Land Resource and Hydrological Inventory of Rachanahalli 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 - 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 Rachanahalli Sub-watershed for Watershed Planning and Development

Yadgir Taluk, Yadgir District, Karnataka (AESR 6.2)

CONTENTS

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How to read and use the Atlas

The Land Resource Inventory of Rachanahalli 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.

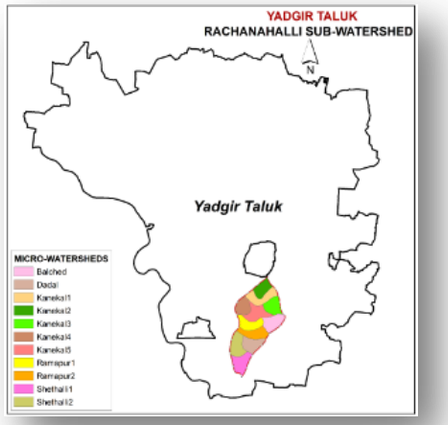
For easy map reading and understanding the information contain in different maps, the physical, cultural and scientific symbols used in the maps are illustrated in the form of colors, graphics and tables.

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.

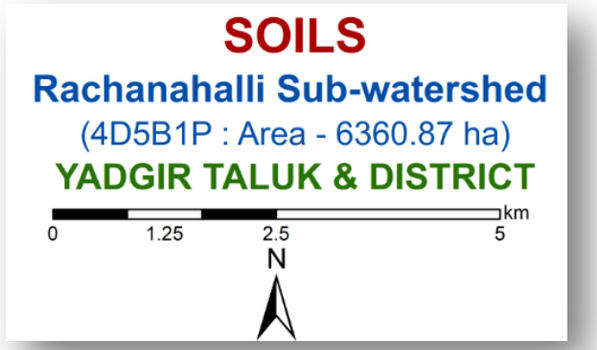
Inset map

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



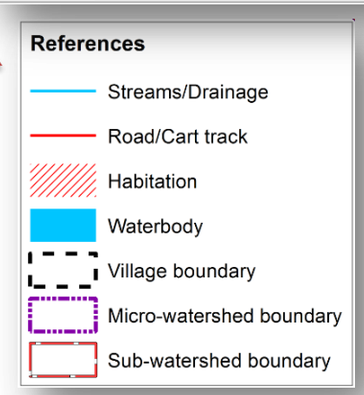
Map title

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



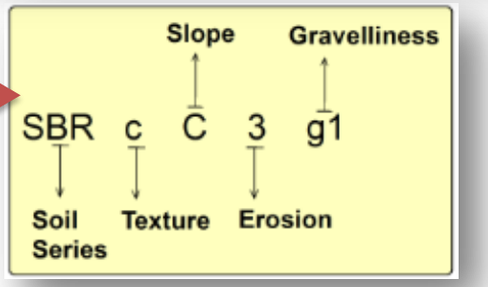
Legends and symbols

*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.

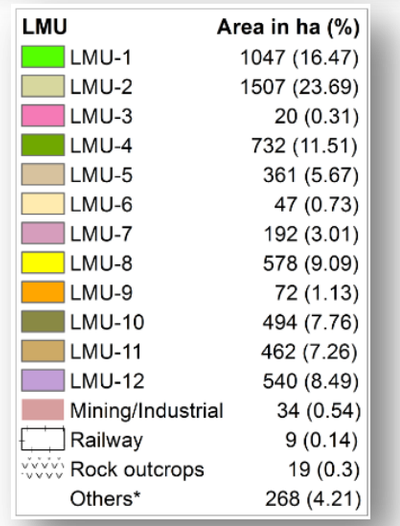


Map colours

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

Land Management Units (LMU)

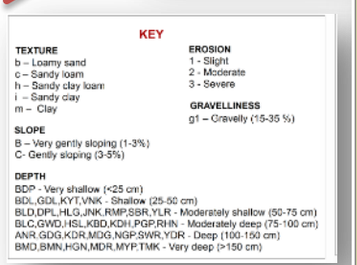
Grouping of similar soil areas based on their soil-site characteristics into management units that respond similarly for a given level of management are designated as land management units..

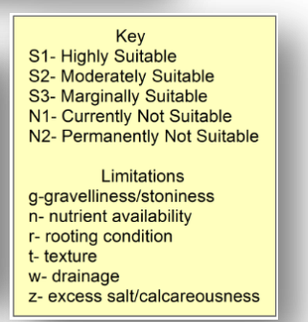


LMU	Area in ha (%)
LMU-1	1047 (16.47)
LMU-2	1507 (23.69)
LMU-3	20 (0.31)
LMU-4	732 (11.51)
LMU-5	361 (5.67)
LMU-6	47 (0.73)
LMU-7	192 (3.01)
LMU-8	578 (9.09)
LMU-9	72 (1.13)
LMU-10	494 (7.76)
LMU-11	462 (7.26)
LMU-12	540 (8.49)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

Map key

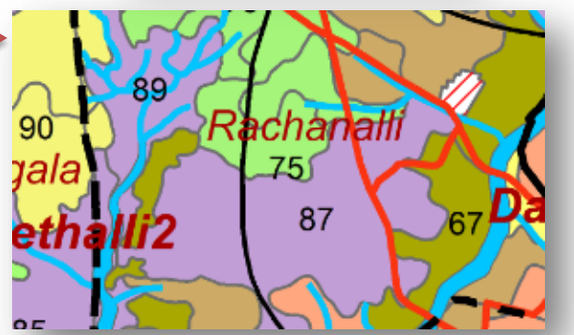
There are many thematic types to be differentiated on the map solely based on colour. Therefore soils and suitability types and their limitations are distinguished by colours with a combination of alpha-numeric characters.





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.



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 Rachanahalli Sub-watershed covering an area of 6360.87 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.

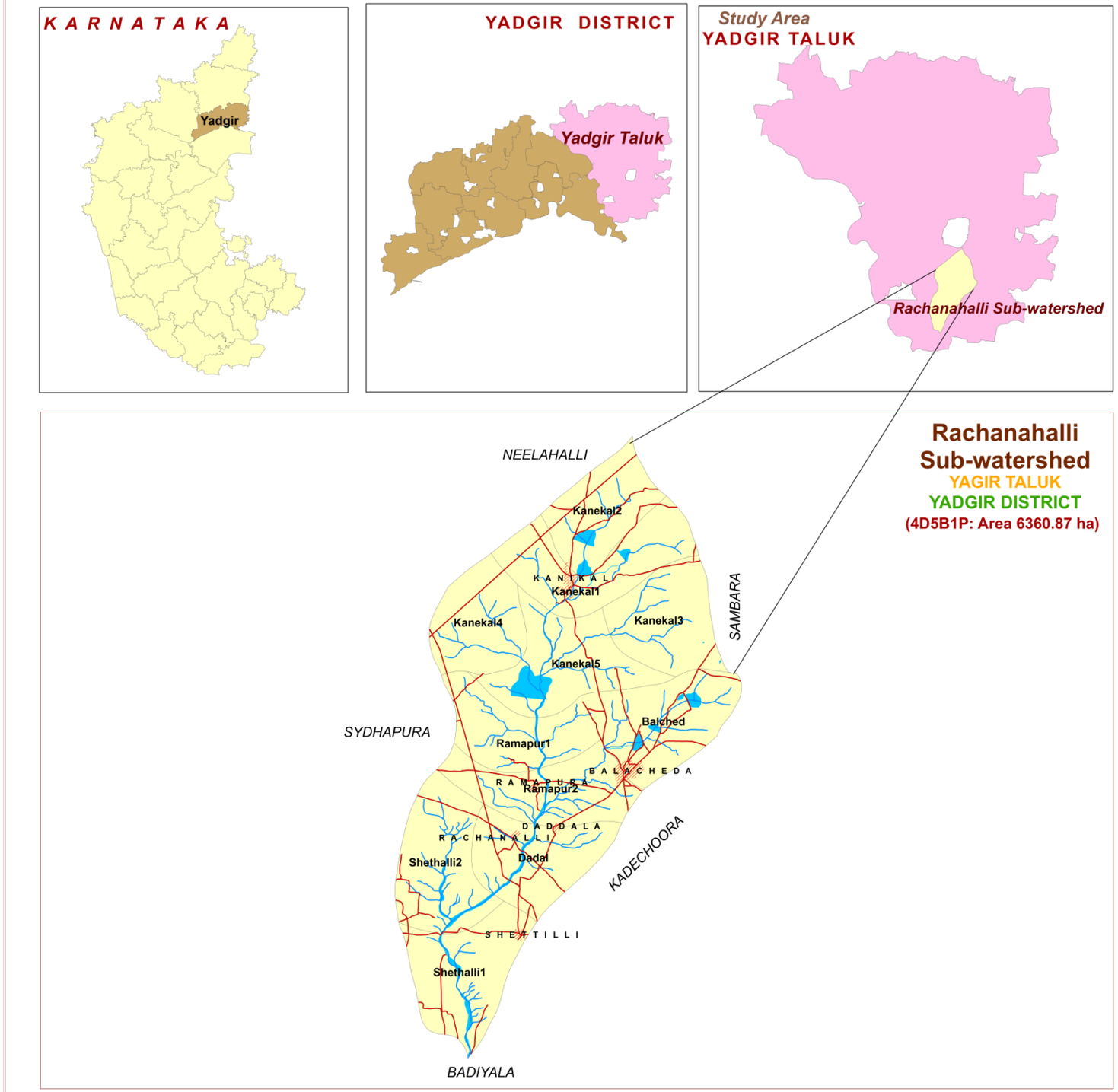
2. General Description of Sub-watershed

The Yadgir, popularly called as “Yadavagiri” by the local people, district came to existence on 30th Dec 2009 by carving out of erst-while Kalaburagi district of Karnataka with a geographical area of 5234.4 square kilometers, located in the northern part of the state. It lies between north latitudes’ $16^0$57’ – $16^0$59’ and east longitudes 77^0 12’ – 77^0 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 SWs-LRI for the Rachanahalli Sub-watershed in Yadgir taluk, Yadgir district. It was selected for data base generation under Sujala III project. Rachanahalli Sub-watershed (code– 4D5B1P) is covering an area of 6360.87 ha and spread across Kadechoora, Sambara, Neelahalli, Sydhapura and Badiyala villages.

2.1. Location and Extent

LOCATION MAP OF RACHANAHALLI SUB-WATERSHED

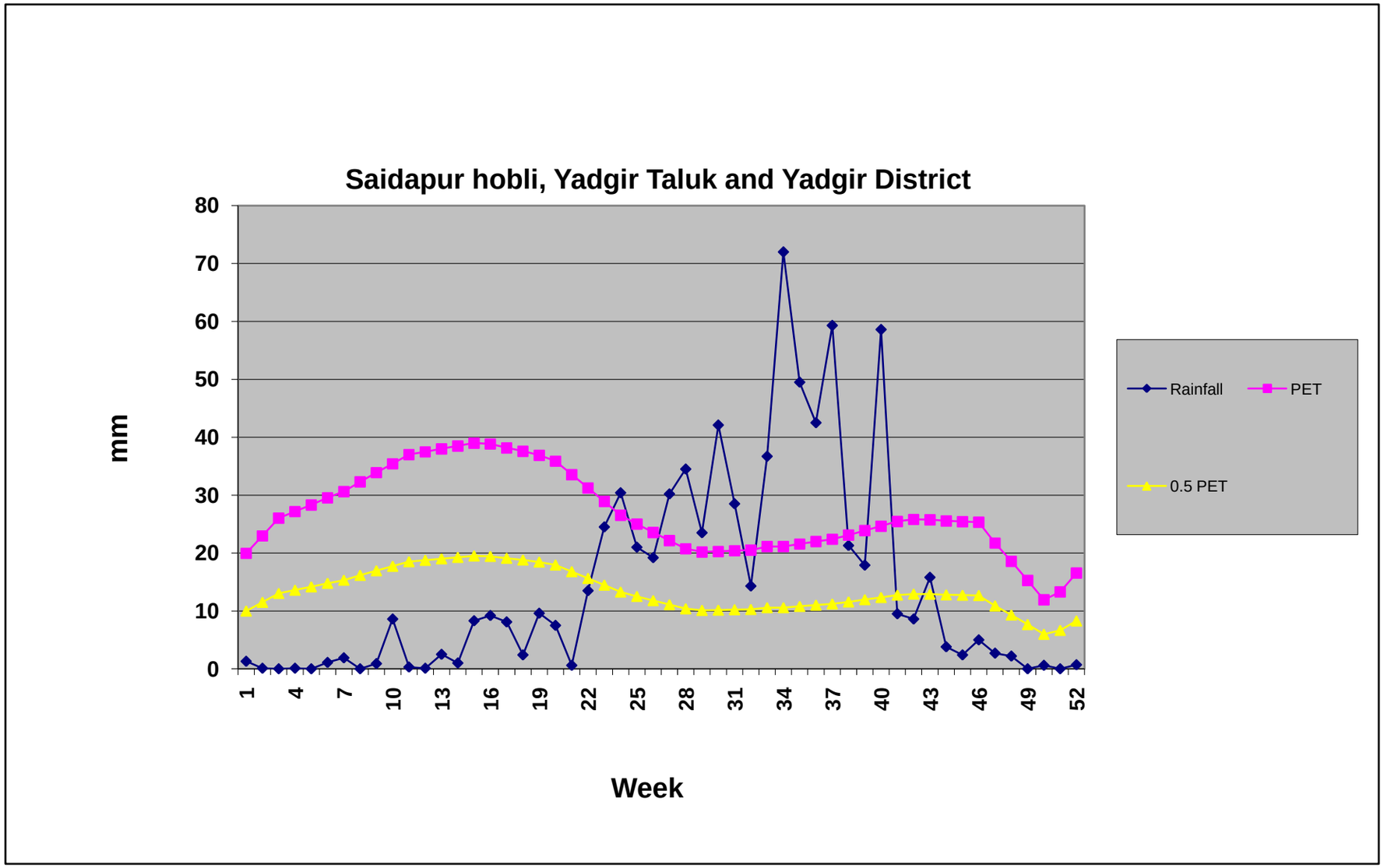


The Rachanahalli Sub-watershed (Yadgir taluk, Yadgir district) is located in between $16^0$30’ – $16^0$38’ North latitudes and $77^0$15’ – $77^0$30’ East longitudes, covering an area of about 6360.87 ha, bounded by Kadechoora, Sambara, Neelahalli, Sydhapura and Badiyala villages.

