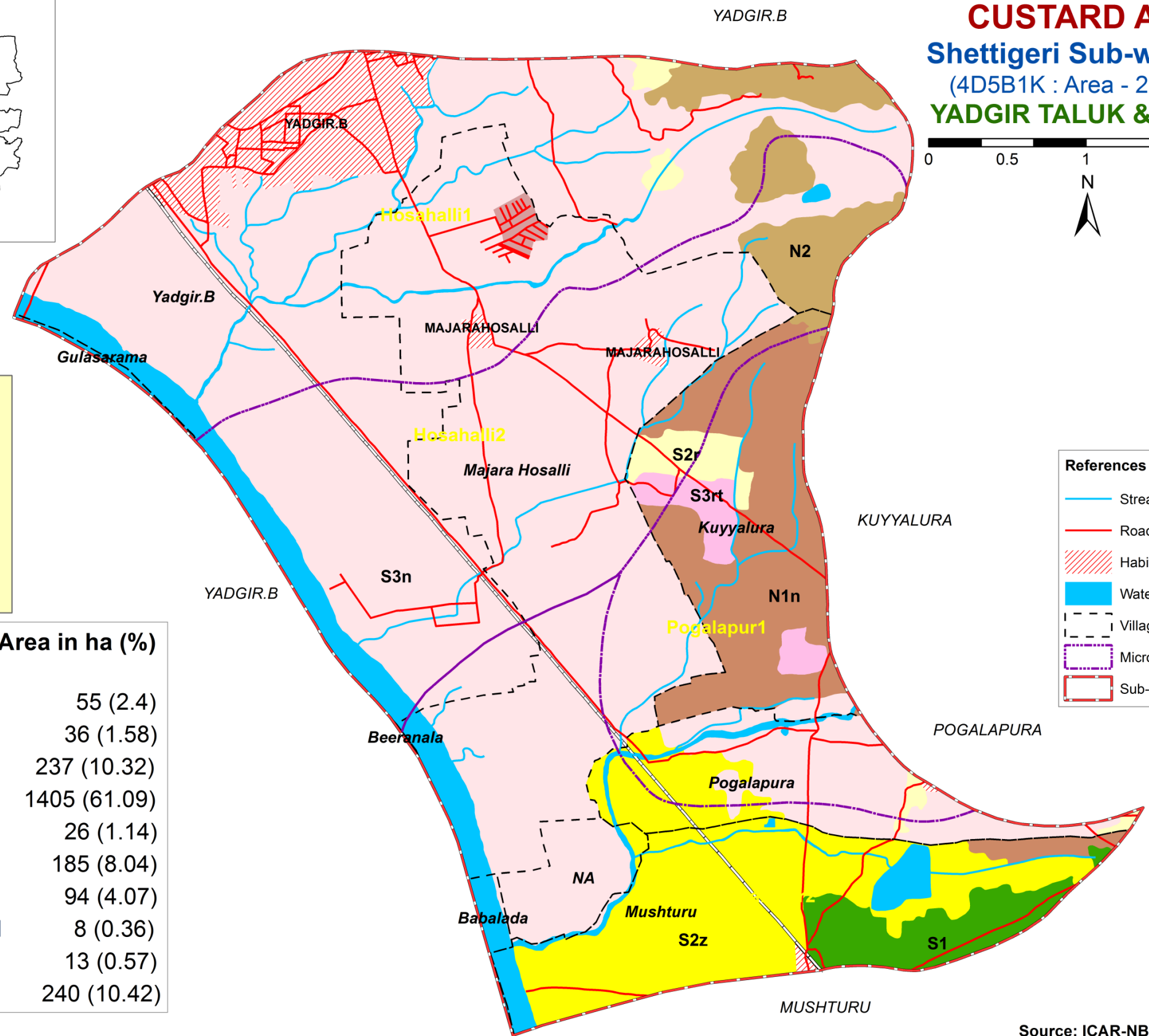
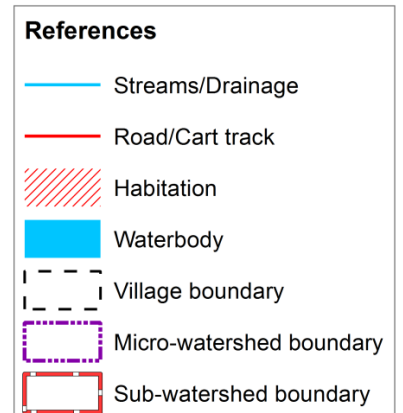
**Key**

S1- Highly Suitable  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**

n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S1	55 (2.4)
S2r	36 (1.58)
S2z	237 (10.32)
S3n	1405 (61.09)
S3rt	26 (1.14)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)



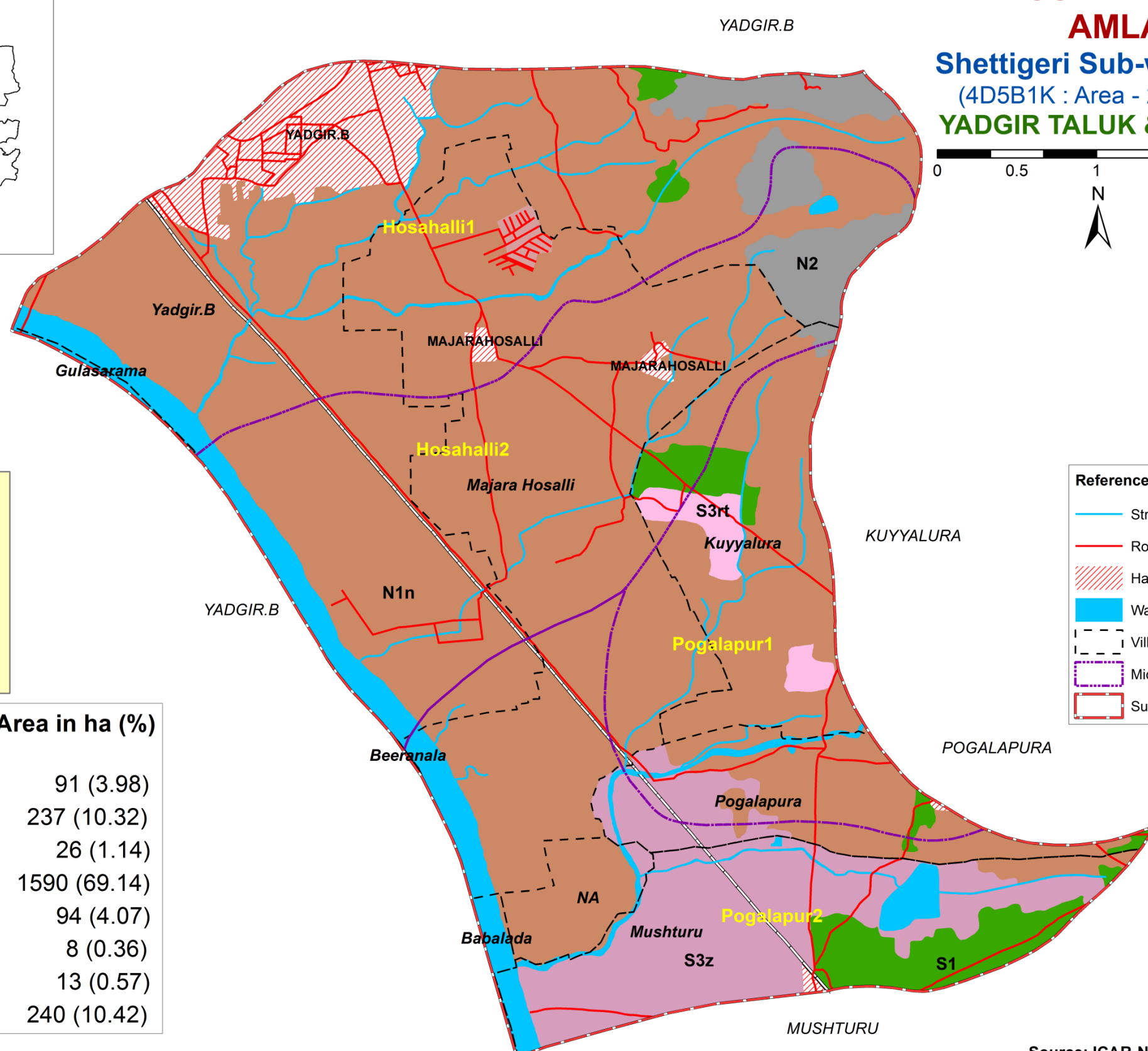
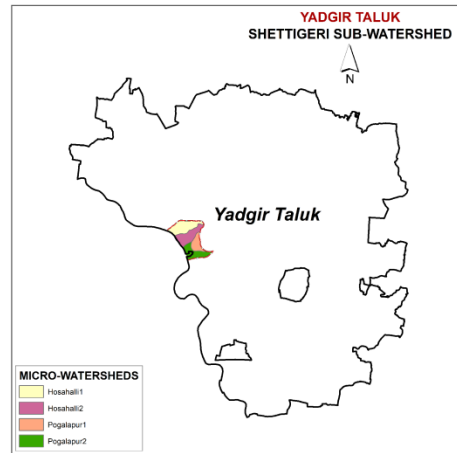
\* - Habitation & Waterbody

# 7.24. Land Suitability for Amla

## LAND SUITABILITY FOR AMLA

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

0 0.5 1 2 km



**Key**

S1- Highly Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**

n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S3z	237 (10.32)
S3rt	26 (1.14)
N1n	1590 (69.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

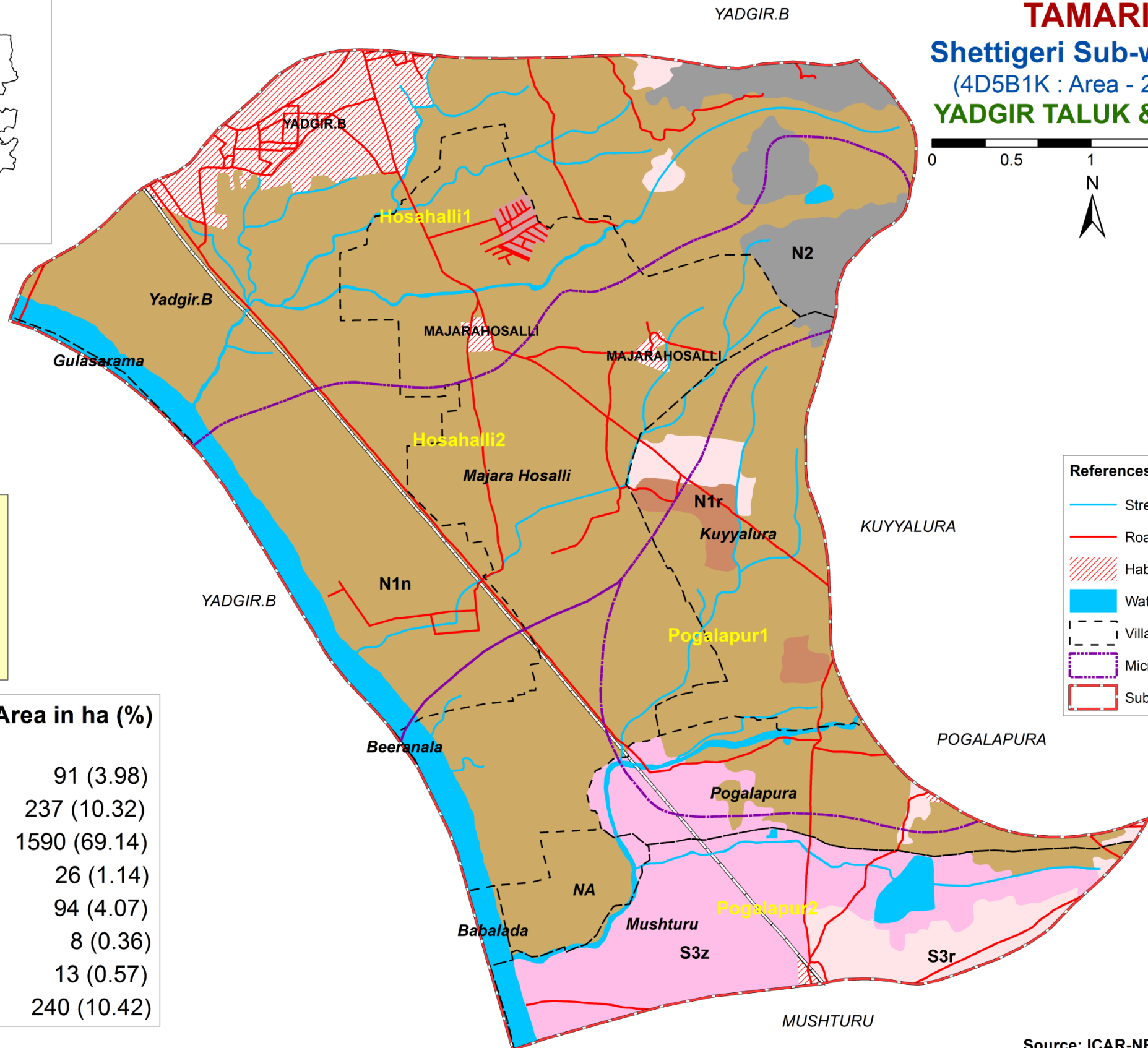
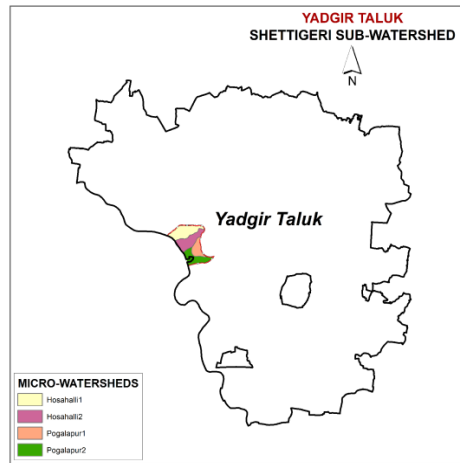
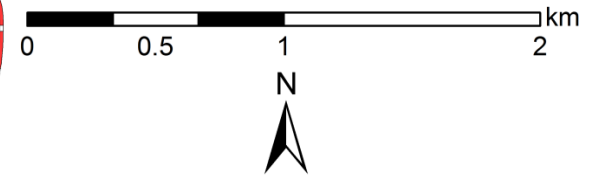
Source: ICAR-NBSS&LUP, Bengaluru