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.

Climate

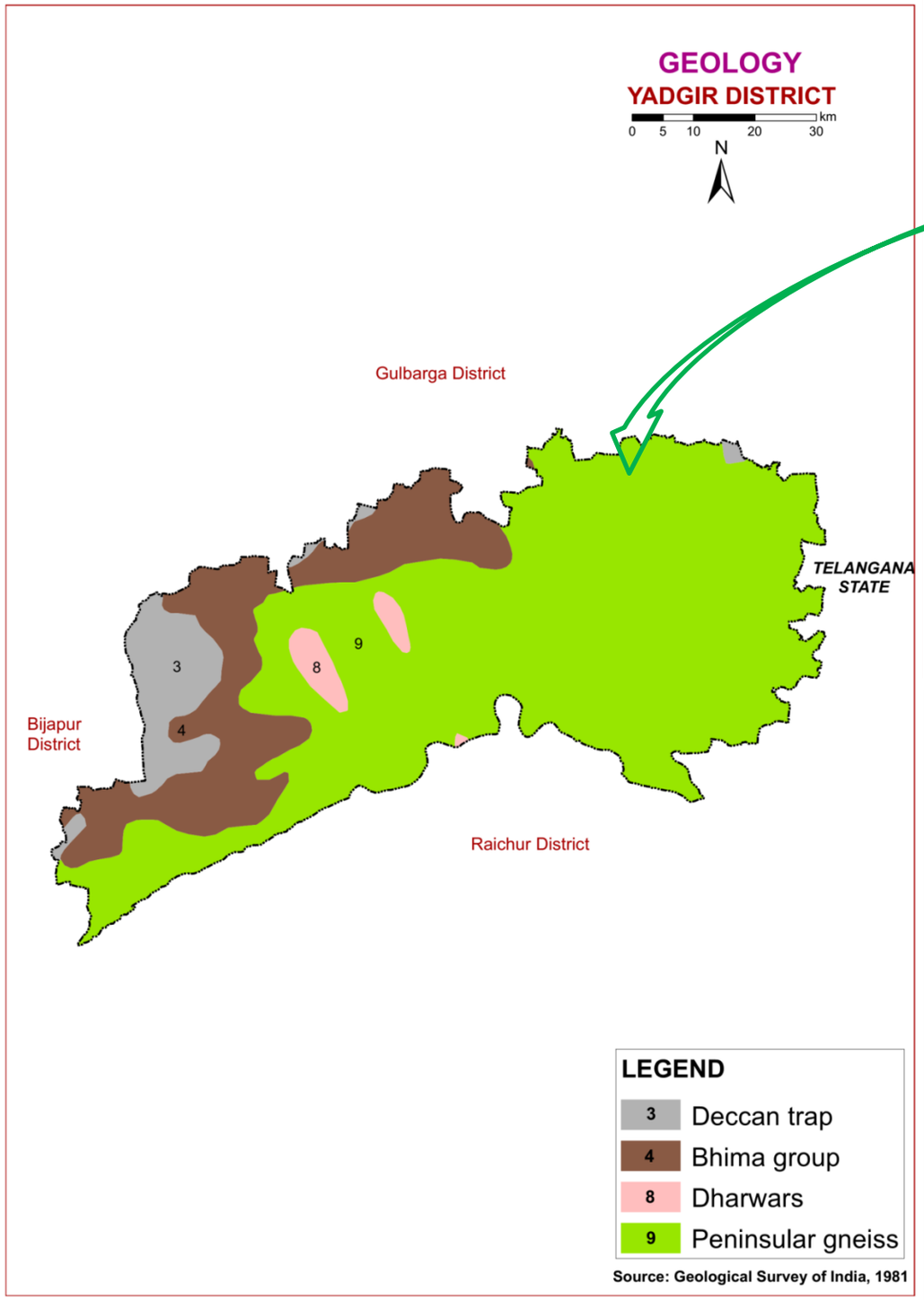


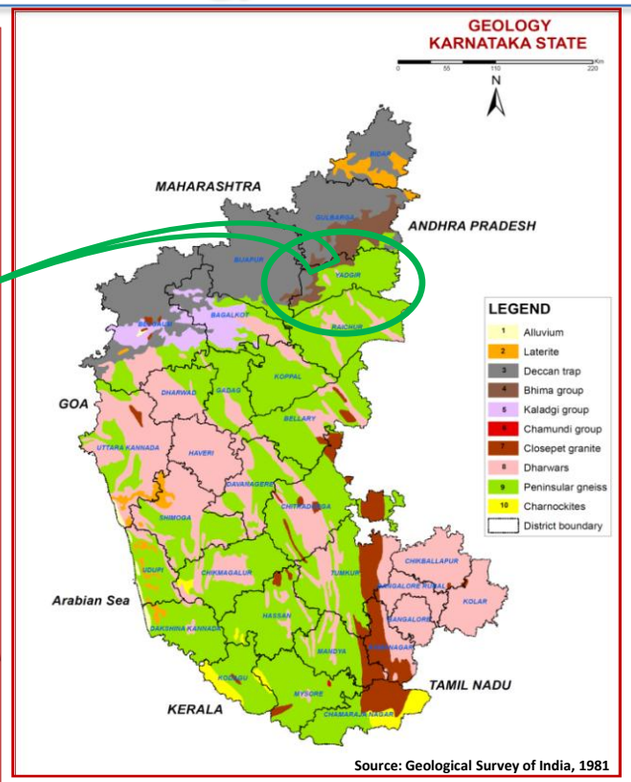
Length of Growing Period (LGP) is varying from June 1st week to 4th week of October (120 - 150 days)

Annual Rainfall : 754mm. in the Saidapur Hobli, Yadgir Taluk & District

Source: KSNDMC (1980-2011)

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, lete Creteceous 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 visicular 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.

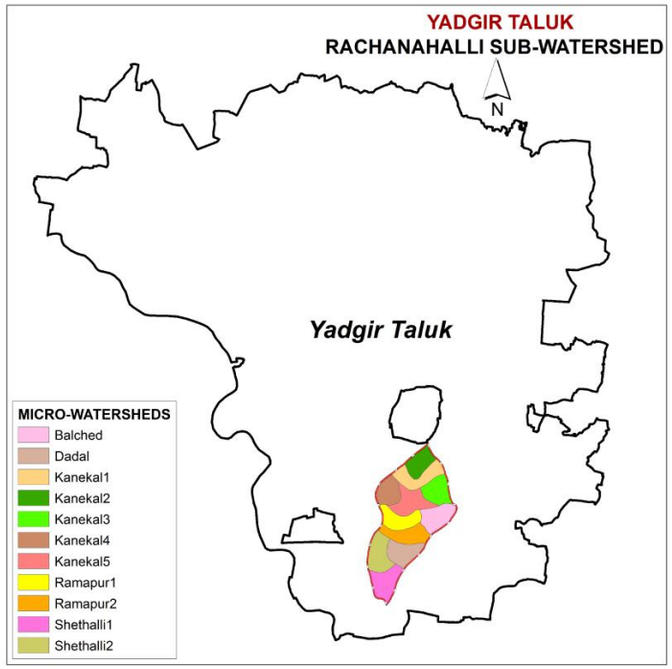
3. Survey Methodology

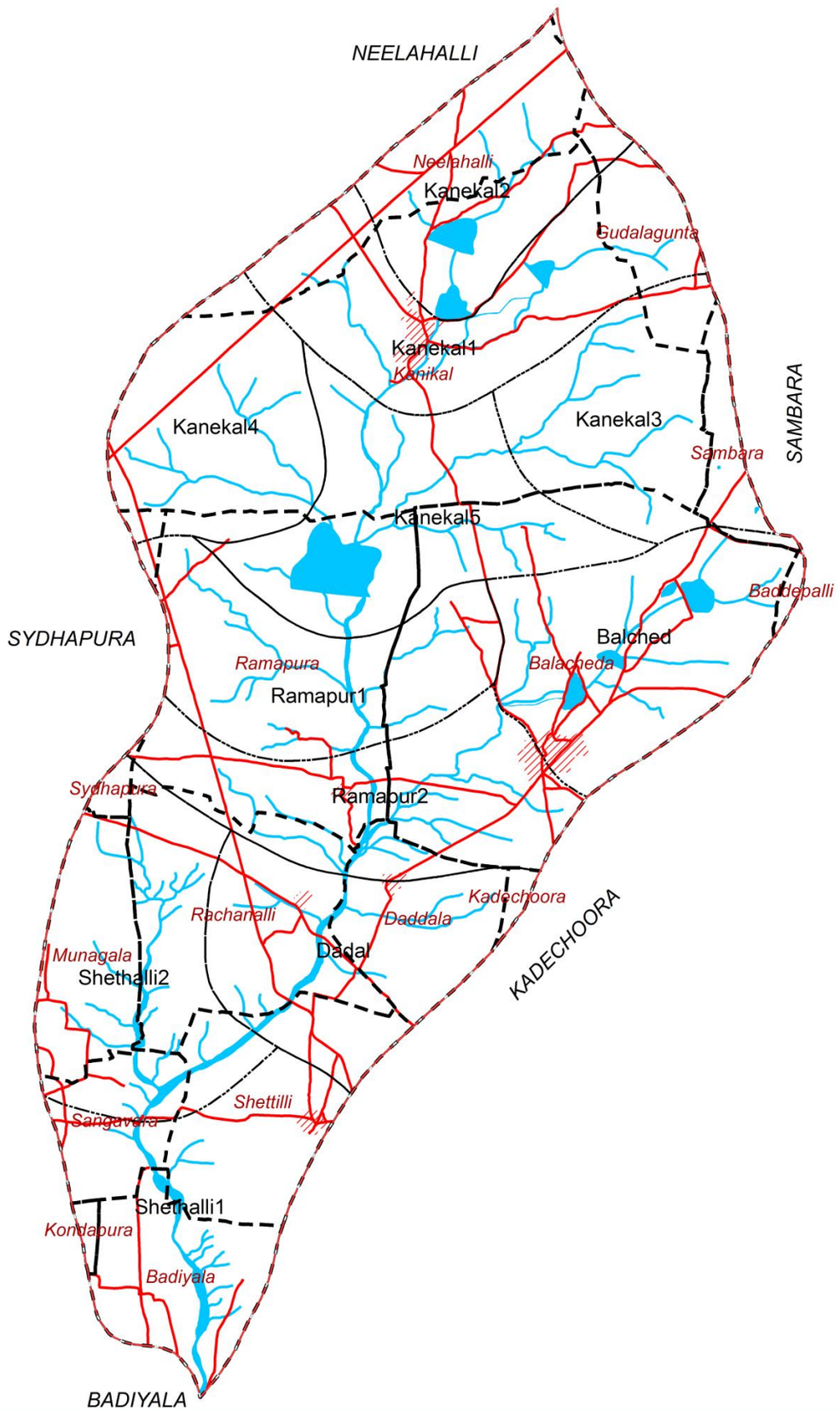
Sequence of activities in generation of LRI

- 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





Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

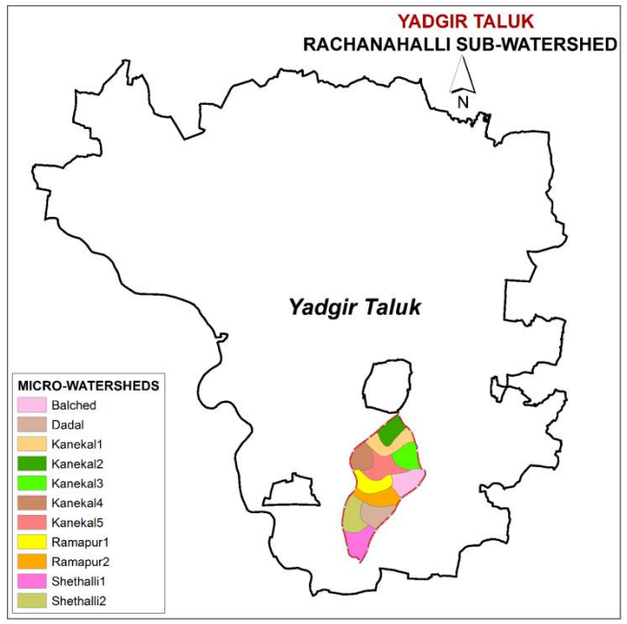
N

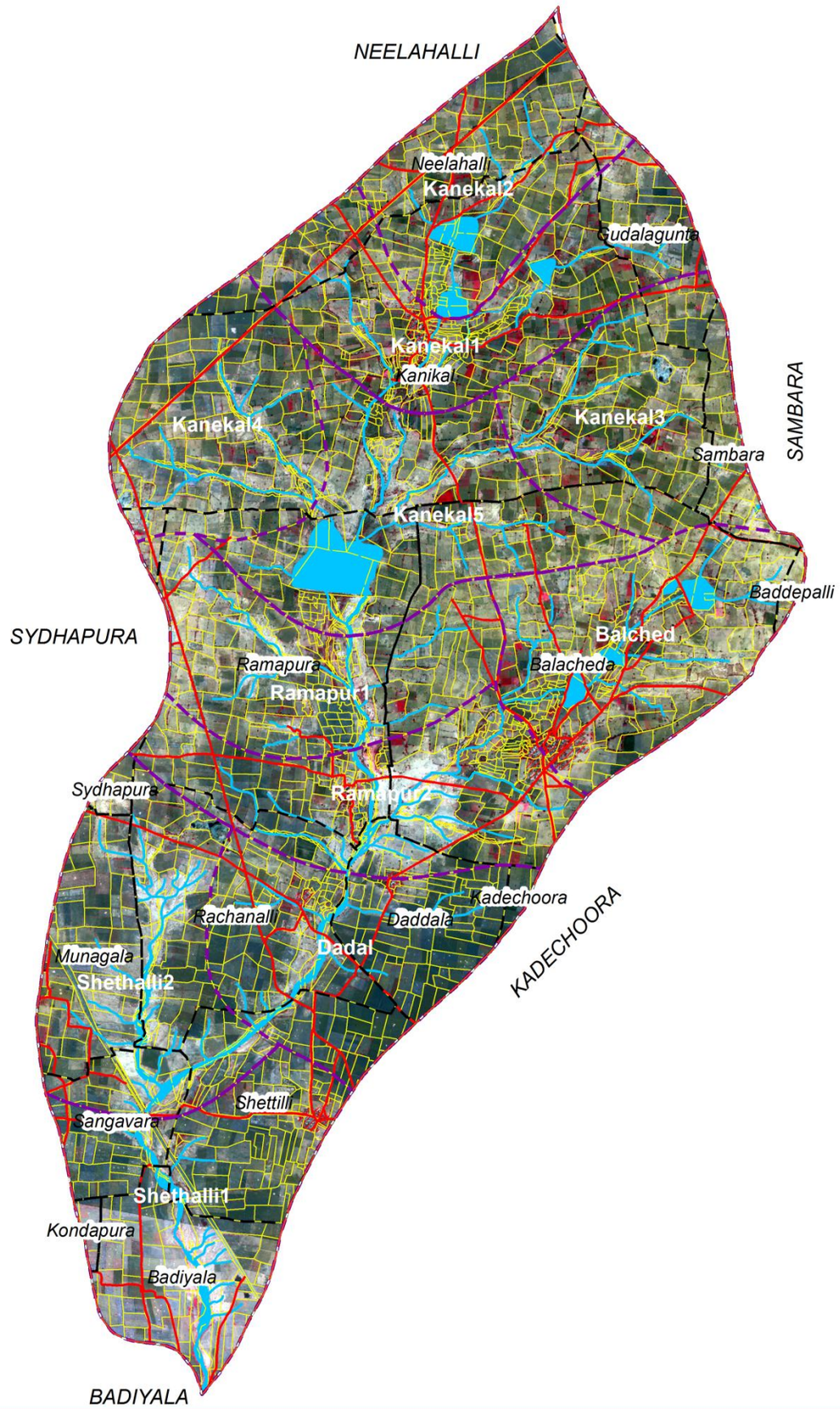
References

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

Source: ICAR-NBSS&LUP, Bengaluru

3.2. Database Used - Satellite Image





SATELLITE IMAGE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

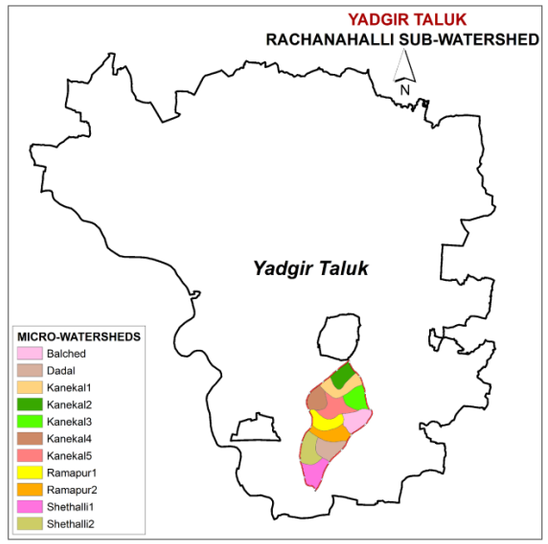
N

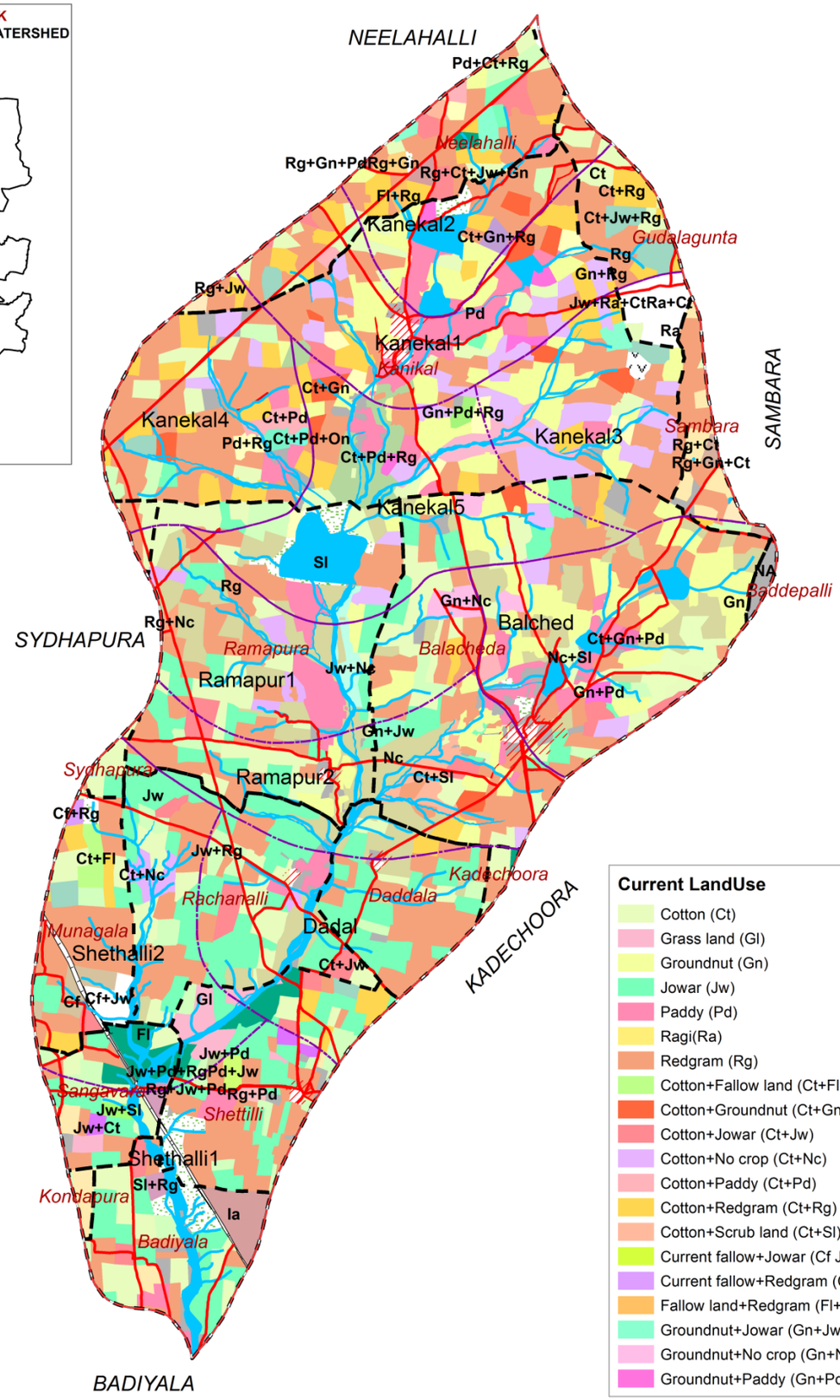
References

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

Source : Cartosat 1 Imagery

3.3. Current Landuse





CURRENT LANDUSE (2018)

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

N

References

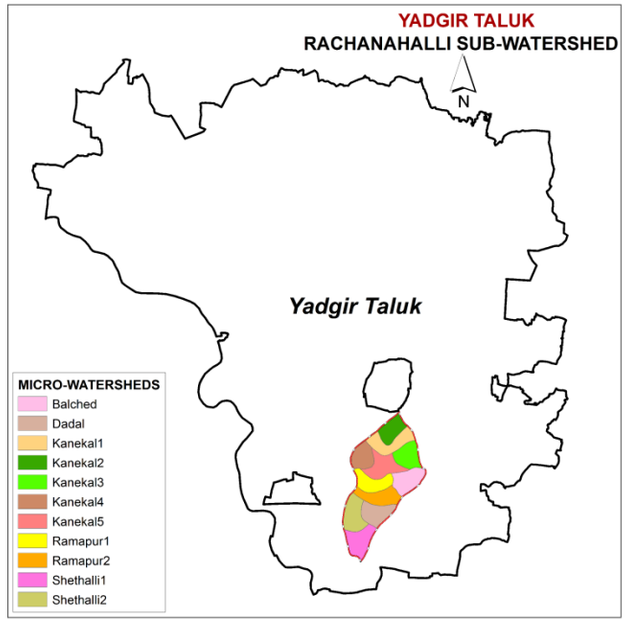
- Streams/Drainage
- Road/Cart track
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