# 7.25. Land Suitability for Tamarind

## LAND SUITABILITY FOR TAMARIND

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT

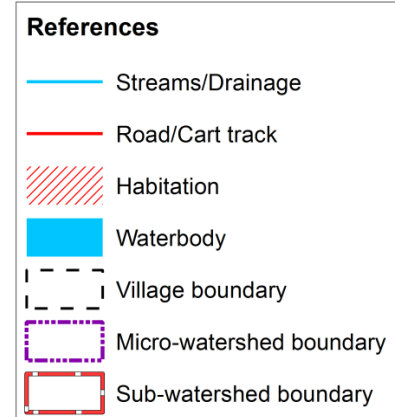


**Key**  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S3r	91 (3.98)
S3z	237 (10.32)
N1n	1590 (69.14)
N1r	26 (1.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

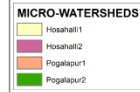
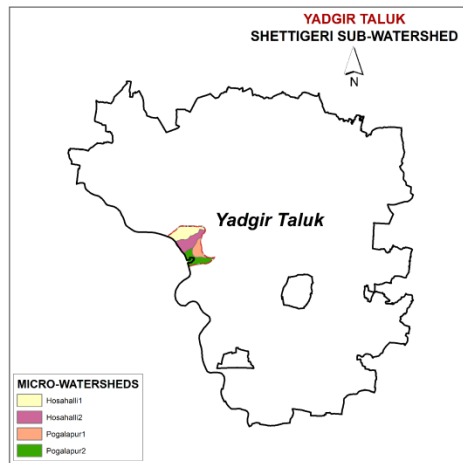
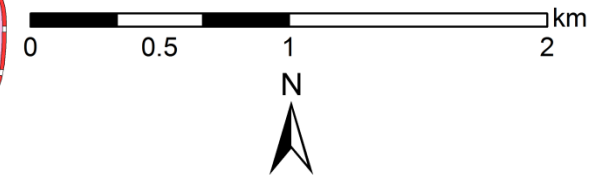


Source: ICAR-NBSS&LUP, Bengaluru

# 7.26. Land Suitability for Brinjal

## LAND SUITABILITY FOR BRINJAL

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
 S1- Highly Suitable  
 S3- Marginally Suitable  
 N1- Currently Not Suitable  
 N2- Permanently Not Suitable

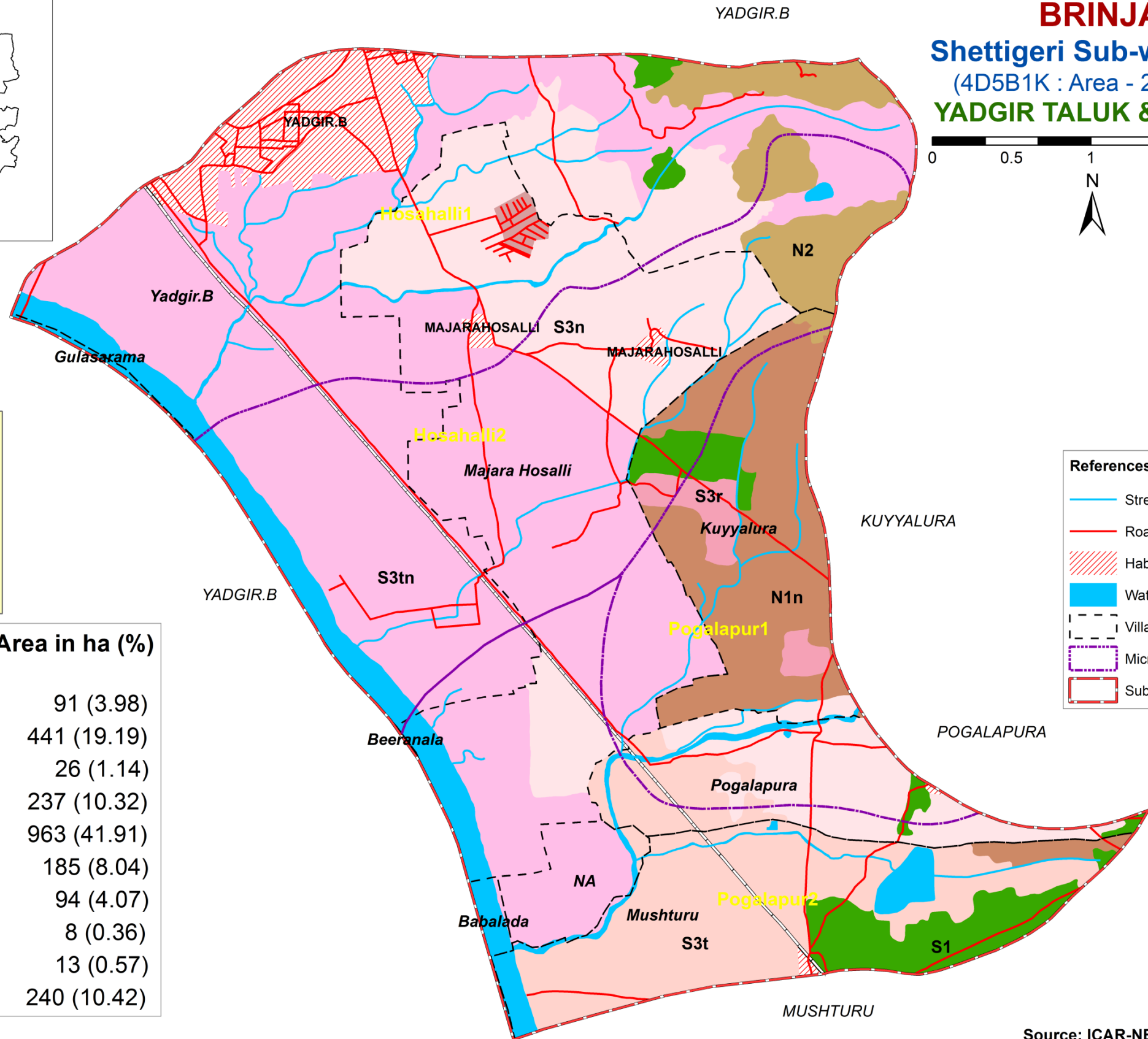
**Limitations**  
 n- nutrient availability  
 r- rooting condition  
 t- texture

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S3n	441 (19.19)
S3r	26 (1.14)
S3t	237 (10.32)
S3tn	963 (41.91)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

**References**

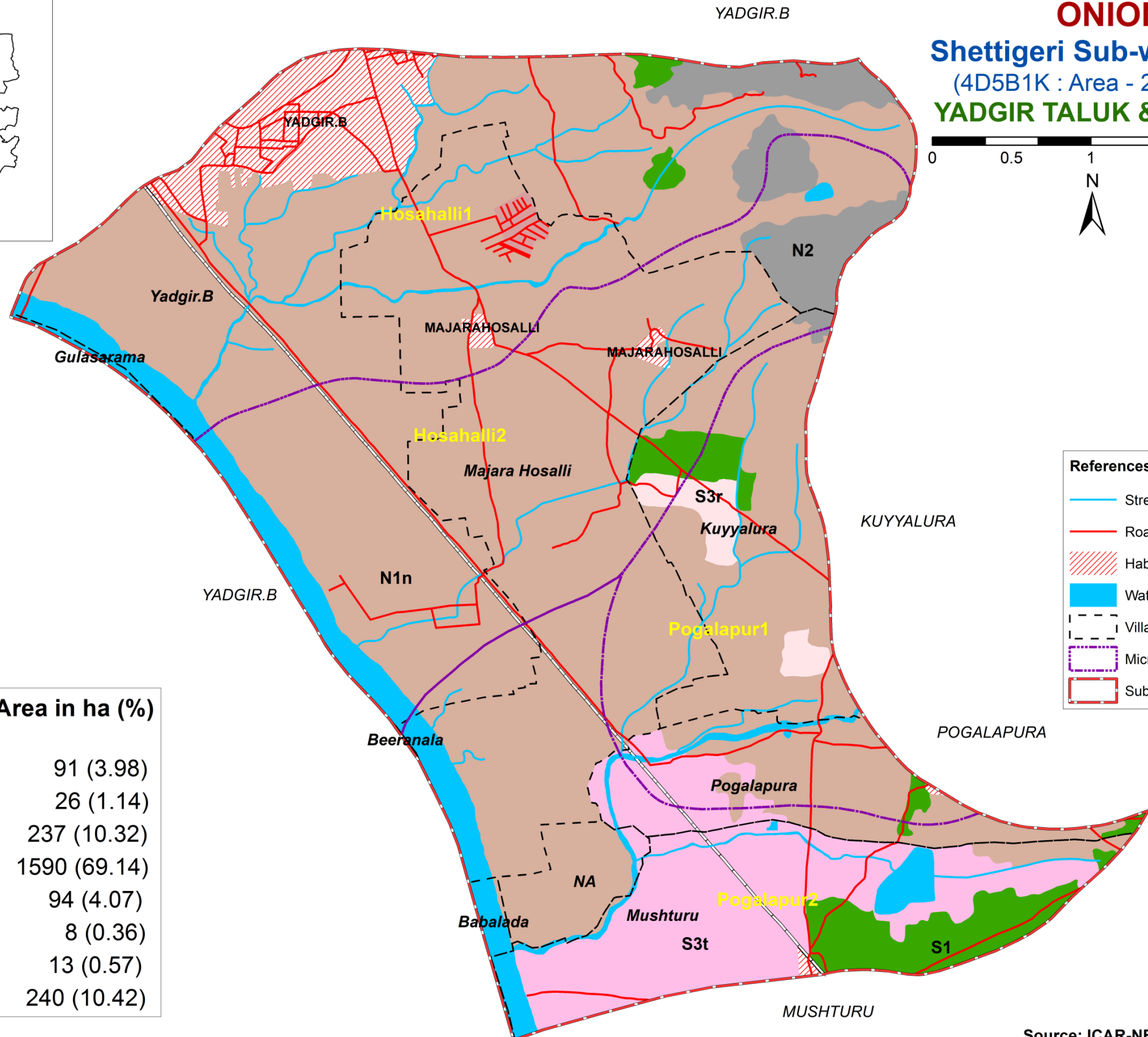
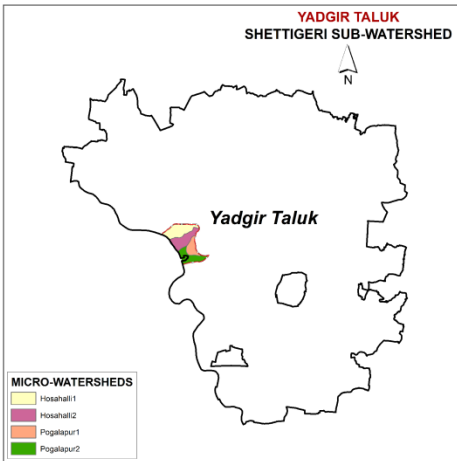
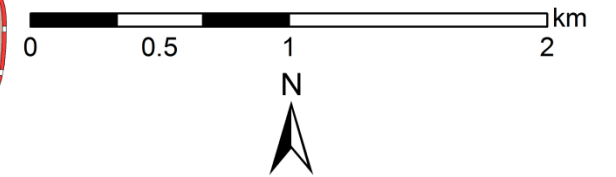
- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary



# 7.27. Land Suitability for Onion

## LAND SUITABILITY FOR ONION

Shettigeri Sub-watershed  
(4D5B1K : Area - 2299.02 ha)  
YADGIR TALUK & DISTRICT



**Key**  
S1- Highly Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture

- References**
- Streams/Drainage
  - Road/Cart track
  - Habitation
  - Waterbody
  - Village boundary
  - Micro-watershed boundary
  - Sub-watershed boundary

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S3r	26 (1.14)
S3t	237 (10.32)
N1n	1590 (69.14)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

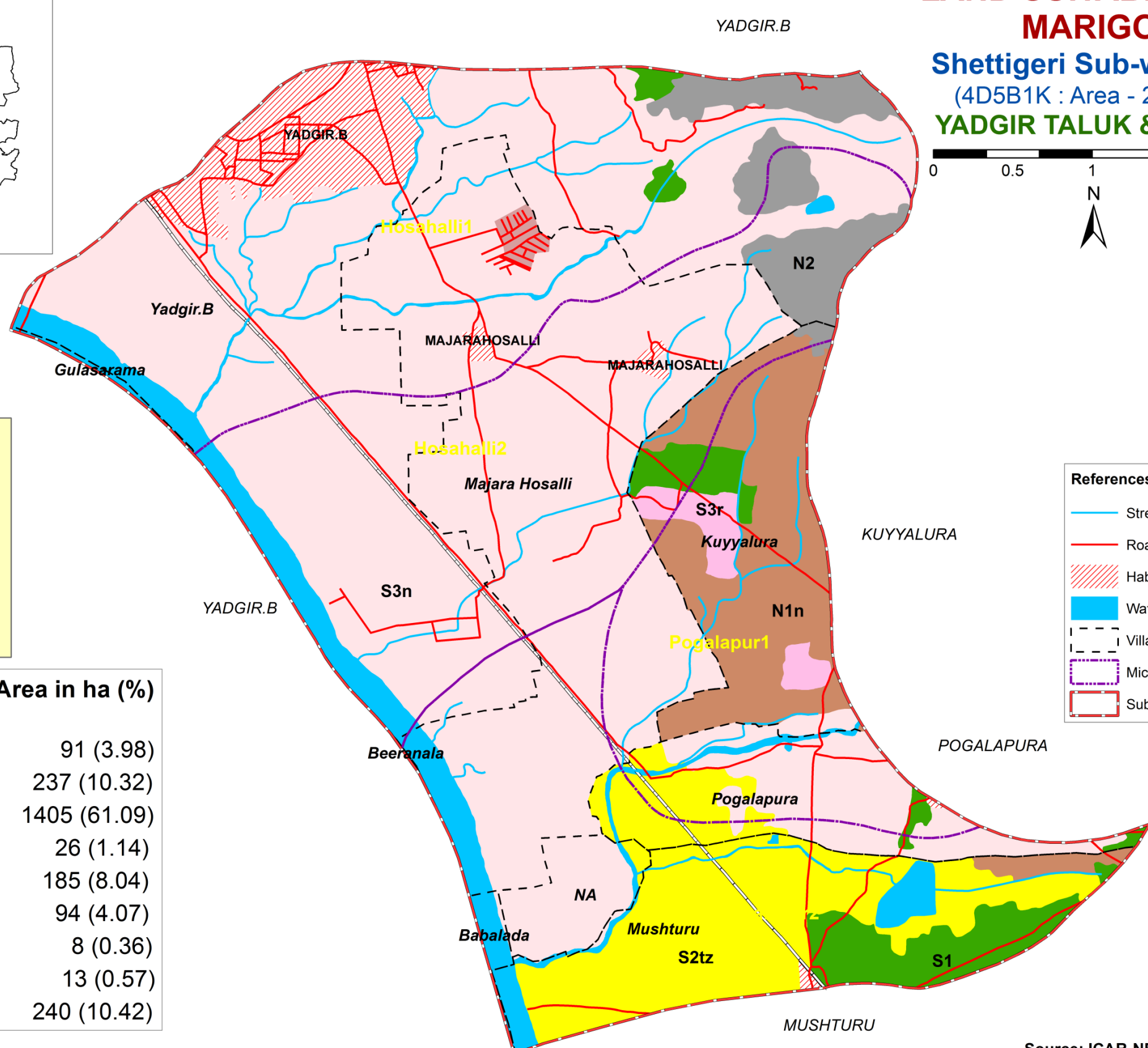
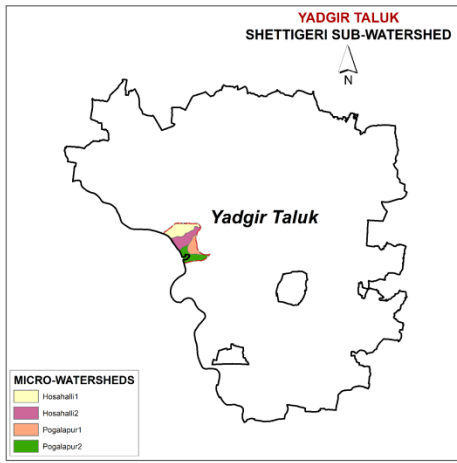
Source: ICAR-NBSS&LUP, Bengaluru



# 7.28. Land Suitability for Marigold

## LAND SUITABILITY FOR MARIGOLD

**Shettigeri Sub-watershed**  
(4D5B1K : Area - 2299.02 ha)  
**YADGIR TALUK & DISTRICT**



**Key**  
S1- Highly Suitable  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**  
n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

**References**

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

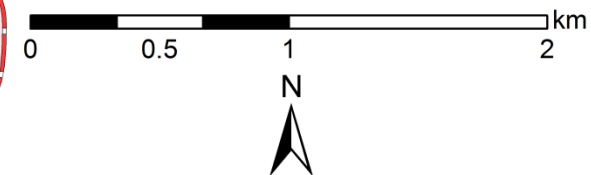
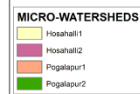
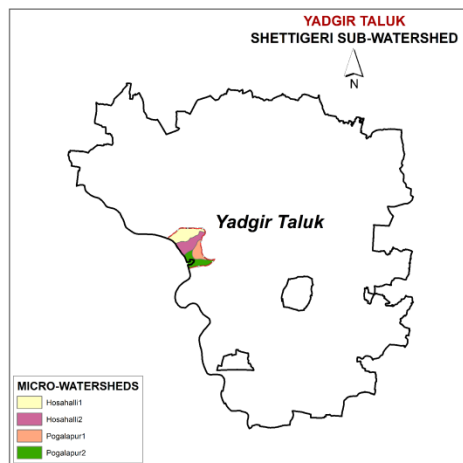
Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2tz	237 (10.32)
S3n	1405 (61.09)
S3r	26 (1.14)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

\* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

# 7.29. Land Suitability for Chrysanthemum

## LAND SUITABILITY FOR CHRYSANTHEMUM Shettigeri Sub-watershed (4D5B1K : Area - 2299.02 ha) YADGIR TALUK & DISTRICT



**Key**

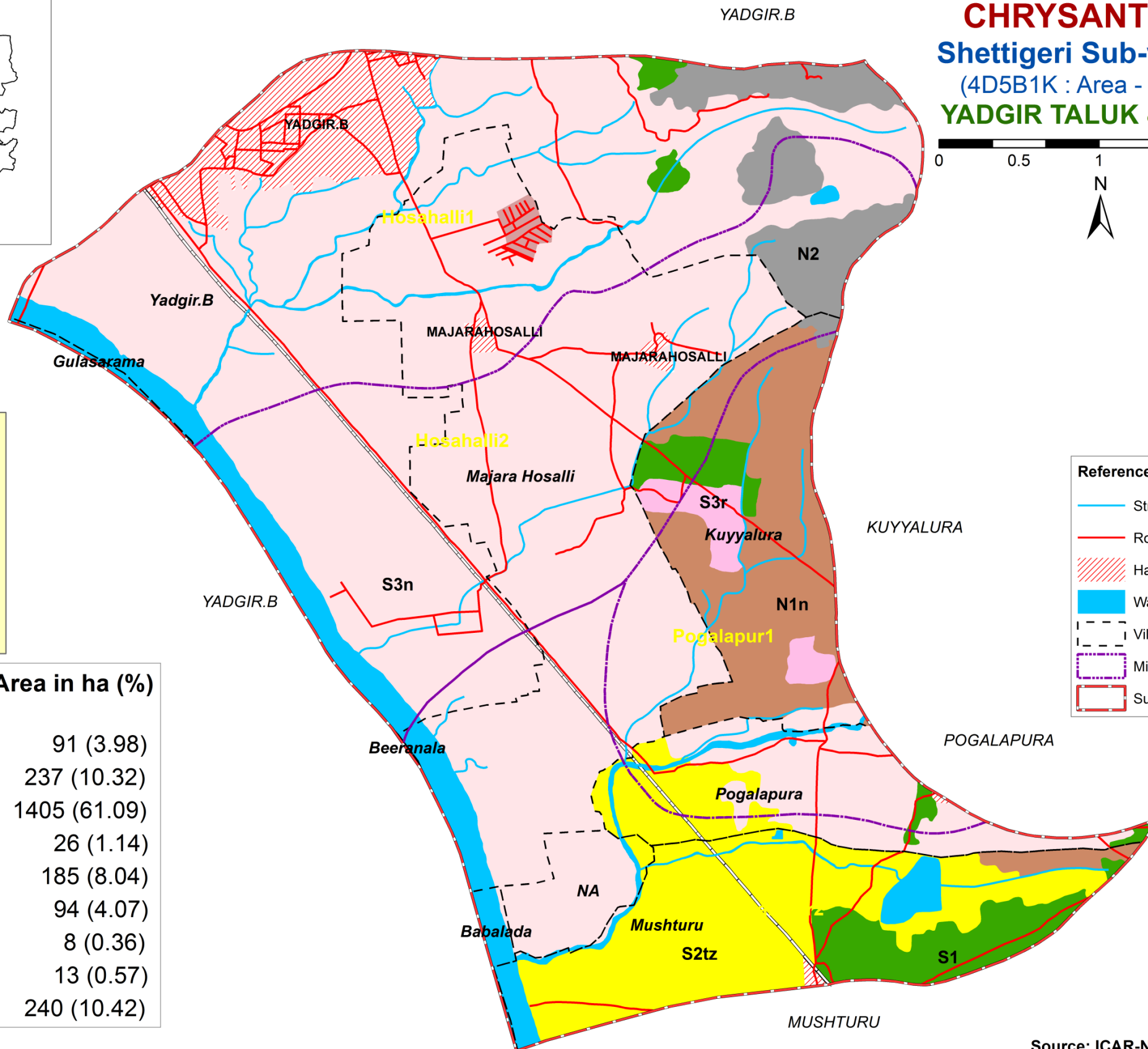
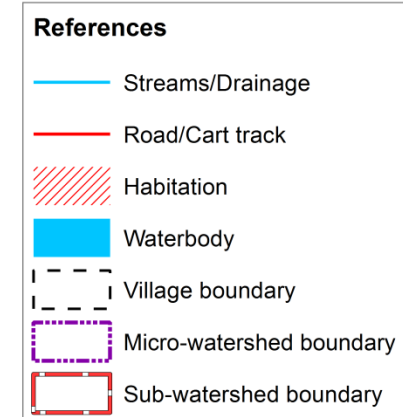
S1- Highly Suitable  
S2- Moderately Suitable  
S3- Marginally Suitable  
N1- Currently Not Suitable  
N2- Permanently Not Suitable