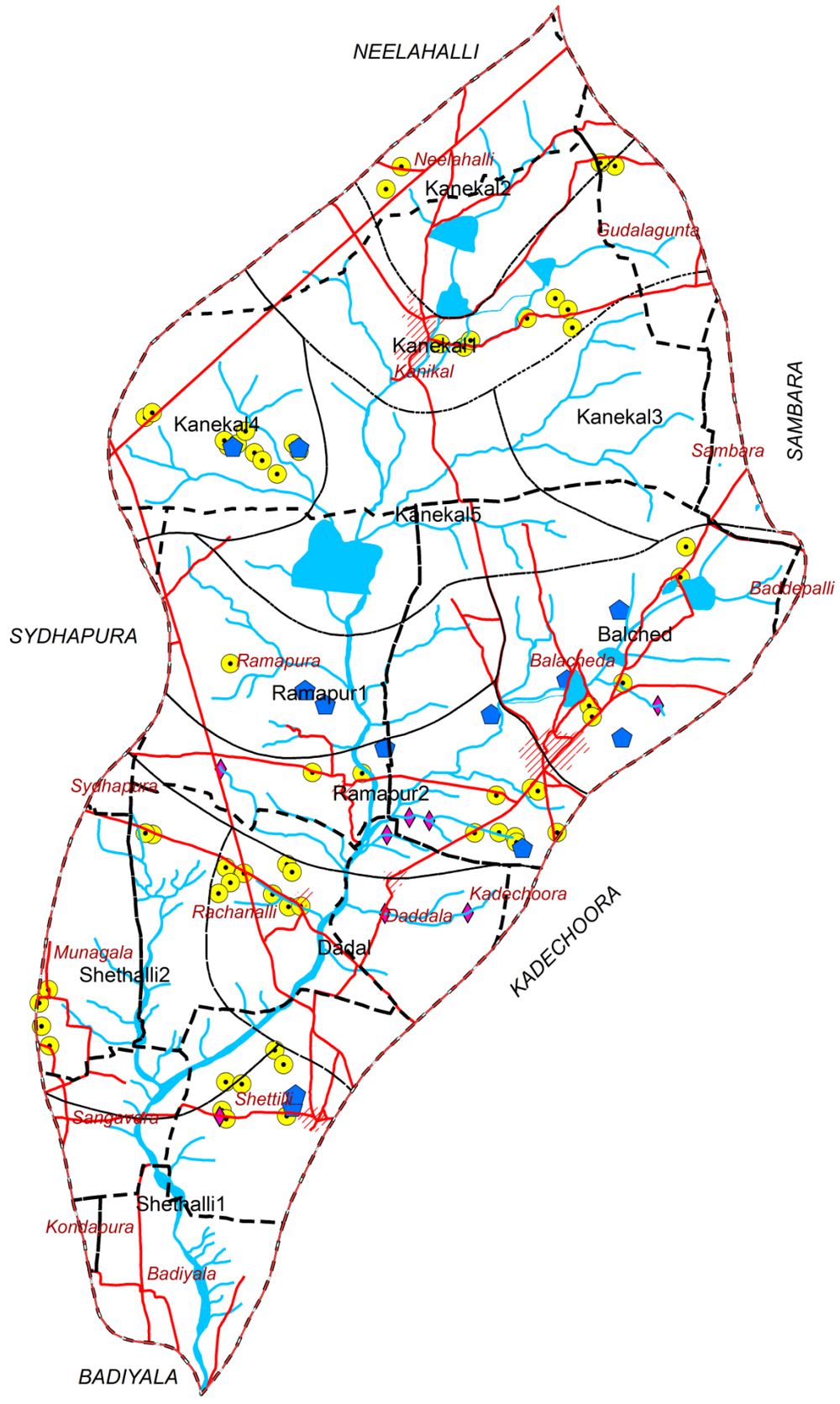
Current LandUse

- Cotton (Ct)
- Grass land (Gl)
- Groundnut (Gn)
- Jowar (Jw)
- Paddy (Pd)
- Ragi(Ra)
- Redgram (Rg)
- Cotton+Fallow land (Ct+Fl)
- Cotton+Groundnut (Ct+Gn)
- Cotton+Jowar (Ct+Jw)
- Cotton+No crop (Ct+Nc)
- Cotton+Paddy (Ct+Pd)
- Cotton+Redgram (Ct+Rg)
- Cotton+Scrub land (Ct+Sl)
- Current fallow+Jowar (Cf Jw)
- Current fallow+Redgram (Cf+Rg)
- Fallow land+Redgram (Fl+Rg)
- Groundnut+Jowar (Gn+Jw)
- Groundnut+No crop (Gn+Nc)
- Groundnut+Paddy (Gn+Pd)
- Groundnut+Redgram (Gn+Rg)
- Jowar+Cotton (Jw+Ct)
- Jowar+No crop (Jw+Nc)
- Jowar+Paddy (Jw+Pd)
- Jowar+Redgram (Jw+Rg)
- Jowar+Scrub land (Jw+Sl)
- No crop+Scrub land (Nc+Sl)
- Paddy+Jowar (Pd+Jw)
- Paddy+Redgram (Pd+Rg)
- Ragi+Cotton(Ra+Ct)
- Redgram+Cotton (Rg+Ct)
- Redgram+Groundnut (Rg+Gn)
- Redgram+Jowar (Rg+Jw)
- Redgram+No crop (Rg+Nc)
- Redgram+Paddy (Rg+Pd)
- Redgram+Scrub land (Rg+Sl)
- Cotton+Groundnut+Paddy (Ct+Gn+Pd)
- Cotton+Groundnut+Redgram (Ct+Gn+Rg)
- Cotton+Jowar+Redgram (Ct+Jw+Rg)
- Cotton+Paddy+Onion (Ct+Pd+On)
- Cotton+Paddy+Redgram (Ct+Pd+Rg)
- Groundnut+Paddy+Redgram (Gn+Pd+Rg)
- Jowar+Paddy+Redgram (Jw+Pd+Rg)
- Jowar+Ragi+Cotton(Jw+Ra+Ct)
- Paddy+Cotton+Redgram (Pd+Ct+Rg)
- Redgram+Groundnut+Cotton (Rg+Gn+Ct)
- Redgram+Groundnut+Paddy (Rg+Gn+Pd)
- Redgram+Jowar+Paddy (Rg+Jw+Pd)
- Redgram+Cotton+Jowar+Groundnut (Rg+Ct+Jw+Gn)
- Fallow land (Fl)
- Current fallow (Cf)
- No crop (Nc)
- Scrub land (Sl)
- Mining/Industrial
- Railway
- Rock outcrops (Rc)
- Road
- Habitation
- Waterbody
- Not Available (NA)

Source: ICAR-NBSS&LUP, Bengaluru

3.4. Location of Wells





LOCATION OF WELLS

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

N

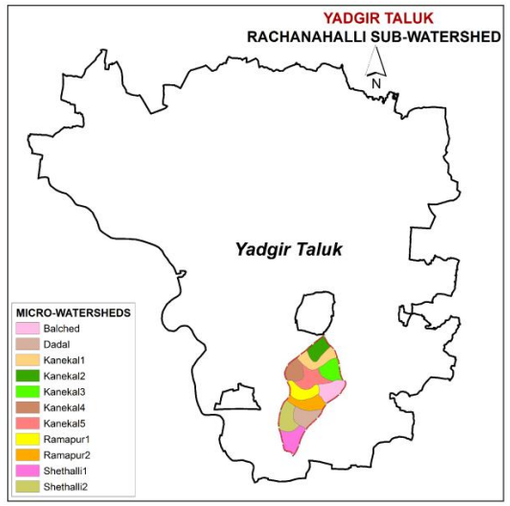
References

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

Legend	No's
Bore well	60
Check Dam	8
Open well	12

Source: ICAR-NBSS&LUP, Bengaluru

4. The Soils



SOILS

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

N

Soil Phase	Area in ha (%)	Soil Phase	Area in ha (%)	Soil Phase	Area in ha (%)
Soil of Granite and Granite Gneiss Landscape					
1, BDPiB2	25 (0.39)	27, YLRbB2	97 (1.53)	47, NGPbB2	39 (0.62)
3, BDLbC3	19 (0.3)	29, YLRcB2g1	180 (2.84)	48, NGPiB2	35 (0.56)
5, BDLiB2	329 (5.17)	31, YLRiB2	101 (1.59)	49, NGPmB2	189 (2.96)
9, VNKcB2	115 (1.8)	32, HSLcB2	30 (0.47)	51, ANRbB2g1	44 (0.7)
11, SBRcB2	338 (5.32)	33, HSLiB2	47 (0.73)	53, ANRhB2	41 (0.64)
12, SBRcC3g1	124 (1.95)	35, GWDiB2	11 (0.17)	55, ANRiB2	65 (1.03)
14, HLGbB2g1	25 (0.39)	38, BLCiB2	37 (0.58)	56, ANRiB3g1	88 (1.39)
15, HLGbB3	74 (1.17)	39, KBDbB3	47 (0.73)	57, MDGcB2	59 (0.93)
16, HLGcB2	104 (1.64)	40, PGPcB2	51 (0.81)	58, MDGiB2	71 (1.12)
18, HLGiB2g1	52 (0.82)	41, PGPiB2	104 (1.63)	61, MDRmB2	180 (2.84)
19, HLGiB3g1	26 (0.42)	42, YDRcB2	17 (0.26)	62, BMNmB2	80 (1.26)
20, JNKcB2	74 (1.17)	43, YDRiB2	104 (1.63)	64, BMDcB2	79 (1.24)
21, JNKcB2g1	54 (0.85)	44, GDGbB2	87 (1.37)	65, BMDiB2g1	44 (0.7)
25, DPLcB2	114 (1.79)	45, GDGbB3g1	113 (1.78)		
26, DPLiB2	85 (1.34)	46, GDGiB2	37 (0.59)		
Soil of Alluvial Landscape					
67, GDLcB3	83 (1.31)	79, RHNmB2	266 (4.18)	92, HGNcB2	30 (0.48)
68, KYTcB2	52 (0.82)	84, KDRcB2	50 (0.79)	93, HGNiB2	105 (1.66)
70, RMPcB2	50 (0.79)	85, KDRcB3	103 (1.62)	95, HGNmB2	696 (10.95)
71, RMPiB2	33 (0.52)	87, KDRiB2	157 (2.47)	97, MYPhB2	21 (0.33)
73, BLDcB2	32 (0.51)	89, KDRmB2	51 (0.81)	98, MYPiB2g1	63 (0.99)
75, BLDiB1g1	39 (0.62)	90, SWRcB2	28 (0.44)		
77, RHNcB2	54 (0.86)	91, SWRmB2	285 (4.48)		
Low lands					
99, KDHcB2	20 (0.31)	105, TMKiB3	112 (1.76)	Rock outcrops	19 (0.3)
104, TMKiB2	58 (0.91)	Mining/Industrial	34 (0.54)	Others*	268 (4.21)
Railway	9 (0.14)				

* - Habitation & Waterbody

KEY

TEXTURE
b – Loamy sand
c – Sandy loam
h – Sandy clay loam
i – Sandy clay
m – Clay

EROSION
1 - Slight
2 - Moderate
3 - Severe

GRAVELLINESS
g1 – Gravelly (15-35 %)

SLOPE
B – Very gently sloping (1-3%)
C- Gently sloping (3-5%)

DEPTH
BDP - Very shallow (<25 cm)
BDL,GDL,KYT,VNK - Shallow (25-50 cm)
BLD,DPL,HLG,JNK,RMP,SBR,YLR - Moderately shallow (50-75 cm)
BLC,GWD,HSL,KBD,KDH,PGP,RHN - Moderately deep (75-100 cm)
ANR,GDG,KDR,MDG,NGP,SWR,YDR - Deep (100-150 cm)
BMD,BMN,HGN,MDR,MYP,TMK - Very deep (>150 cm)

Slope: C
Gravelliness: g1

SBR c C 3 g1

Soil Series: SBR
Texture: c
Erosion: 3

References

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

4.1 Mapping unit description of Rachanahalli (4D5B1P) Sub-watershed in Yadgir Taluk, Yadgir district

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of Granite and Granite gneiss Landscape				
	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		**80 (1.26)**
62		BMNmB2	Clay surface, slope 1-3%, moderate erosion	80 (1.26)
	BMD	Bomraldoddi soils are very deep (>150 cm), well drained, have dark reddish brown to dark grey, reddish brown, dark brown and yellowish red, slightly calcareous sandy clay loam soils occurring on nearly level to very gently sloping uplands under cultivation		**123(1.94)**
64		BMDcB2	Sandy loam surface, slope 1-3%, moderate erosion	79 (1.24)
65		BMDiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	44 (0.7)
	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		**180 (2.84)**
61		MDRmB2	Clay surface, slope 1-3%, moderate erosion	180 (2.84)
	YDR	Yadgir soils are deep (100-150 cm), well drained, have brown to dark yellowish brown and olive brown, sodic sandy loam soils occurring on very gently sloping uplands under cultivation		**121(1.89)**
42		YDRcB2	Sandy loam surface, slope 1-3%, moderate erosion	17 (0.26)
43		YDRiB2	Sandy clay soils, slope 1-3%, moderate erosion	104 (1.63)
	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		**238(3.76)**
51		ANRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	44 (0.7)
53		ANRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	41 (0.64)
55		ANRiB2	Sandy clay surface, slope 1-3%, moderate erosion,	65 (1.03)
56		ANRiB3g1	Sandy clay surface, slope 1-3%, severe erosion, gravelly (15-35%)	88 (1.39)
	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		**130 (2.05)**
57		MDGcB2	Sandy loam surface, slope 1-3%, moderate erosion	59 (0.93)
58		MDGiB2	Sandy clay surface, slope 1-3%, moderate erosion,	71 (1.12)
	NGP	Nagalapur soils are deep (100-150 cm), moderately well drained, have very dark gray to very dark grayish brown, black calcareous cracking clay soils occurring on very gently sloping uplands under cultivation		**263(4.14)**
47		NGPbB2	Loamy sand surface, slope 1-3%, moderate erosion	39 (0.62)
48		NGPiB2	Sandy clay surface, slope 1-3%, moderate erosion	35 (0.56)
49		NGPmB2	Clay surface, slope 1-3%, moderate erosion	189 (2.96)
	GDG	Gondedagi soils are deep (100-150 cm), well drained, have dark reddish gray to dark brown, sandy clay loam soils occurring on very gently to gently sloping uplands under cultivation		**237 (3.74)**

To be continued….