**Limitations**

n- nutrient availability  
r- rooting condition  
t- texture  
z- excess salt/calcareousness

Suitability subclass	Area in ha (%)
S1	91 (3.98)
S2tz	237 (10.32)
S3n	1405 (61.09)
S3r	26 (1.14)
N1n	185 (8.04)
N2	94 (4.07)
Mining/Industrial	8 (0.36)
Railway	13 (0.57)
Others*	240 (10.42)

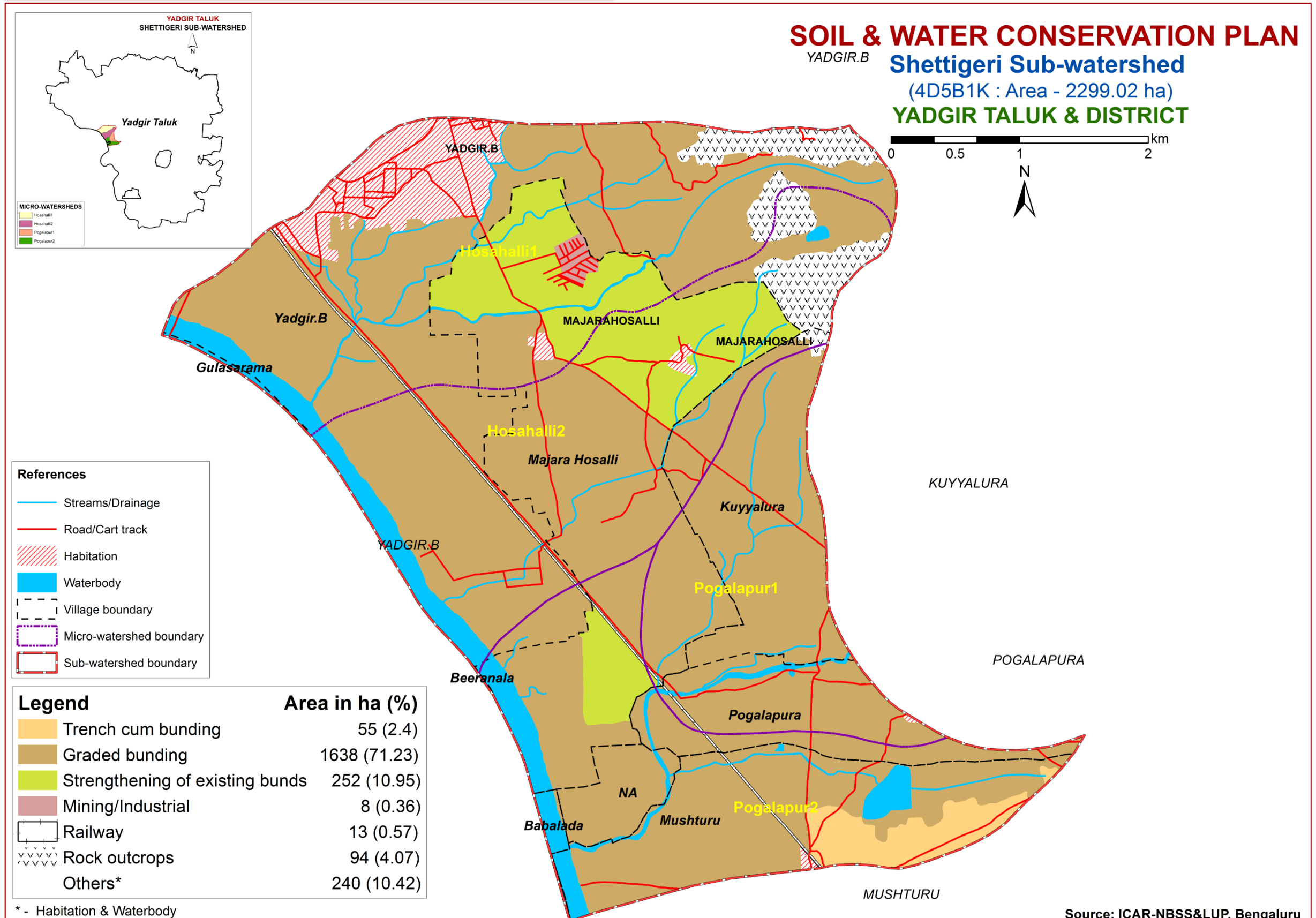
\* - Habitation & Waterbody



Source: ICAR-NBSS&LUP, Bengaluru

# 8. Soil and Water Conservation Measures

## 8.1. Soil & Water Conservation Plan



Source: ICAR-NBSS&LUP, Bengaluru



**9. Table.** Proposed Crop Plan for Shettigeri Sub-watershed, Balichakra Hobli, Yadgir Taluk, Yadgir District based on soil-site–crop suitability Assessment

LMU.No	Soil Map Units	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
1	51.ANRbB2g1 52.ANRbB3 55.ANRiB2 (Sodic soils)	-	<b>Agri-Silvi-Pasture</b> Ber, Aonla, Acacia sp. Dhaincha, Rhodes grass, Para grass ,Bermuda grass	Application of gypsum, iron pyrites and elemental sulphur. Addition of farm yard manures, green manures and providing subsurface drainage
2	62.BMNmB2 33.HSLiB2 (Moderately deep to very deep,	Maize, sorghum, Sunflower, Cotton, Red gram, Bengalgram, Bajra	<b>Fruit crops:</b> Lime, Musambi, Custard apple, Pomegranate <b>Vegetables:</b> Chilli, Bhendi <b>Flowers:</b> Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
3	95.HGNmB2 171.MDGhA1 58.MDGiB2 132.MDRhB2 (Deep to very deep, strongly alkaline soils)	Sorghum, Maize, Bajra	<b>Agri-Silvi:</b> Ber, Aonla, Acacia sp. Dhaincha, Rhodes grass, Para grass , Bermuda grass	Application of gypsum, iron pyrites and elemental sulphur. Addition of farm yard manures, green manures and providing subsurface drainage
4	114.PGPhB2 (Moderately deep, red sandy clay soils)	Sunflower, Sorghum, Maize, Groundnut, Red gram, Bajra	<b>Fruit crops:</b> Mango, Musambi, Sapota, Tamarind, Pomegranate, Amla, Custard apple, Guava, Jackfruit, Jamun, Lime <b>Vegetables:</b> Tomato, Onion, Bhendi, Chilli, Brinjal, Drumstick, Coriander <b>Flowers:</b> Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
5	5.BDLiB2 (Shallow soils)	-	<b>Agri-Silvi-Pasture:</b> Hybrid Napier, <i>Styloxanthes hamata</i> , Glyricidia, <i>Styloxanthes scabra</i>	Use of short duration varieties, sowing across the slope and split application of nitrogen fertilizers

## **PART - B**

# **Hydrological Inventory of Shettigeri Sub-watershed, Yadgir Taluk, Yadgir District, Karnataka for Watershed Planning and Development**



**Sujala - III**

**Karnataka Watershed Development Project-II  
Watershed Development Department  
Government of Karnataka**



# Hydrological Inventory of Shettigeri Sub-watershed, Yadgir Taluk, Yadgir District, Karnataka for Watershed Planning and Development



ICAR - NBSS & LUP

**Prepared by**

**ICAR-National Bureau of Soil Survey and Land Use Planning  
Regional Centre, Hebbal, Bangalore - 560 024**

**Phone:080-23412242**

**E-mail: [hd\\_rcb.nbsslup@icar.gov.in](mailto:hd_rcb.nbsslup@icar.gov.in)  
[nbssrcb@gmail.com](mailto:nbssrcb@gmail.com)**





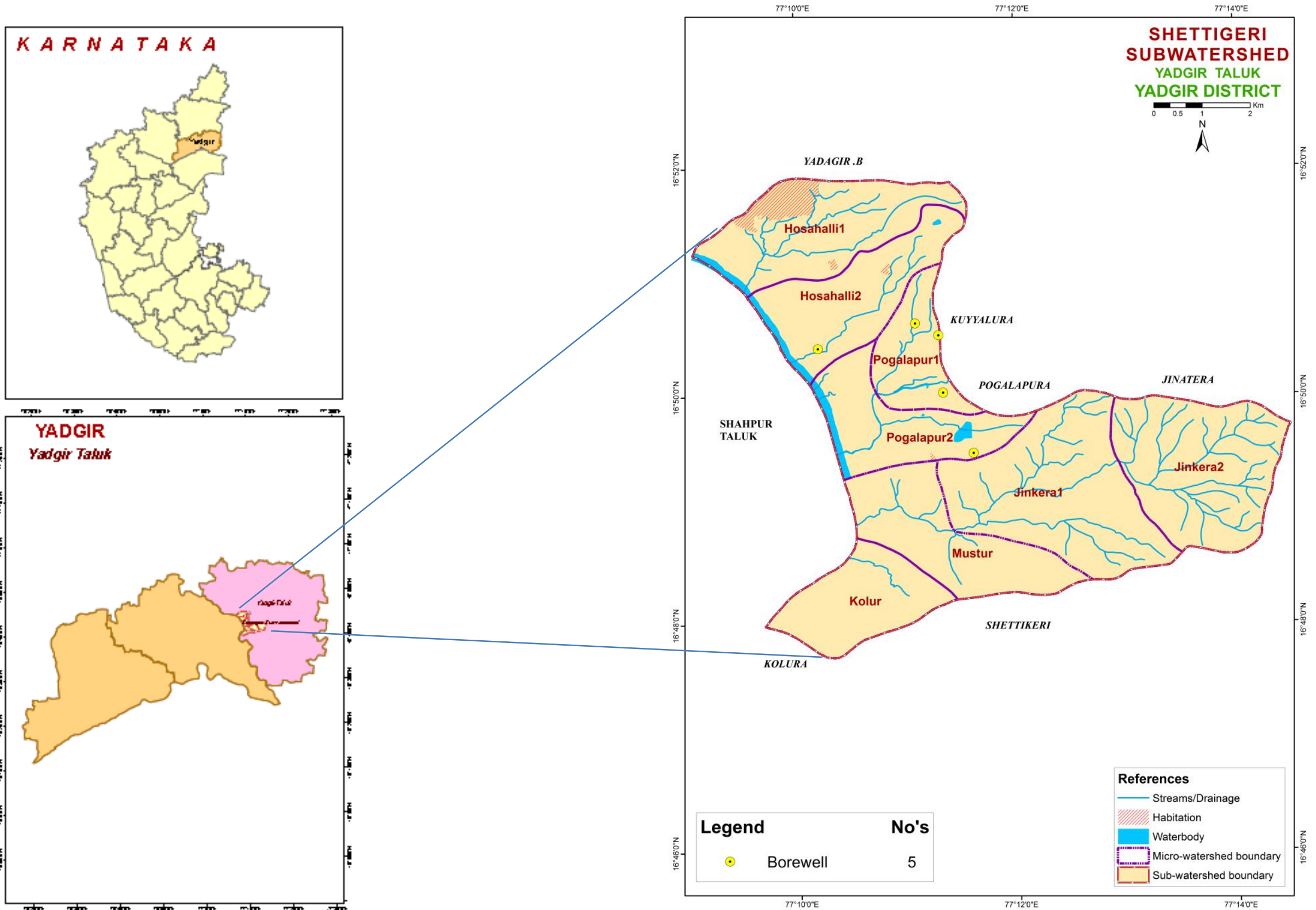
# Details of Hydrology Team of LRI Partner Responsible for Preparation of Atlas

Name	Designation
Dr. Rajendra Hegde	Principal Scientist & Head Coordinator
Dr. S. Srinivas	Principal Scientist
Dr. K .V. Niranjana	Chief Technical Officer
Sh. R.S.Reddy	Consultant
Sh. A.G.Devendra Prasad	Consultant
Smt. K.Karunya Lakshmi	Research Associate
Ms. Seema, K.V.	Senior Research Fellow
Dr. Sekhar Muddu (Reviewed and approved)	Professor & Lead Scientist, Dept. of Civil Engineering & ICWaR, IISc, Bangalore
<p style="text-align: right;"><b>Email:</b> <a href="mailto:hd_rcb.nbsslup@icar.gov.in">hd_rcb.nbsslup@icar.gov.in</a> <a href="mailto:nbssrcb@gmail.com">nbssrcb@gmail.com</a> <b>Phone: Office:</b> 080-23412242,23410993 <b>Fax:</b> 080-23510350</p>	

## INTRODUCTION

- The inventory and documentation of spatial and temporal changes in hydrological components of Shettigeri sub-watershed (4D5B1K) in Yadgir Taluk, Yadgir District, has been undertaken for integrated planning, development and management.
- Shettigeri sub-watershed (Yadgir Taluk, Yadgir District) is located between 16<sup>o</sup>39'40"-16<sup>o</sup>45'9" North latitudes and 77<sup>o</sup>7'16"-77<sup>o</sup>13'58" East longitudes, covering an area of about 5422 ha.
- This sub-watershed encompasses of 8 MWs namely Hosahalli-1 (4D5B1M2b), Hosahalli-2 (4D5B1M1a), Jinkera-1 (4D5B1M1b), Jinkera-2 (4D5B1M1c), Kolor (4D5B1M1e), Mustur (4D5B1M1d), Pogalapur-1 (4D5B1M2i) and Pogalapur-2 (4D5B1M2c). Land Resource Inventory (LRI) was generated for four among the eight micro-watersheds.
- Average annual rainfall (1960-2014) of the Hobli (Block) pertaining to the sub-watershed is 887 mm.
- In this sub-watershed major *kharif* crops grown are Maize, Cotton, Sunflower, Groundnut, Red gram, Chilly, Soybean, Paddy and major *rabi* crops are Sorghum, Bengalgram, Bajra.
- Hydrological components namely rainfall (annual, *kharif*, *rabi* and summer), PET, AET, runoff, surface soil moisture, ground water status and water balance are presented.

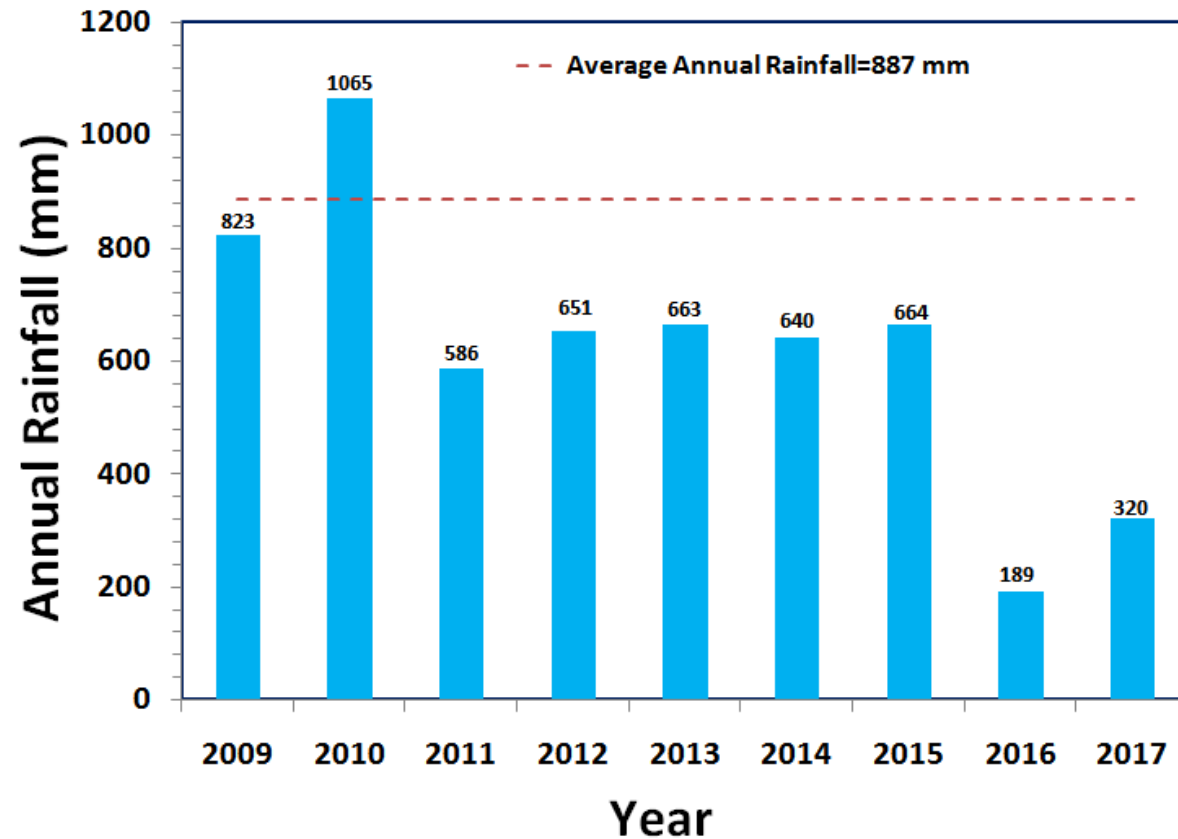
# LOCATION MAP OF SHETTIGERI SUB-WATERSHED



Soil & Water Conservation Structures in Shettigeri sub-watershed, Yadgir Taluk, Yadgir District

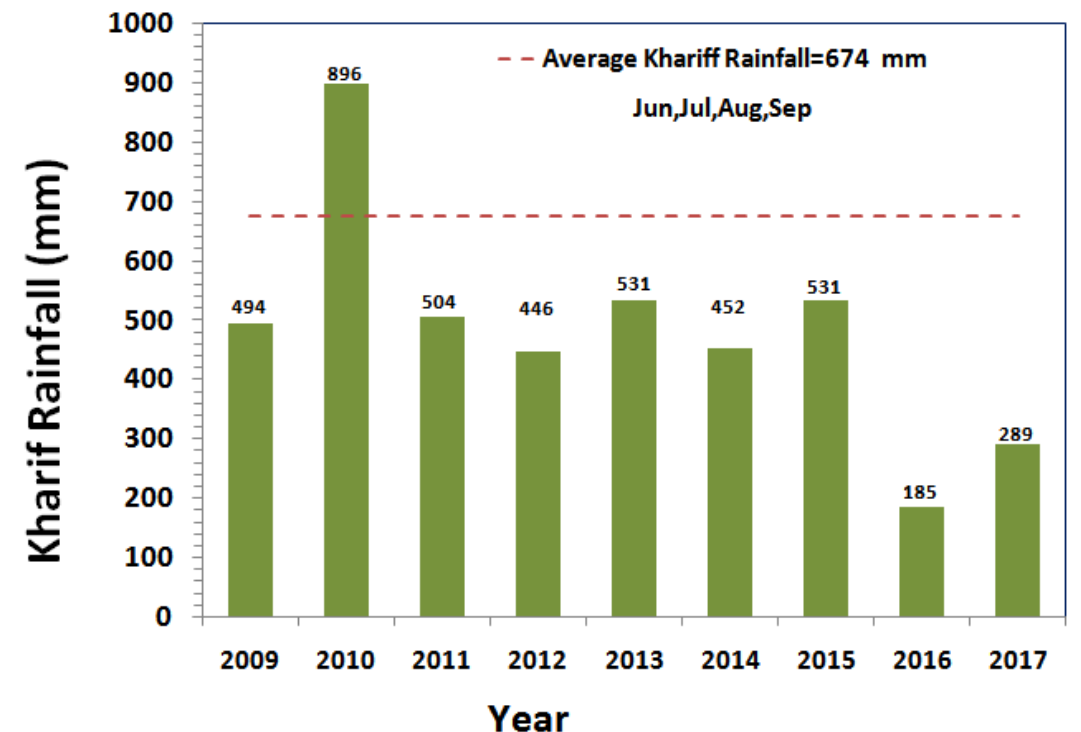


# RAINFALL INDEX

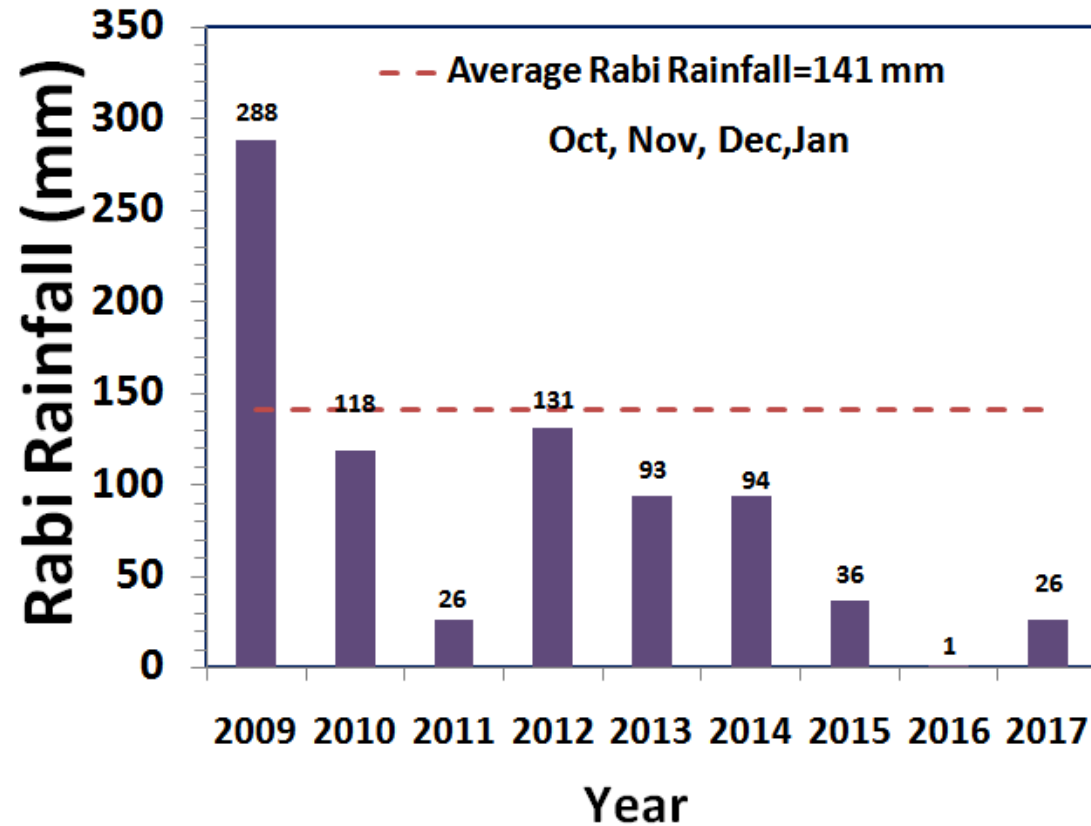


The average annual rainfall (1960-2014) recorded at the Yadgir station in Yadgir taluk of Yadgir district is 887 mm. The annual rainfall at Balichakra station (Hobli H.Q.) is presented. During the years 2009, 2011, 2012, 2013, 2014, 2015 and 2016 the annual rainfall was deficient by 7%, 34%, 27%, 25%, 28%, 25%, 79% and 64% respectively.

The *kharif* rainfall (Jun–Sep) is an average about 80% of the annual rainfall and it typically follows the annual rainfall patterns. During the years 2009, 2011, 2012, 2013, 2014, 2015, 2016 and 2017 the annual rainfall was deficient by 27%, 25%, 34%, 21%, 33%, 21%, 73% and 57% respectively.