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
44		GDGbB2	Loamy sand surface, slope 1-3%, moderate erosion	87 (1.37)
45		GDGbB3g1	Loamy sand surface, slope 1-3%, severe erosion, gravelly (15-35%)	113 (1.78)
46		GDGiB2	Sandy clay surface, slope 1-3%, moderate erosion	37 (0.59)
	GWD	Gowdagera soils are moderately deep (75-100 cm), moderately well drained, have dark grayish brown to very dark grayish brown, calcareous sodic sandy clay loam soils occurring on very gently sloping uplands under cultivation		**11 (0.17)**
35		GWDiB2	Sandy clay surface, slope 1-3%, moderate erosion	11 (0.17)
	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		**77 (1.2)**
32		HSLcB2	Sandy loam surface, slope 1-3%, moderate eroison	30 (0.47)
33		HSLiB2	Sandy clay surface, slope 1-3%, moderate erosion	47 (0.73)
	KBD	Kalabelagundi soils are moderately deep (75-100 cm), well drained, have reddish brown to dark reddish brown and dark reddish gray, gravelly sandy clay loam soils occurring on very gently sloping uplands under cultivation		**47 (0.73)**
39		KBDbB3	Loamy sand surface, slope 1-3%, severe erosion	47 (0.73)
	BLC	Balichakra soils are moderately deep (75-100 cm), well drained, have reddish brown to dark reddish brown, sandy clay loam red soils occurring on very gently sloping uplands under cultivation		**37 (0.58)**
38		BLCiB2	Sandy clay surface, slope 1-3%, moderate erosion	37 (0.58)
	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		**155 (2.44)**
40		PGPcB2	Sandy loam surface, slope 1-3%, moderate erosion	51 (0.81)
41		PGPiB2	Sandy clay surface, slope 1-3%, moderate erosion	104 (1.63)
	DPL	Duppali soils are moderately shallow (50-75 cm), well drained, have dark brown to dark reddish brown, sandy clay soils occurring on very gently to gently sloping uplands under cultivation		**199 (3.13)**
25		DPLcB2	Sandy loam surface, slope 1-3%, moderate erosion	114 (1.79)
26		DPLiB2	Sandy clay surface, slope 1-3%, moderate erosion	85 (1.34)
	YLR	Yalleri soils are moderately shallow (50-75 cm), well drained, have brown to reddish brown and dark reddish brown, clay red soils occurring on very gently to gently sloping uplands under cultivation		**378 (5.96)**
27		YLRbB2	Loamy sand surface, slope 1-3%, moderate erosion	97 (1.53)
29		YLRcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	180 (2.84)
31		YLRiB2	Sandy clay surface, slope 1-3%, moderate erosion	101 (1.59)
	HLG	Halagera soils are moderately shallow (50-75 cm), well drained, have very dark grayish brown to dark yellowish brown, calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation.		**281 (4.44)**

To be continued….

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
14		HLGbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	25 (0.39)
15		HLGbB3	Loamy sand surface, slope 1-3%, severe erosion	74 (1.17)
16		HLGcB2	Sandy loam surface, slope 1-3%, moderate erosion	104 (1.64)
18		HLGiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	52 (0.82)
19		HLGiB3g1	Sandy clay surface, slope 1-3%, severe erosion, gravelly (15-35%)	26 (0.42)
	JNK	Jinkera soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark grayish brown, slightly calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation		**128 (2.02)**
20		JNKcB2	Sandy loam surface, slope 1-3%, moderate erosion	74 (1.17)
21		JNKcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	54 (0.85)
	SBR	Sambara soils are moderately shallow (50-75 cm), somewhat excessively drained, have light gray to pink, loamy sand soils occurring on very gently to gently sloping uplands under cultivation		**462 (7.27)**
11		SBRcB2	Sandy loam surface, slope 1-3%, moderate erosion	338 (5.32)
12		SBRcC3g1	Sandy loam surface, slope 1-3%, severe erosion, gravelly (15-35%)	124 (1.95)
	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		**348 (5.47)**
3		BDLbC3	Loamy sand surface, slope 3-5%, severe erosion	19 (0.3)
5		BDLiB2	Sandy clay surface, slope 1-3%, moderate erosion	329 (5.17)
	VNK	Vanakanahalli soils are shallow (25-50 cm), well drained, have dark reddish brown, sandy clay red soils occurring on very gently to moderately sloping uplands under cultivation		**115 (1.8)**
9		VNKcB2	Sandy loam surface, slope 1-3%, moderate erosion	115 (1.8)
	BDP	Baddeppalli soils are very shallow (<25 cm), well drained, have dark brown to dark reddish brown, calcareous sandy clay loam soils occurring on very gently sloping uplands under cultivation		**25 (0.39)**
1		BDPiB2	Sandy clay surface, slope 1-3%, moderate erosion	25 (0.39)
	TMK	Thumakur soils are very deep (>150 cm), moderately well drained, have very dark gray to dark brown, slightly calcareous sodic clay soils occurring on nearly level to very gently sloping low lands under cultivation		**170 (2.67)**
104		TMKiB2	Sandy clay surface, slope 1-3%, moderate erosion	58 (0.91)
105		TMKiB3	Sandy clay surface, slope 1-3%, severe erosion	112 (1.76)
	KDH	Kadechoor soils are moderately deep (75-100 cm), moderately well drained, have very dark grayish brown to dark brown, slightly calcareous sandy clay soils occurring on very gently to gently sloping lowlands under cultivation		**20 (0.31)**
99		KDHcB2	Sandy loam surface, slope 1-3%, moderate erosion	20 (0.31)

To be continued….

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of Alluvial Landscape				
	MYP	Mylapura soils are very deep (>150 cm), well drained, have very dark gray to dark grayish brown and dark brown, calcareous sodic sandy clay loam soils occurring on nearly level to very gently sloping plains under cultivation		**84(1.32)**
97		MYPhB2	Sandy clay surface, slope 1-3%, moderate erosion	21 (0.33)
98		MYPiB2g1	Sandy clay surface, slope 1-3%, moderate erosion, gravelly (15-35%)	63 (0.99)
	HGN	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		**801(13.09)**
92		HGNcB2	Sandy loam surface, slope 1-3%, moderate erosion	30 (0.48)
93		HGNiB2	Sandy clay surface, slope 1-3%, moderate erosion	105 (1.66)
95		HGNmB2	Clay surface, slope 1-3%, moderate erosion	696 (10.95)
	KDR	Kudlura soils are deep (100-150 cm), moderately well drained, have very dark gray to grayish brown, calcareous cracking clay soils occurring on nearly level to very gently sloping plains under cultivation		**361(5.69)**
84		KDRcB2	Sandy loam surface, slope 1-3%, moderate erosion	50 (0.79)
85		KDRcB3	Sandy loam surface, slope 1-3%, severe erosion	103 (1.62)
87		KDRiB2	Sandy clay surface, slope 1-3%, moderate erosion	157 (2.47)
89		KDRmB2	Clay surface, slope 1-3%, moderate erosion	51 (0.81)
	SWR	Sowrashtrahalli soils are deep (100-150 cm), moderately well drained, have very dark gray to dark gray, calcareous cracking clay soils occurring on very gently sloping plains under cultivation		**313(4.92)**
90		SWRcB2	Sandy loam surface, slope 1-3%, moderate erosion	28 (0.44)
91		SWRmB2	Clay surface, slope 1-3%, moderate erosion	285 (4.48)
	RHN	Rachanalli soils are moderately deep (75-100 cm), well drained, have very dark grayish brown to dark brown, slightly calcareous sodic sandy clay loam soils occurring on very gently sloping plains under cultivation.		**320(5.04)**
77		RHNcB2	Sandy loam surface, slope 1-3%, moderate erosion	54 (0.86)
79		RHNmB2	Clay surface, slope 1-3%, moderate erosion	266 (4.18)
	BLD	Balched soils are moderately shallow (50-75 cm), moderately well drained, have black to very dark grayish brown, slightly calcareous clay loam soils. occurring on very gently to gently sloping plains under cultivation		**71(1.13)**
73		BLDcB2	Sandy loam surface, slope 1-3%, moderate erosion	32 (0.51)
75		BLDiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	39 (0.62)

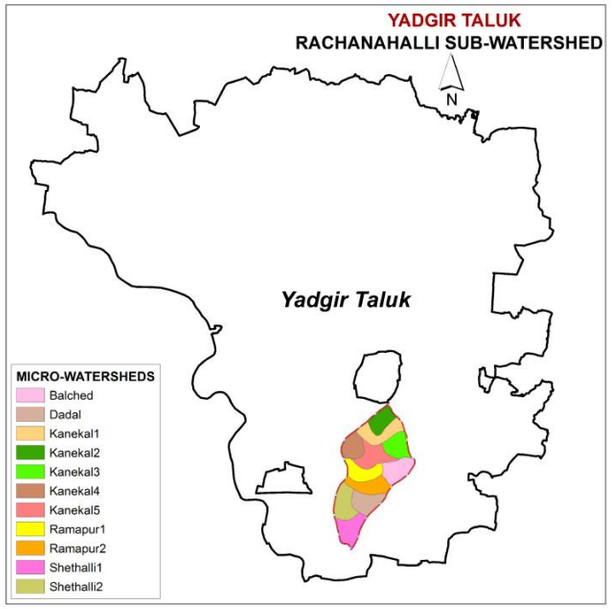
To be continued….

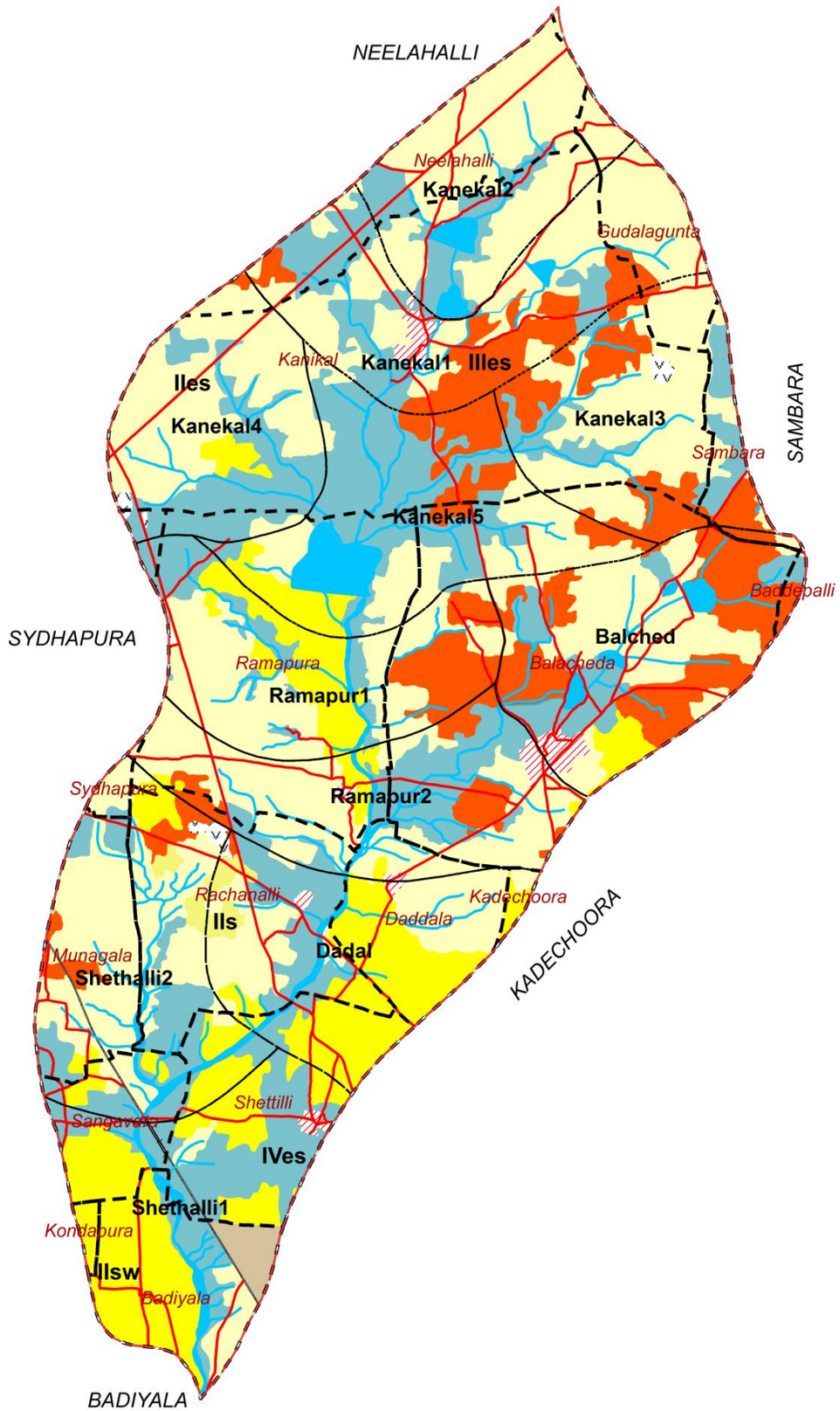
Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
	RMP	Rampur soils are moderately shallow (50-75 cm), well drained, have very dark to yellowish brown, sandy clay loam soils occurring on very gently sloping plains under cultivation		**83(1.31)**
70		RMPcB2	Sandy loam surface, slope 1-3%, moderate erosion	50 (0.79)
71		RMPiB2	Sandy clay surface, slope 1-3%, moderate erosion	33 (0.52)
	GDL	Gudalagunta soils are shallow (25-50 cm), well drained, have very dark gray, calcareous sodic clay soils occurring on very gently sloping plains under cultivation		**83 (1.31)**
67		GDLcB3	Sandy loam surface, slope 1-3%, severe erosion	83 (1.31)
	KYT	Kyathanala soils are shallow (25-50 cm), well drained, have dark brown to strong brown and dark reddish brown sandy clay loam soils occurring on very gently 326 (0.23)sloping plains under cultivation		**52 (0.82)**
68		KYTcB2	Sandy loam surface, slope 1-3%, moderate erosion	52 (0.82)
992		Railway	Railway line	9 (0.14)
994		Mining/Industrial	Mining/Industrial area	34 (0.54)
999		Rock outcrops	Rock lands, both massive and bouldery with little or no soil	19 (0.3)
1000		Others	Habitation & Waterbody	268 (4.21)