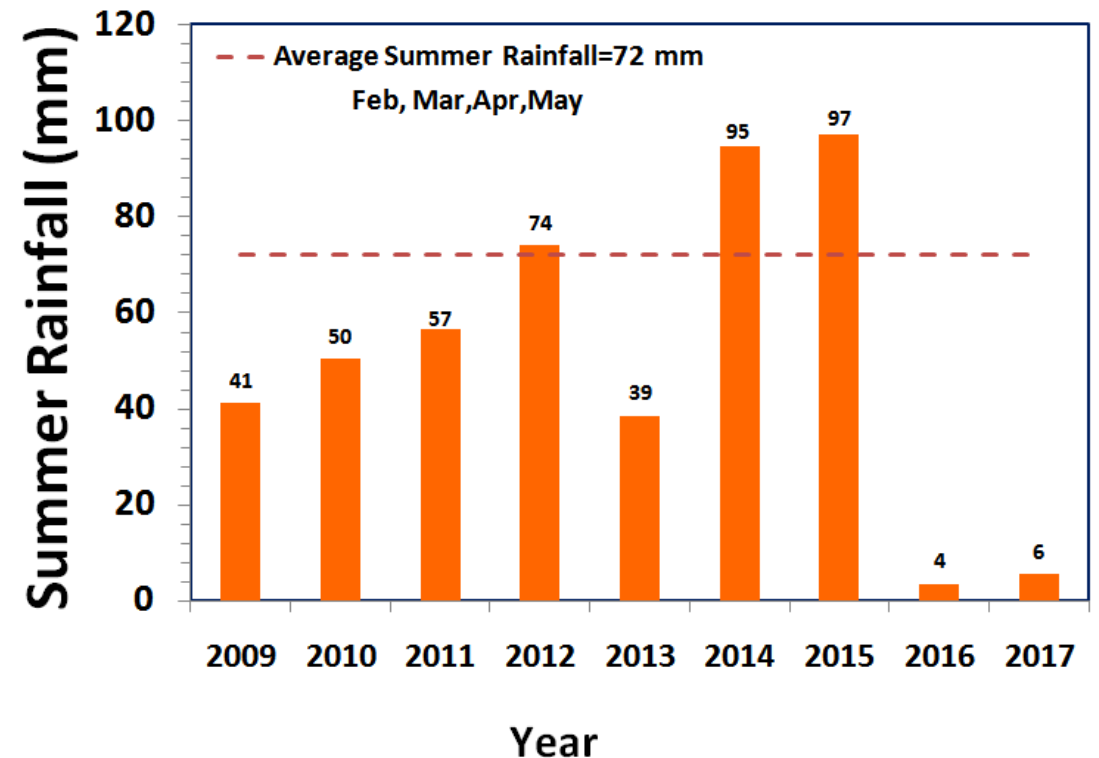


# RAINFALL INDEX

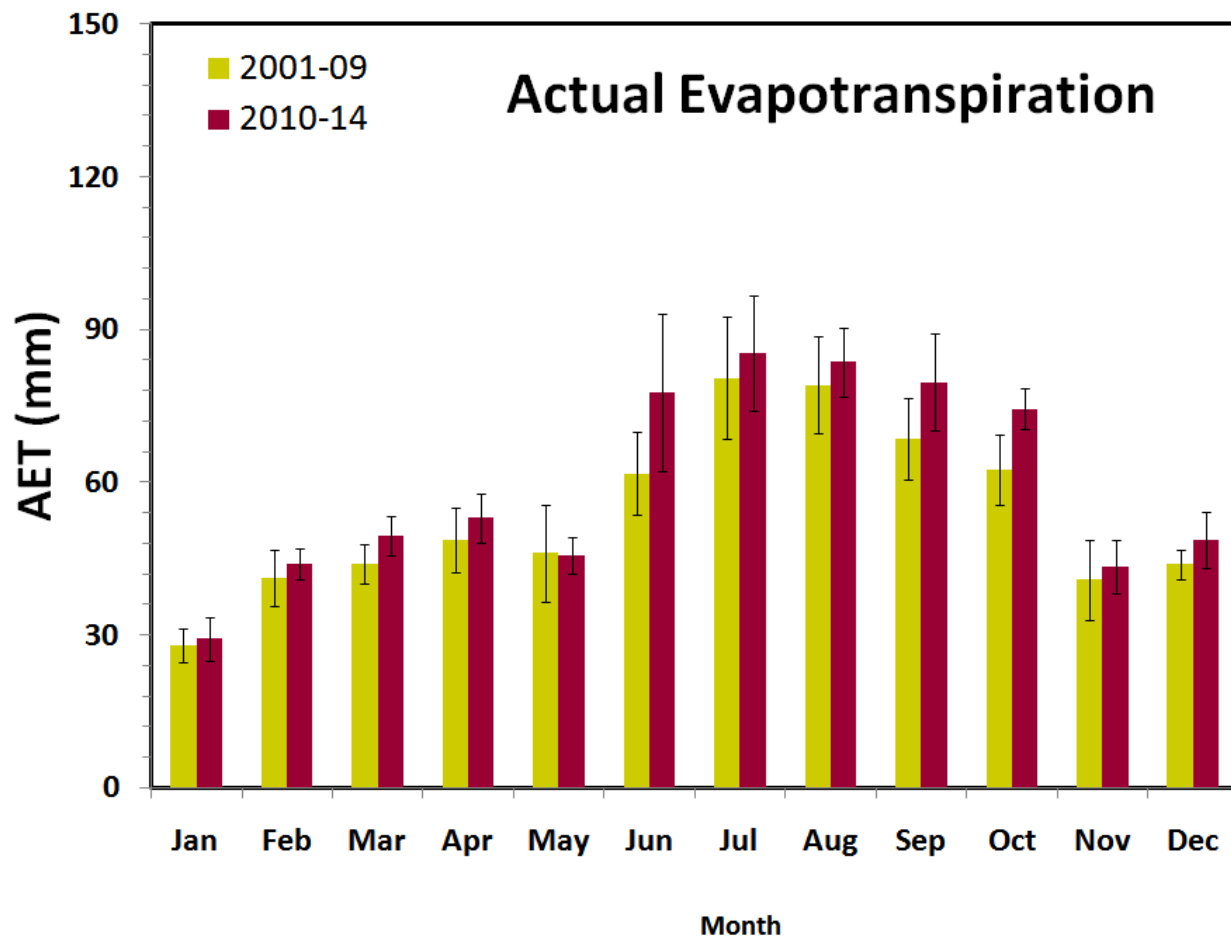
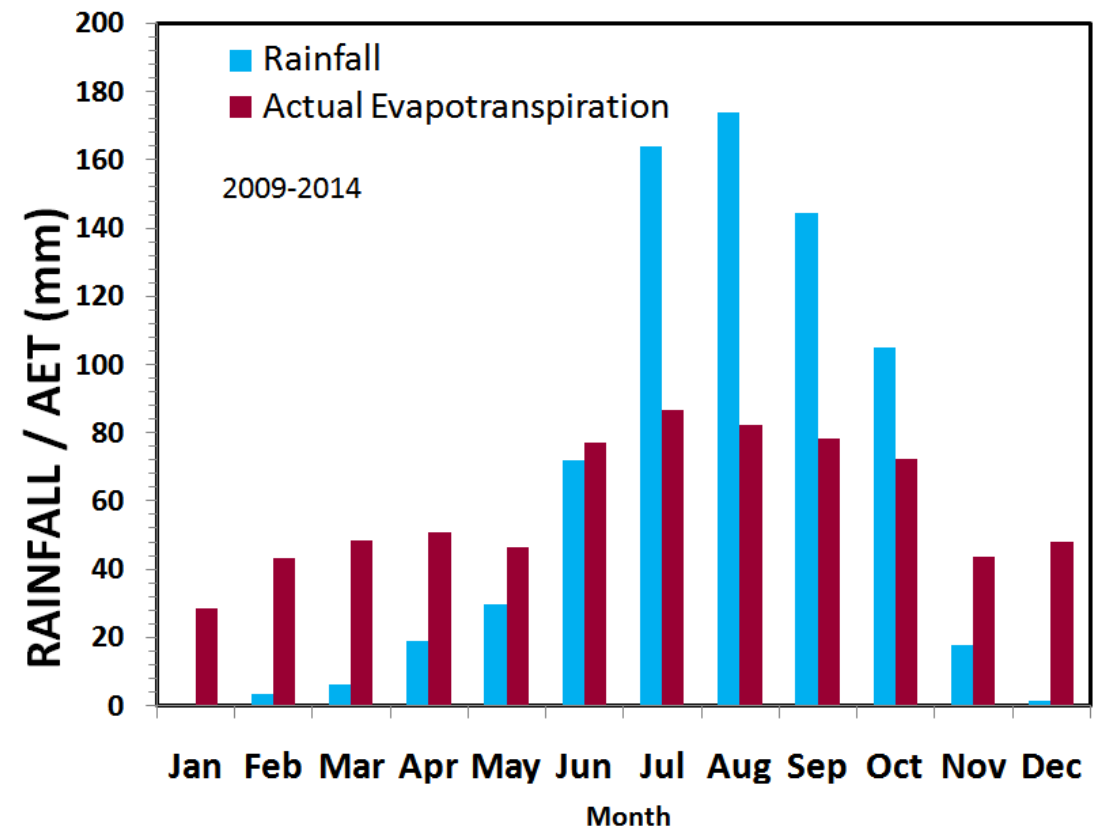
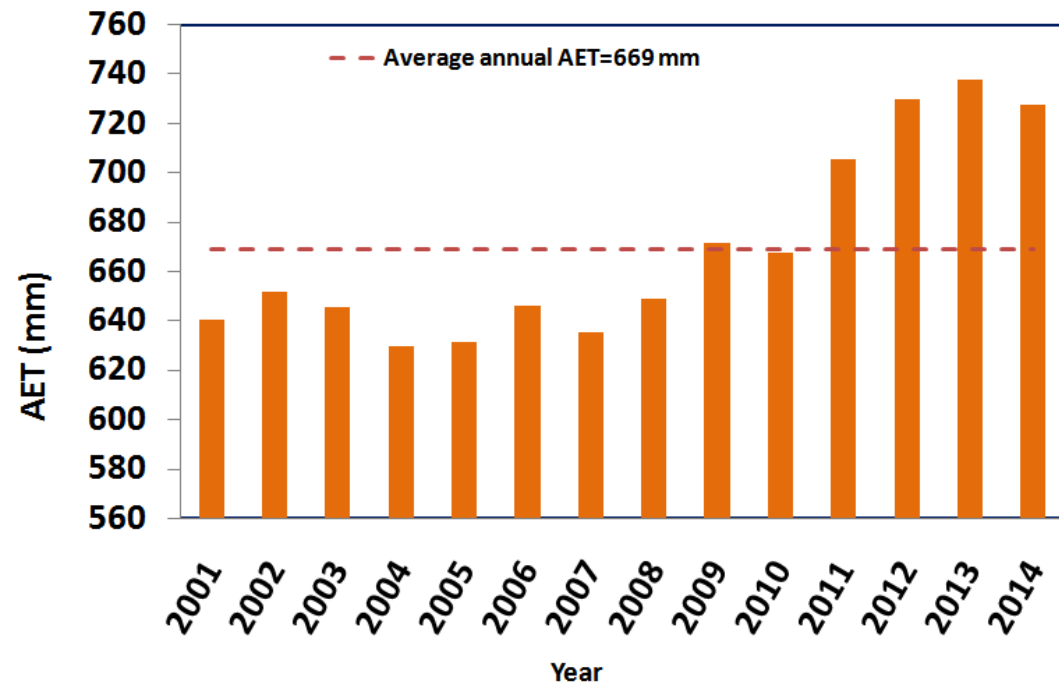


The average *rabi* rainfall (Oct-Jan) is about 13% of the Average annual rainfall. During the year 2009 high *rabi* rainfall was received, where as other years showed deficient rainfall.

The average summer rainfall (Feb-May) is about 8% of the average annual rainfall.



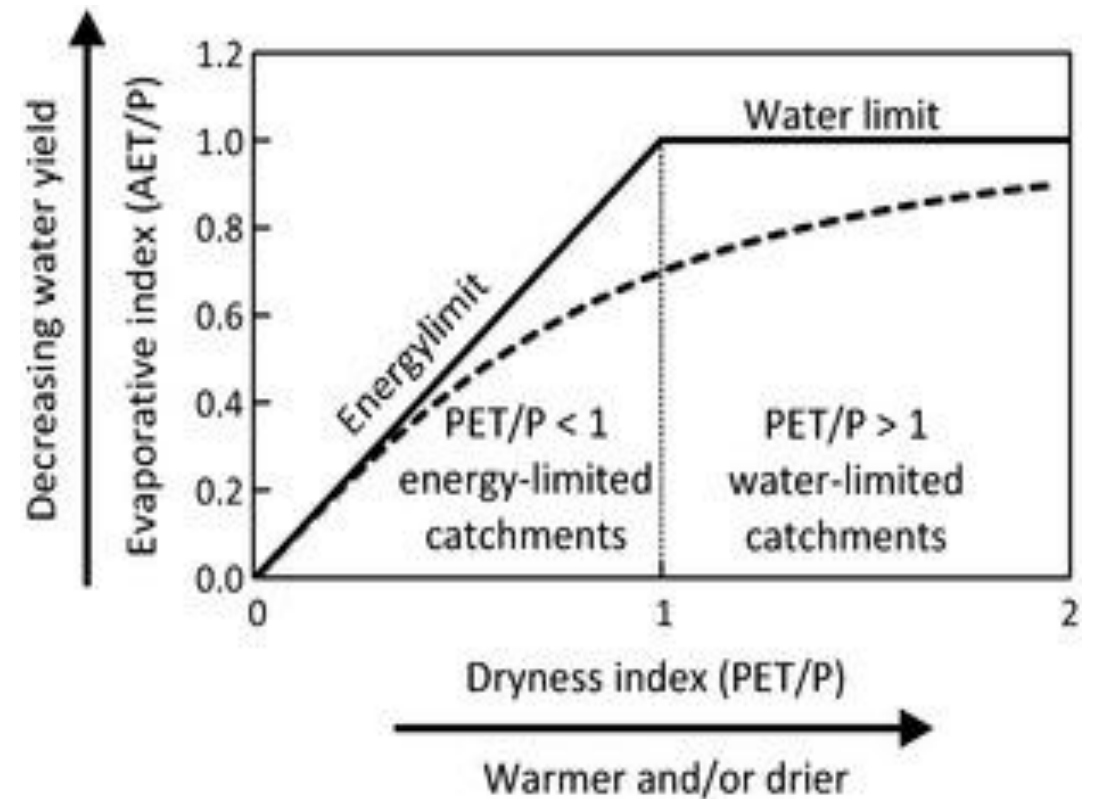
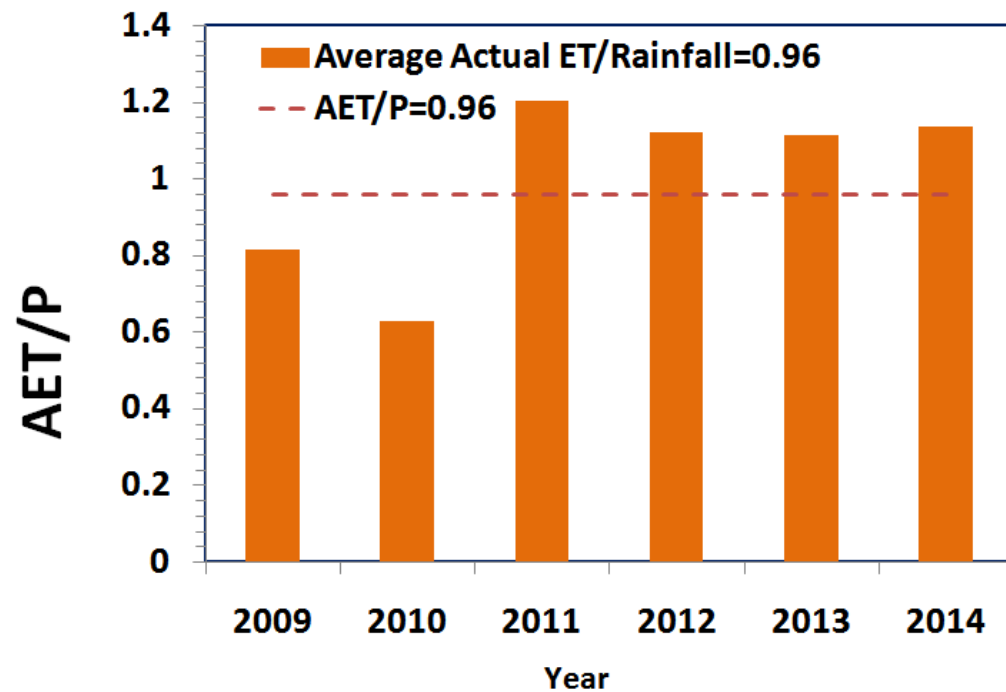
# EVAPOTRANSPIRATION



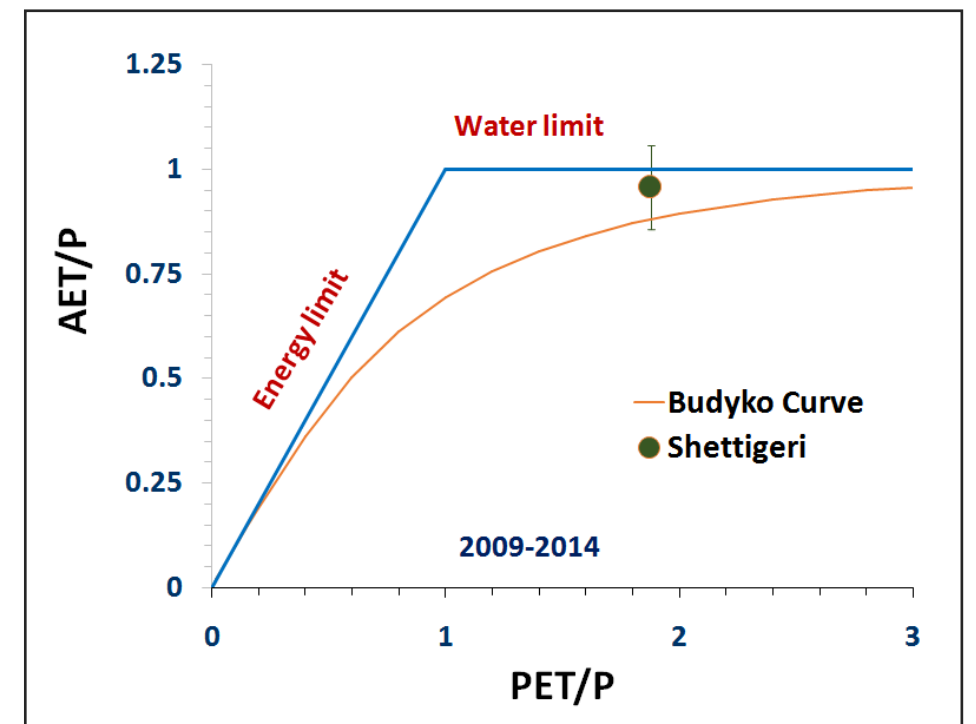
The average annual actual ET is lower than the average rainfall. During *kharif*, average rainfall and AET was found to be 674 mm and 324 mm respectively, whereas in *rabi* it was about 141 mm and 193 mm. The annual ET increased by 10% during 2010-2014 compared to 2001-2009 .



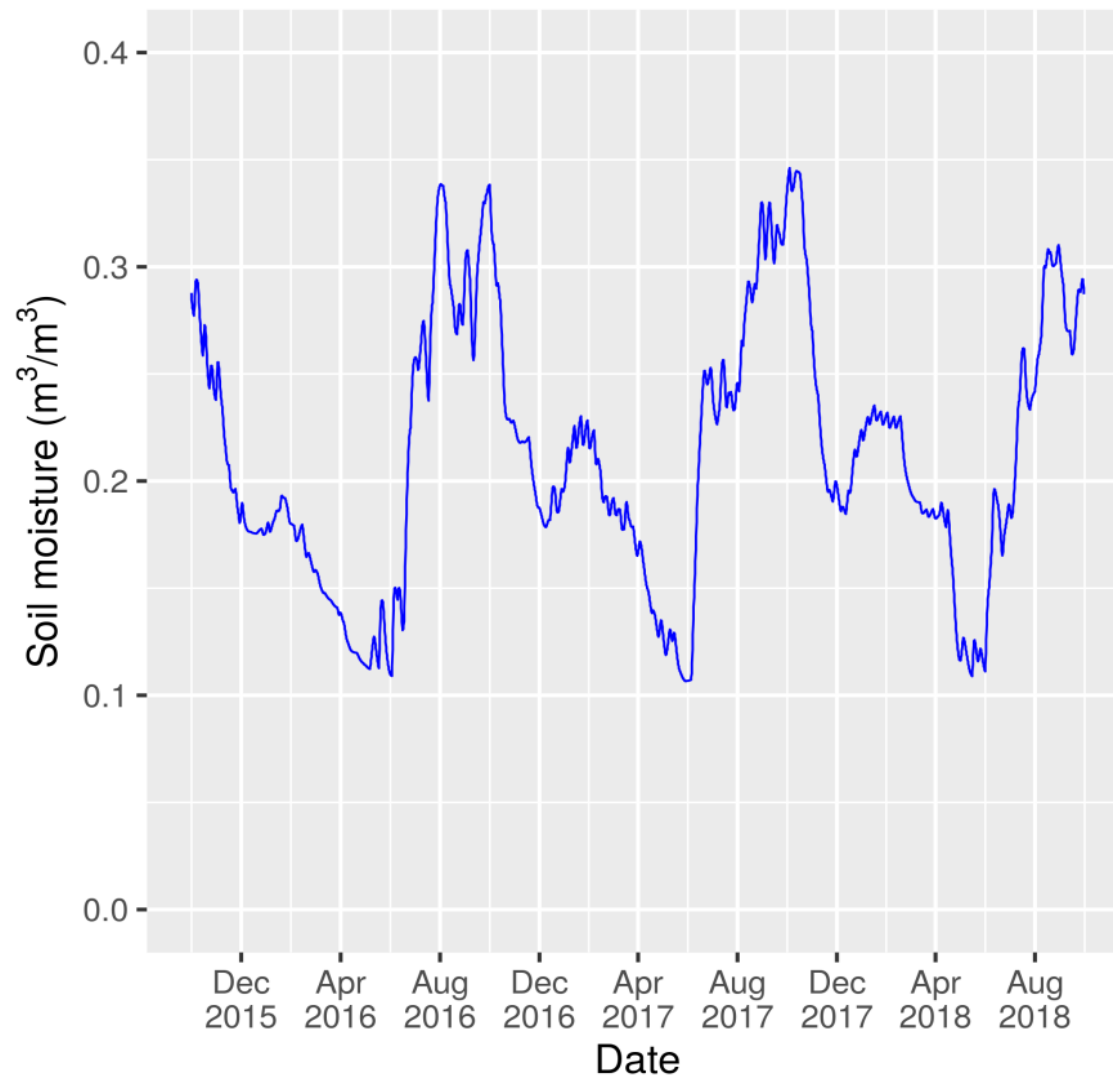
# EVAPOTRANSPIRATION INDEX



The average AET/P ratio was about 96%, which is higher than the sustainable limit of about 80%. Even during extremely lower rainfall year of 2016, AET was 670 mm. This suggests the presence of water storage and utilization from other sources such as groundwater, which buffered the lower rainfall.

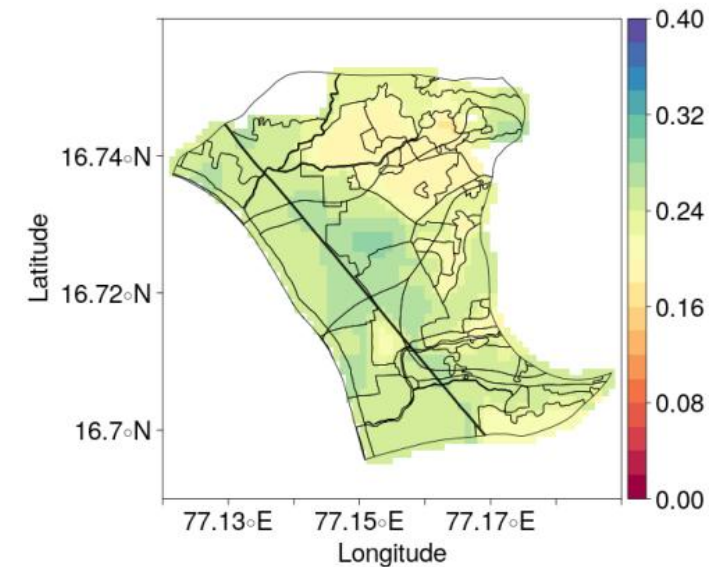


# SATELLITE RETRIEVED SOIL MOISTURE

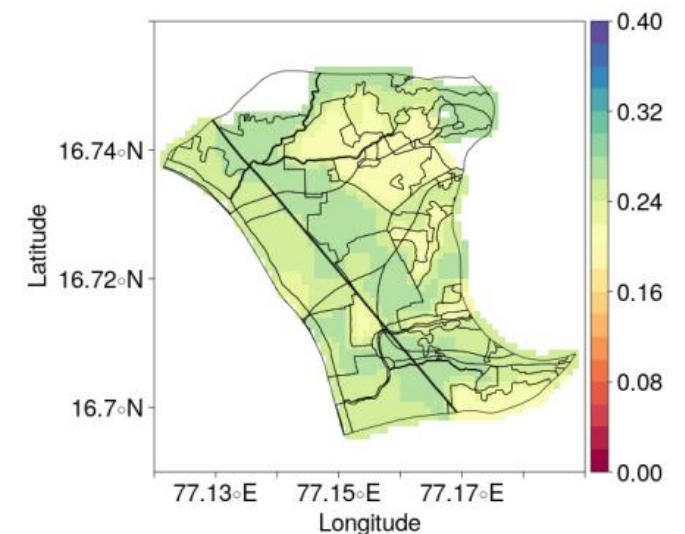


The method developed for retrieving soil moisture from multi-satellite observations allowed to map surface soil moisture behavior in the micro-watershed. The available surface moisture was varied in the range of 15-31 % in *kharif* and 18-34% in *rabi* seasons of 2016 and 11-33% in *Kharif* and 22-34% in *rabi* seasons of 2017.