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

5. Soil Survey Interpretations

5.1. Land Capability Classification





LAND CAPABILITY

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

N

Key

II - Good cultivable land
III - Moderately good cultivable lands
IV - Fairly good cultivable lands

Limitations

e - Erosion limitation
s - Soil limitation
(depth, gravelliness, texture, salinity/alkalinity)
w - Excess of water limitation.
(wetness high water table, drainage)

Capability subclass	Area in ha (%)
IIs	39 (0.62)
IIes	2847 (44.78)
IIsw	851 (13.39)
IIIes	756 (11.9)
IVs	25 (0.39)
IVes	1534 (24.12)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

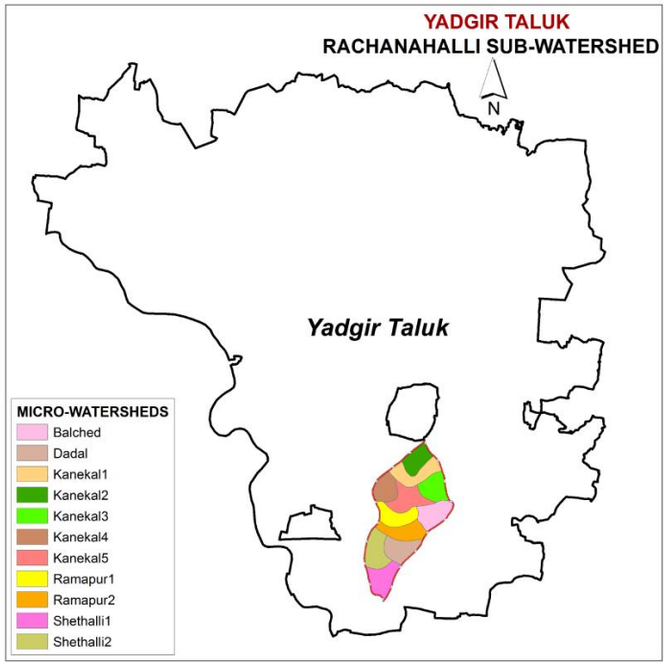
* - Habitation & Waterbody

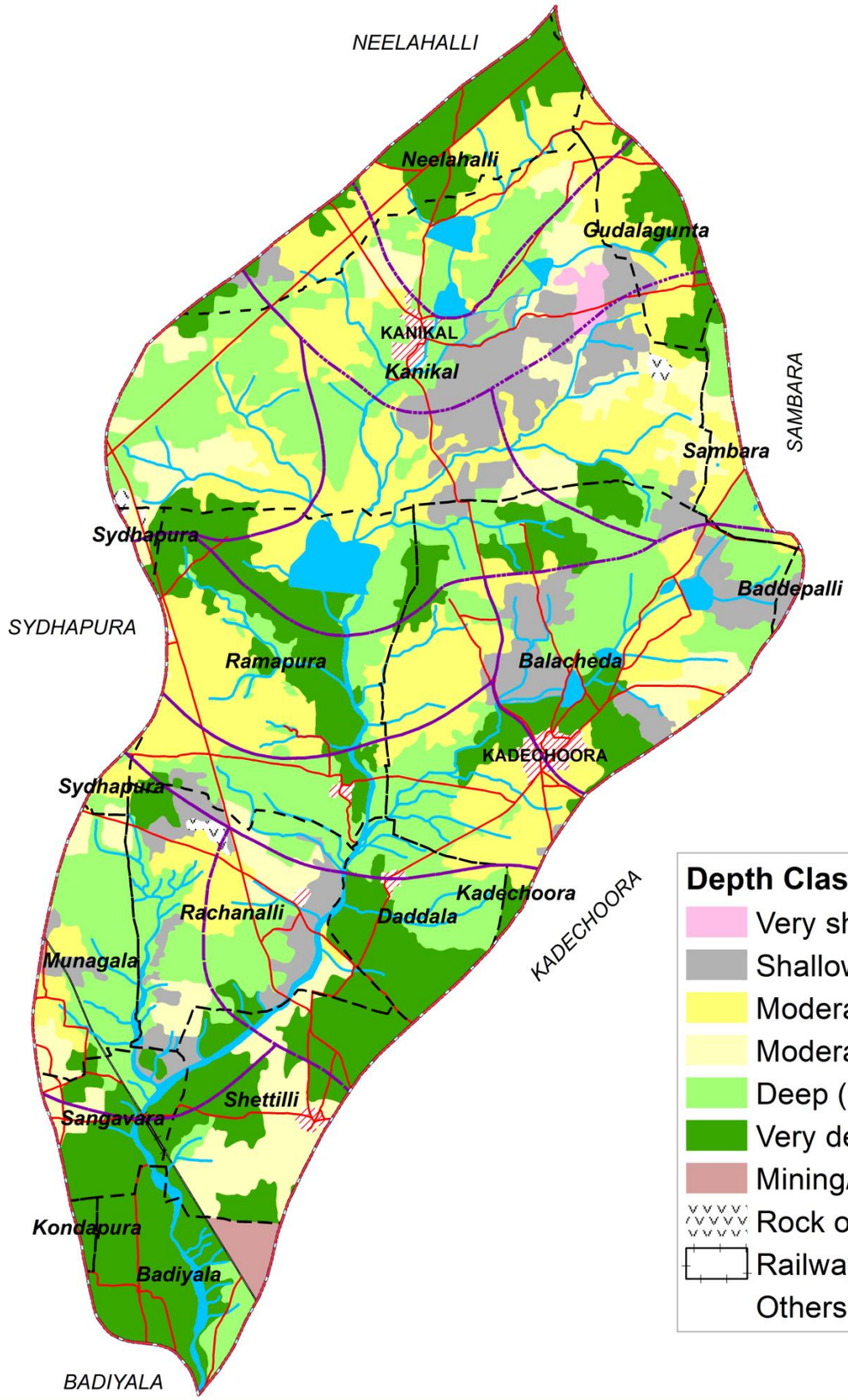
Source: ICAR-NBSS&LUP, Bengaluru

References

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

5.2. Soil Depth





SOIL DEPTH
Rachanahalli Sub-watershed
(4D5B1P : Area - 6360.87 ha)
YADGIR TALUK & DISTRICT

km
0 1 2 4
N

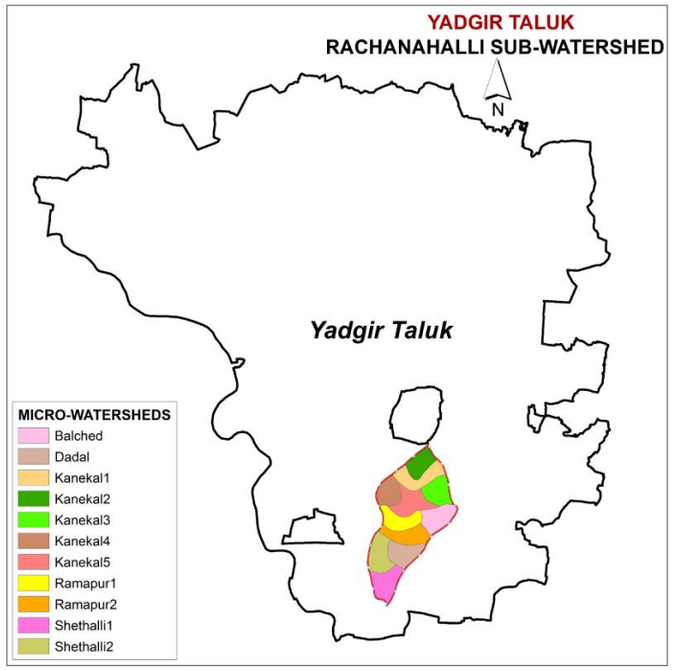
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

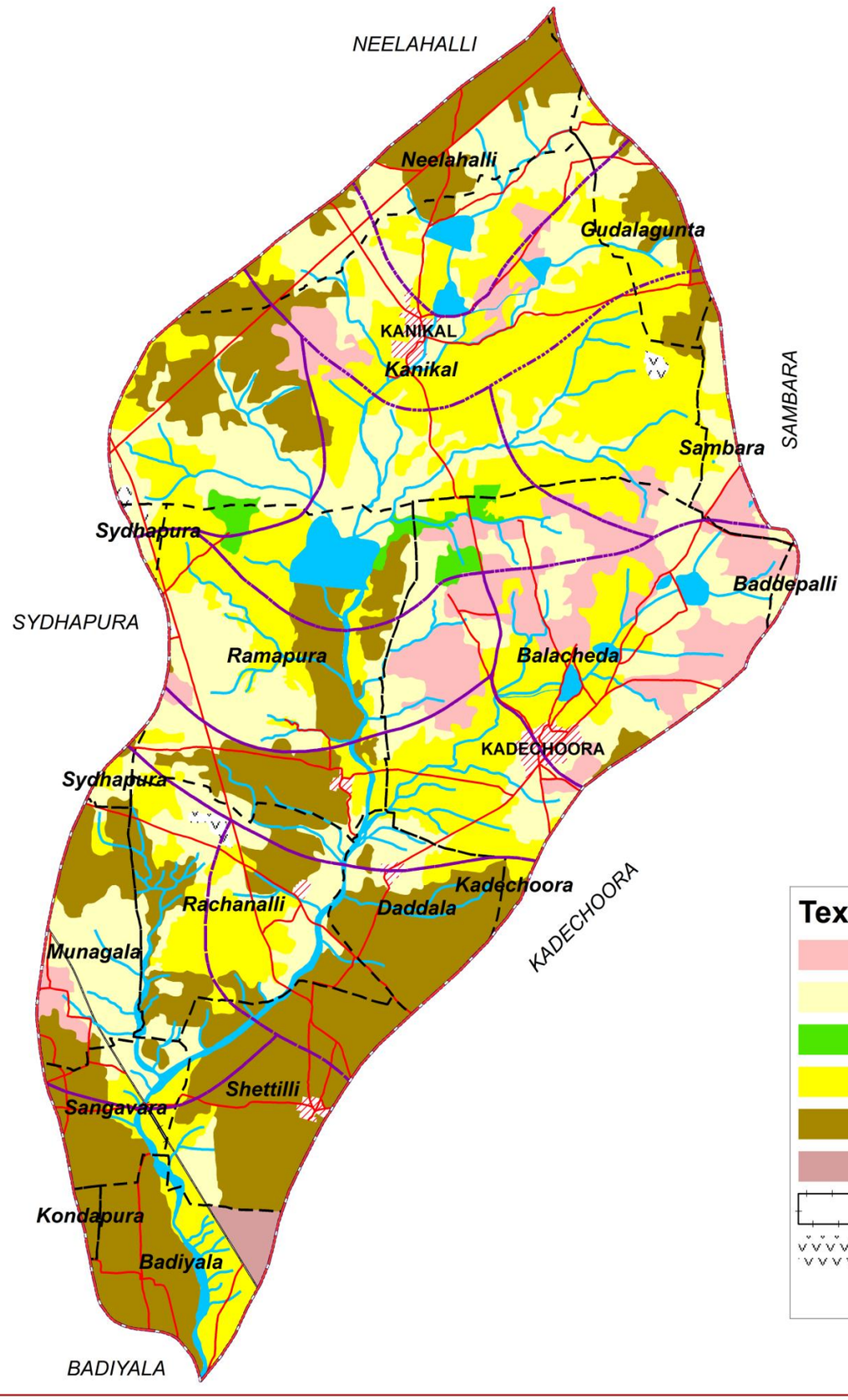
Depth Class	Area in ha (%)
Very shallow (<25 cm)	25 (0.39)
Shallow (25-50 cm)	598 (9.4)
Moderately shallow (50-75 cm)	1605 (25.24)
Moderately deep (75-100 cm)	666 (10.47)
Deep (100-150 cm)	1665 (26.19)
Very deep (>150 cm)	1469 (23.11)
Mining/Industrial	34 (0.54)
Rock outcrops	19 (0.3)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

5.3. Surface Soil Texture





SURFACE SOIL TEXTURE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

References

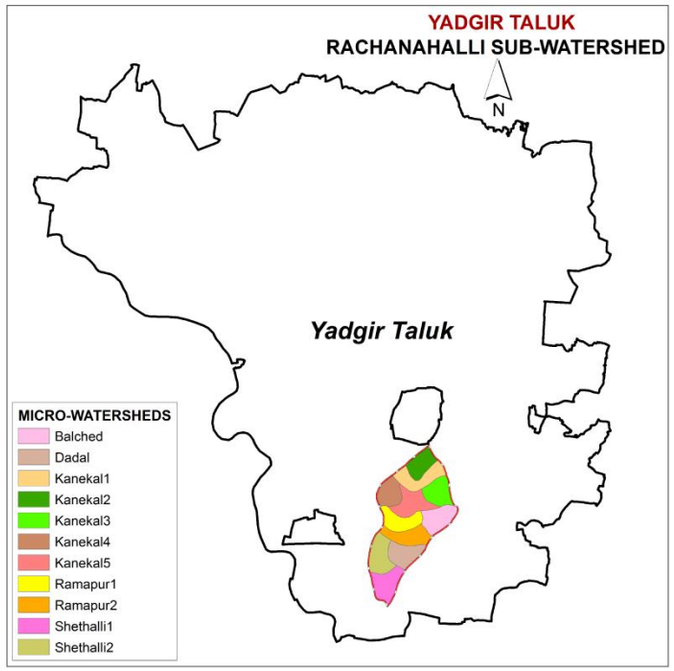
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

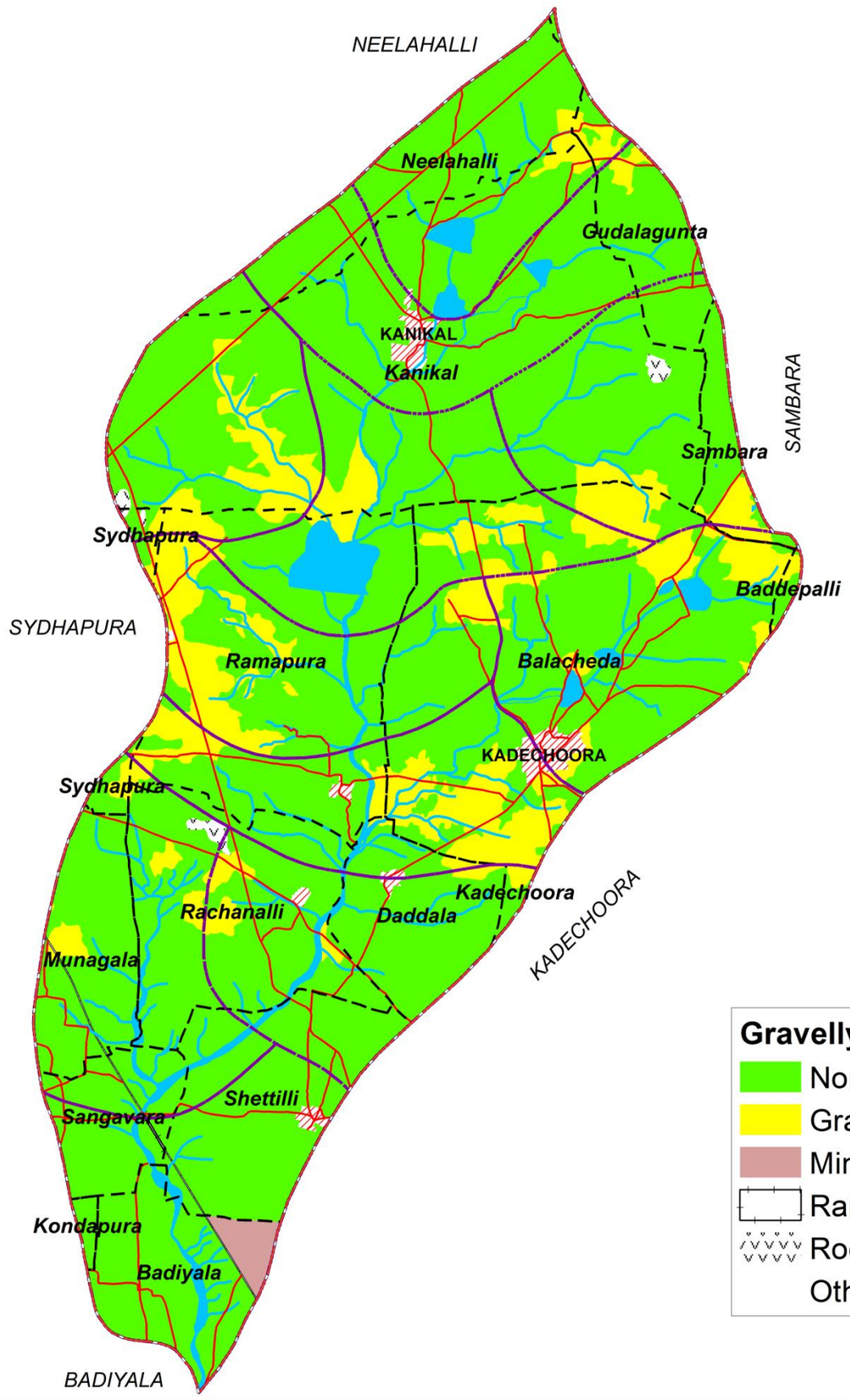
Texture Class	Area in ha(%)
Loamy sand	546 (8.59)
Sandy loam	1843 (28.98)
Sandy clay loam	62 (0.98)
Sandy clay	1830 (28.77)
Clay	1749 (27.5)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

5.4. Surface Soil Gravelliness





SOIL GRAVELLINESS

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

References

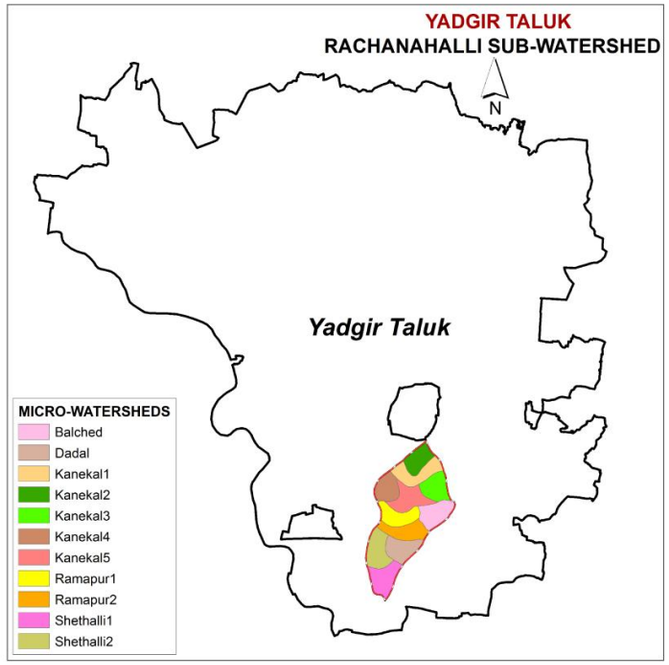
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Gravelly Class	Area in ha (%)
Non gravelly (<15%)	5177 (81.38)
Gravelly (15-35%)	854 (13.42)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

5.5. Available Water Capacity



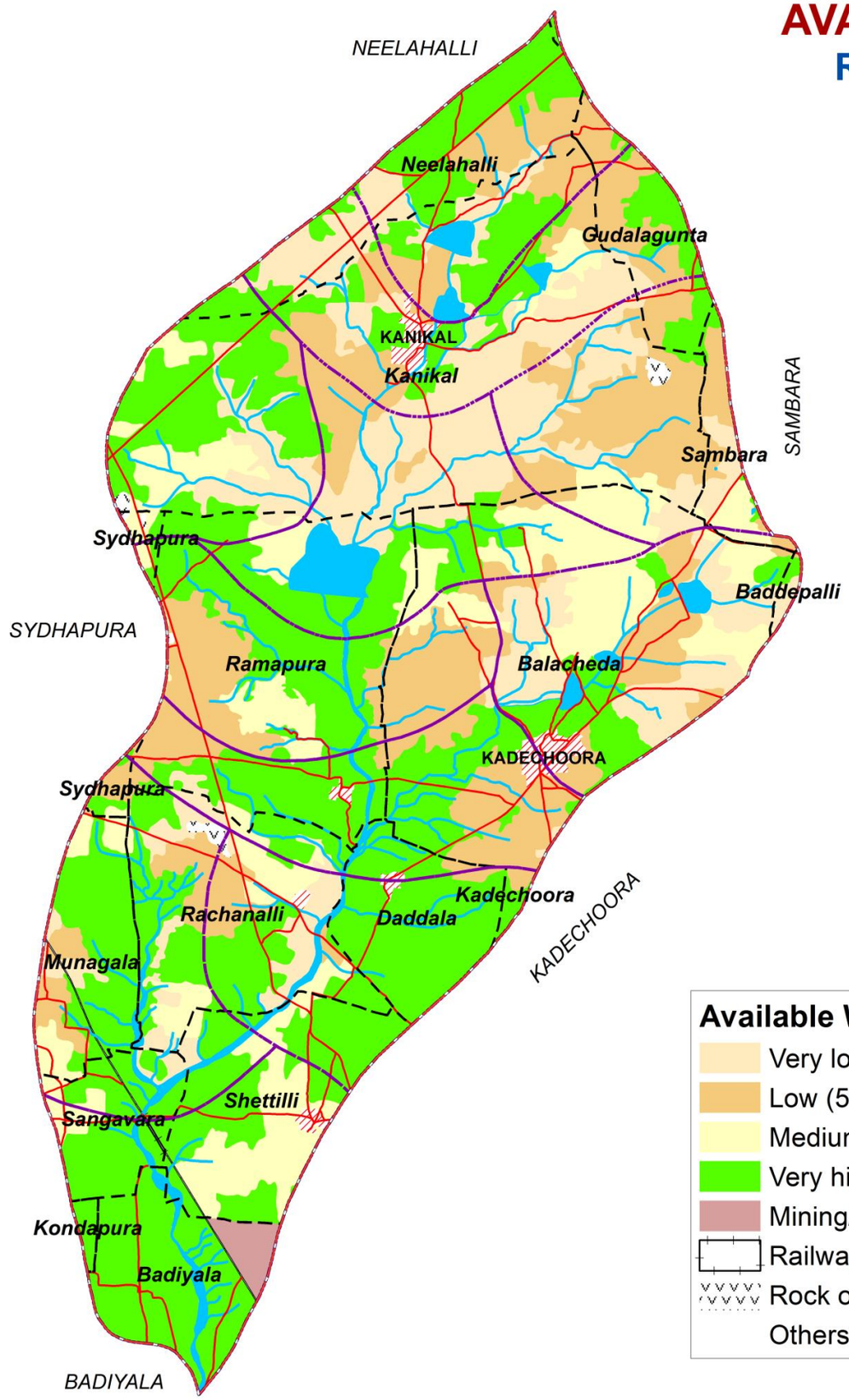
AVAILABLE WATER CAPACITY

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N



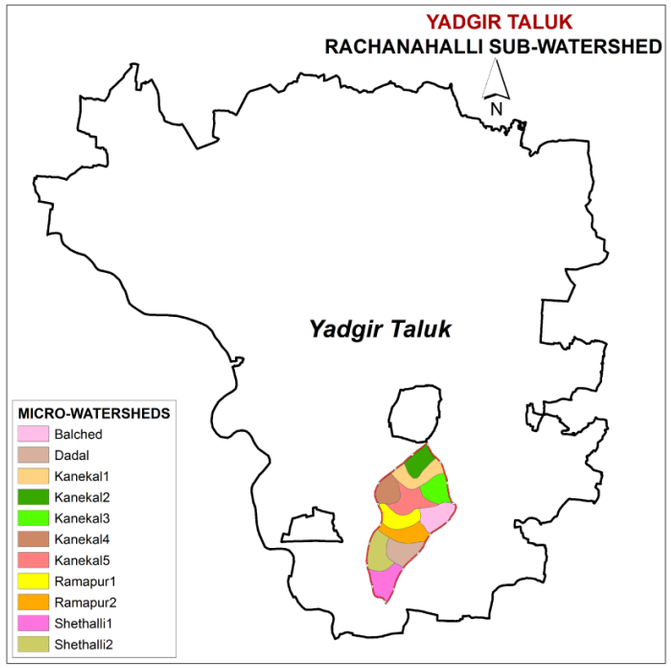
References

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

Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	1132 (17.79)
Low (51-100 mm/m)	1372 (21.57)
Medium (101-150 mm/m)	871 (13.7)
Very high (>200 mm/m)	2655 (41.74)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