### Shettigeri- Rabi Soil Moisture

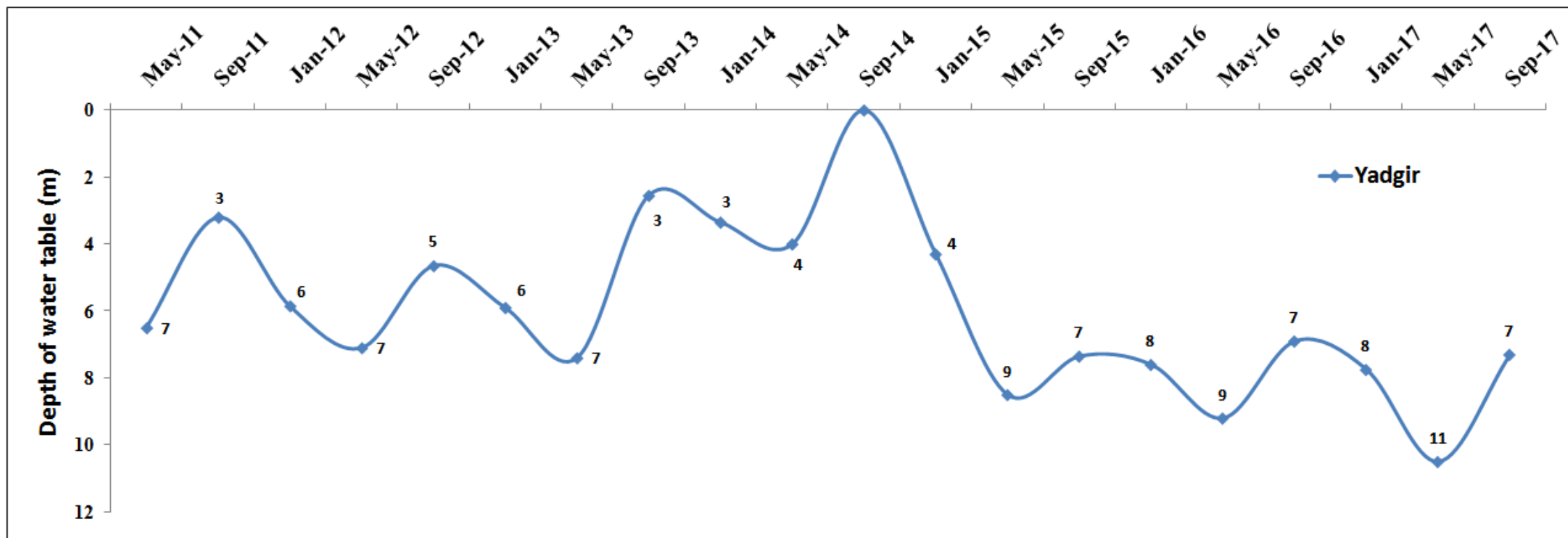


### Shettigeri- Kharif Soil Moisture



# GROUND WATER STATUS

## YADGIR STATION



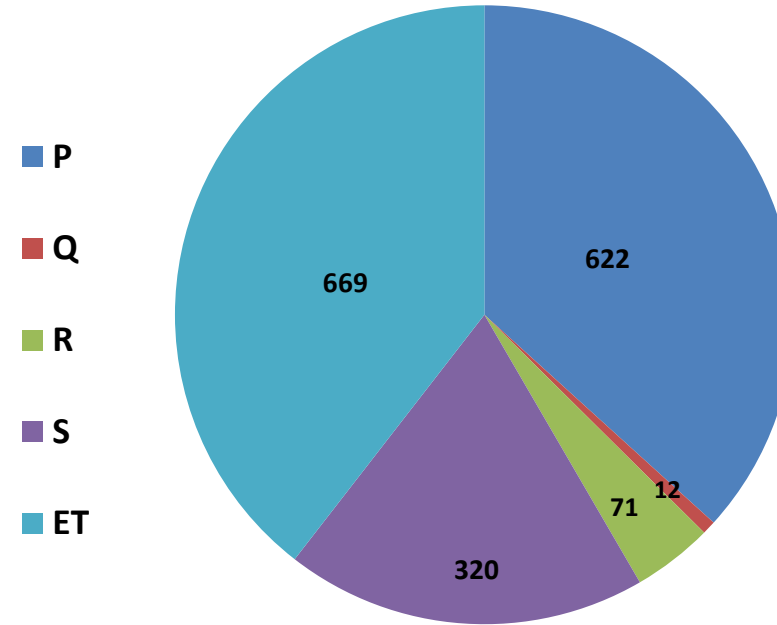
The total number of wells present in Shettigeri Sub-watershed as per LRI data is 5 Bore wells. The groundwater level shown above is from the data obtained from Dept. of Mines & Geology for the nearest station Yadgir. The graph depicts the groundwater level during the years 2011-2017 were slightly varying, where as during the year 2014 was found constant.



# WATER BALANCE

$$Q = P - E - R - S$$

- Q = Runoff
- P = Precipitation
- E = Evapotranspiration
- R = Groundwater recharge
- S = Soil moisture storage change

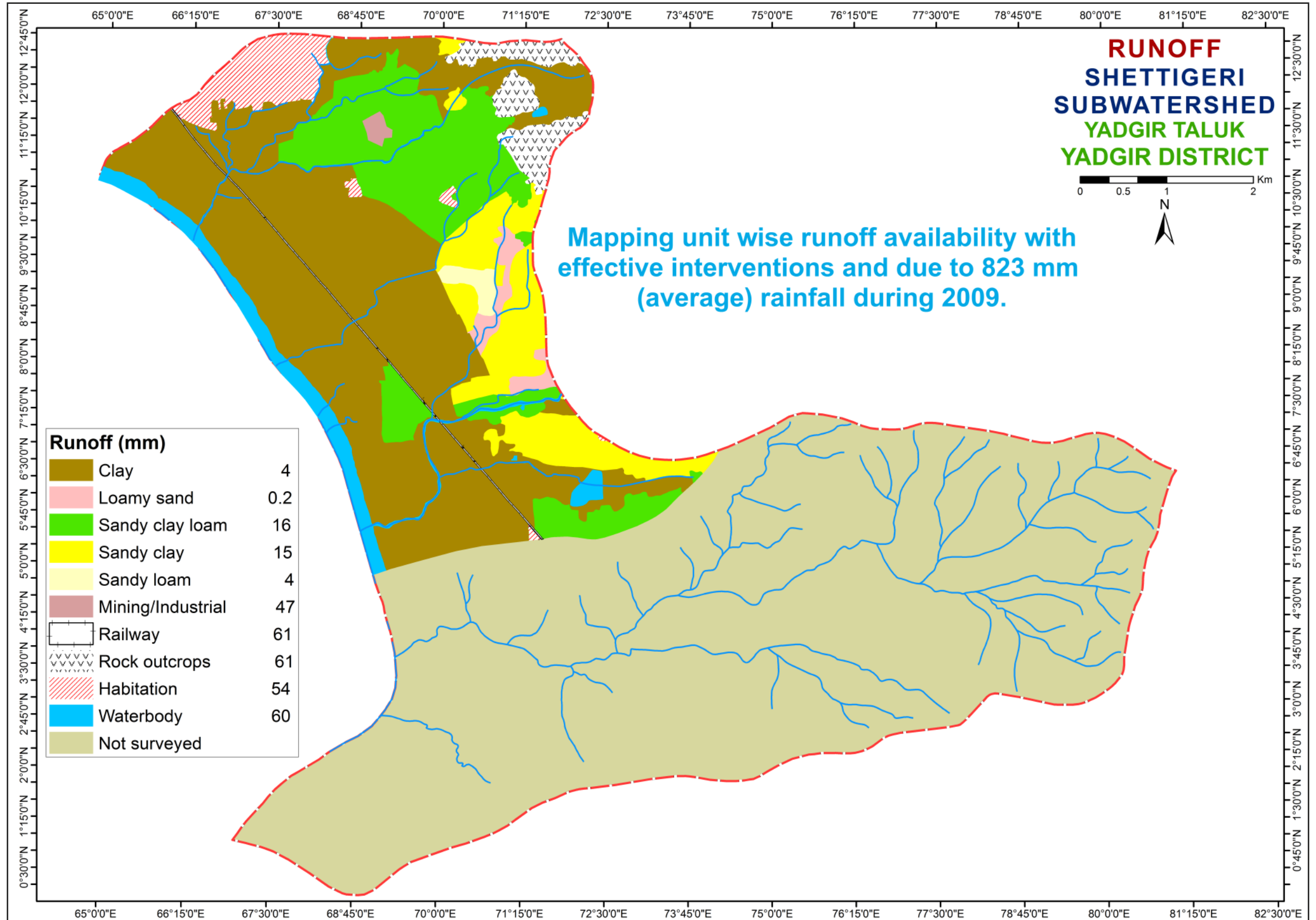


During July-October months, Precipitation is higher than Evapotranspiration, hence Runoff can occur in the watershed.

**P = 622 mm (average of 2009-2017)   ET = 669mm   R = 71 mm   S = 320 mm   Q = 12 mm**

<b>Sl. No.</b>	<b>Parameters</b>	<b>Average_ 2009 (mm)</b>
<b>1.</b>	Rainfall	823
<b>2.</b>	Runoff availability with existing conditions	41
<b>3.</b>	Runoff availability with effective interventions	15
<b>4.</b>	Runoff allowed as environmental flow at the outlet	3
<b>5.</b>	Runoff excess for harvesting by construction of structures	12

# RUNOFF



## SUMMARY

- The average annual rainfall of 887 mm in the Shettigeri sub-watershed as recorded from the Balichakra station data.
- 80%, 13% and 8% of the annual rainfall occurs during *kharif*, *rabi* and summer seasons respectively and exhibited a higher temporal variability.
- The evapotranspiration estimation tool developed indicates that the watershed water balance is in deficit. The cropping & irrigation choices are not appropriate and need to be altered to shift the deficit water balance.
- The estimated runoff available to use is 12 mm for an average annual rainfall of 622 mm (2009-2017). The utilizable groundwater is 49.7 mm (70% of 71 mm recharge estimated). This means the total available water resource combining the soil moisture store for kharif & rabi (320 mm) and utilizable runoff plus recharge is 382 (=320+12+50)
- The average actual evapotranspiration estimated in the watershed based on the current land use and irrigation practices for the kharif and rabi seasons is 531 mm. Hence the amount of water use for kharif and rabi seasons may be estimated as 664 mm (i.e. 125% of AET). This demand for the two seasons is higher by 282 mm, i.e. (664-382). The AET in June-Sept months is only 58% of rainfall. Hence, there is a good opportunity to harvest the excess water through watershed management practices for utilizing during rabi season.
- The total number of wells present in Shettigeri Sub-watershed as per LRI data is 5 Bore wells. The groundwater level data obtained from Dept. of Mines & Geology for the nearest station Yadgir. The groundwater level during the years 2011-2017 were slightly varying, where as during the year 2014 was found constant.