Source: ICAR-NBSS&LUP, Bengaluru

5.6.Slope



SLOPE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

References

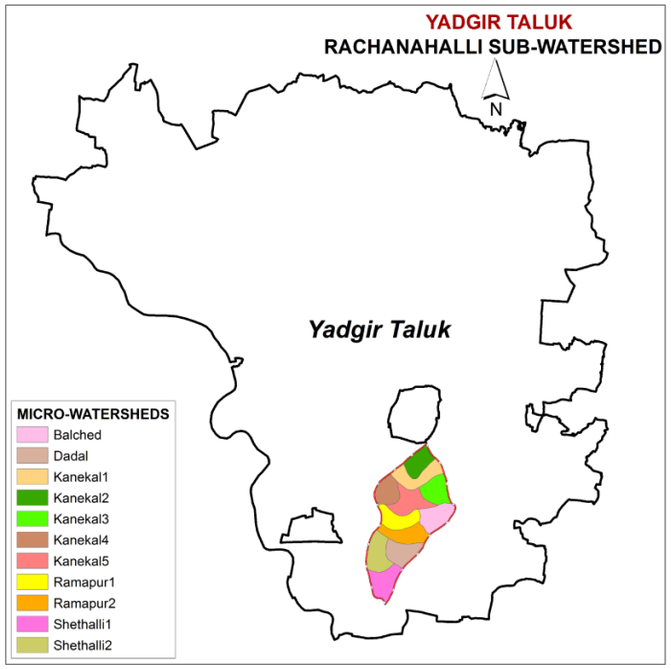
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

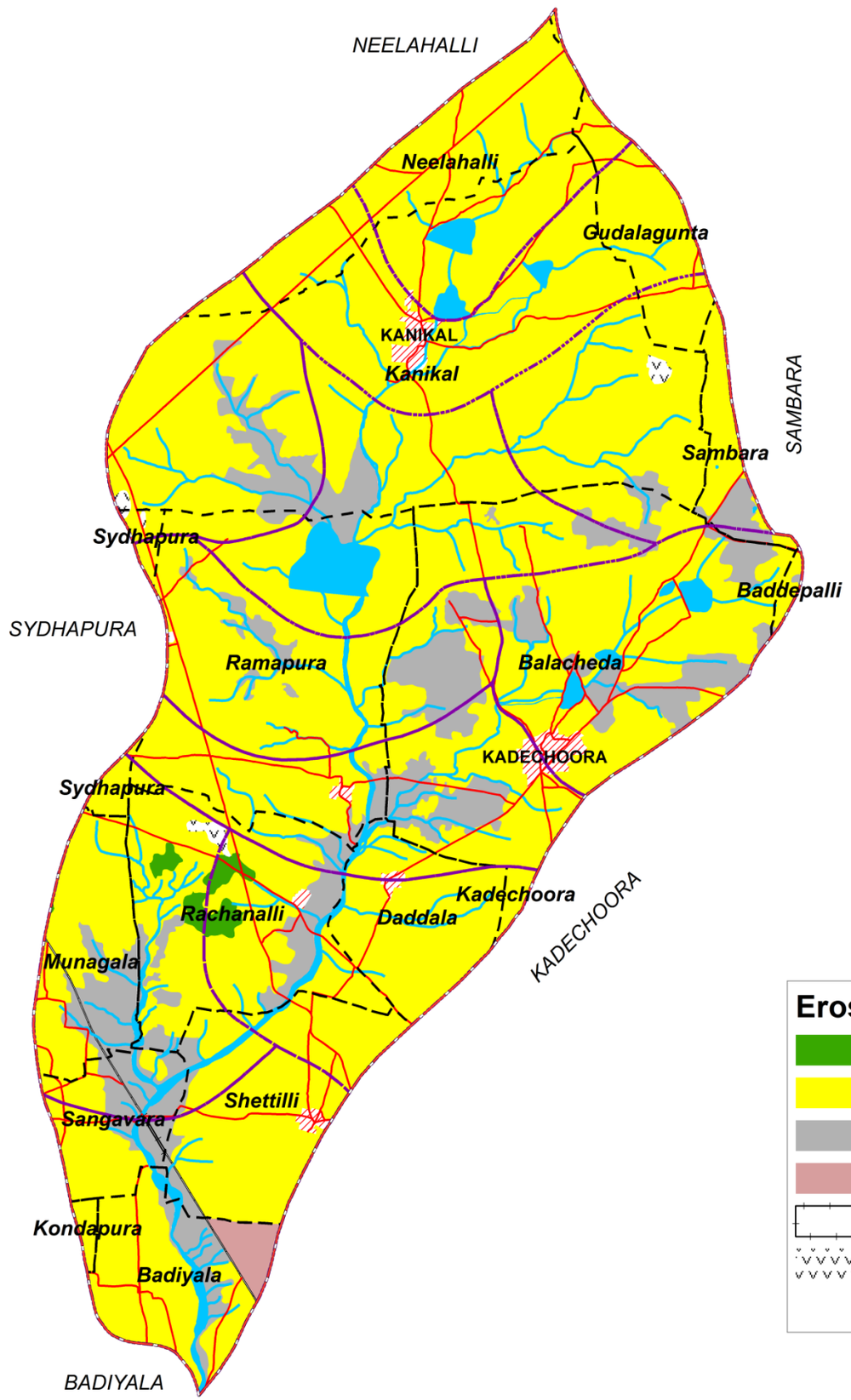
Slope Class	Area in ha (%)
Very gently sloping (1-3%)	5887 (92.55)
Gently sloping (3-5%)	143 (2.25)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

5.7.Soil Erosion





SOIL EROSION

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

References

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

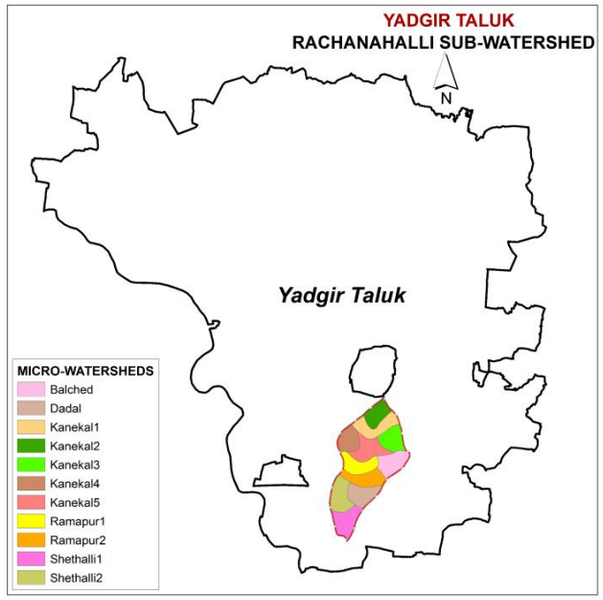
Erosion Class	Area in ha(%)
Slight	39 (0.62)
Moderate	5201 (81.77)
Severe	790 (12.42)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

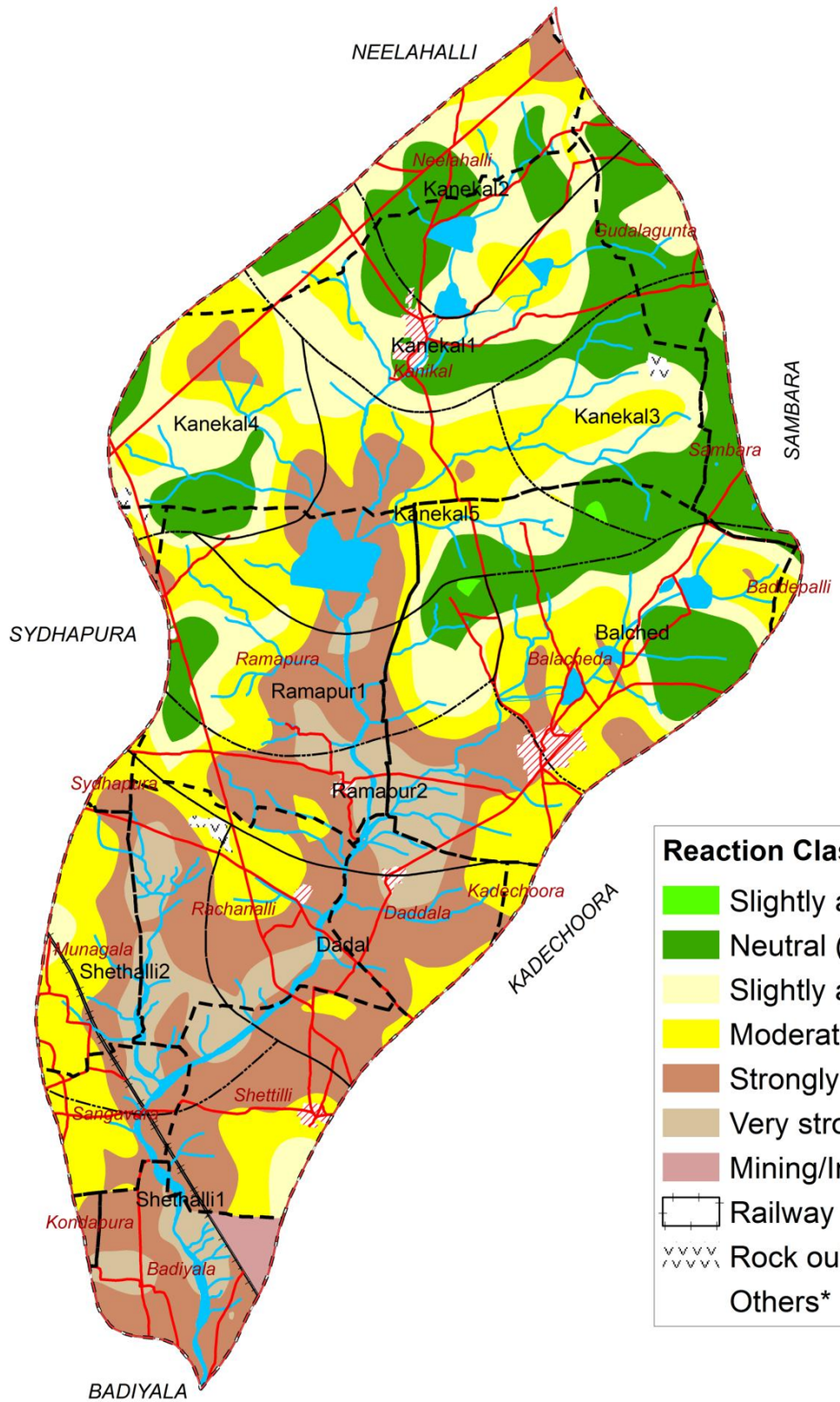
* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

6. Soil Fertility Status

6.1. Soil Reaction (pH)





SOIL REACTION (pH) - 2018

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1.25 2.5 5 km

N

Reaction Class	Area in ha (%)
Slightly acid (pH 6.0 – 6.5)	6 (0.1)
Neutral (pH 6.5 – 7.3)	1146 (18.02)
Slightly alkaline (pH 7.3 – 7.8)	1232 (19.38)
Moderately alkaline (pH 7.8 – 8.4)	1651 (25.97)
Strongly alkaline (pH 8.4 – 9.0)	1534 (24.12)
Very strongly alkaline (pH > 9.0)	459 (7.22)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

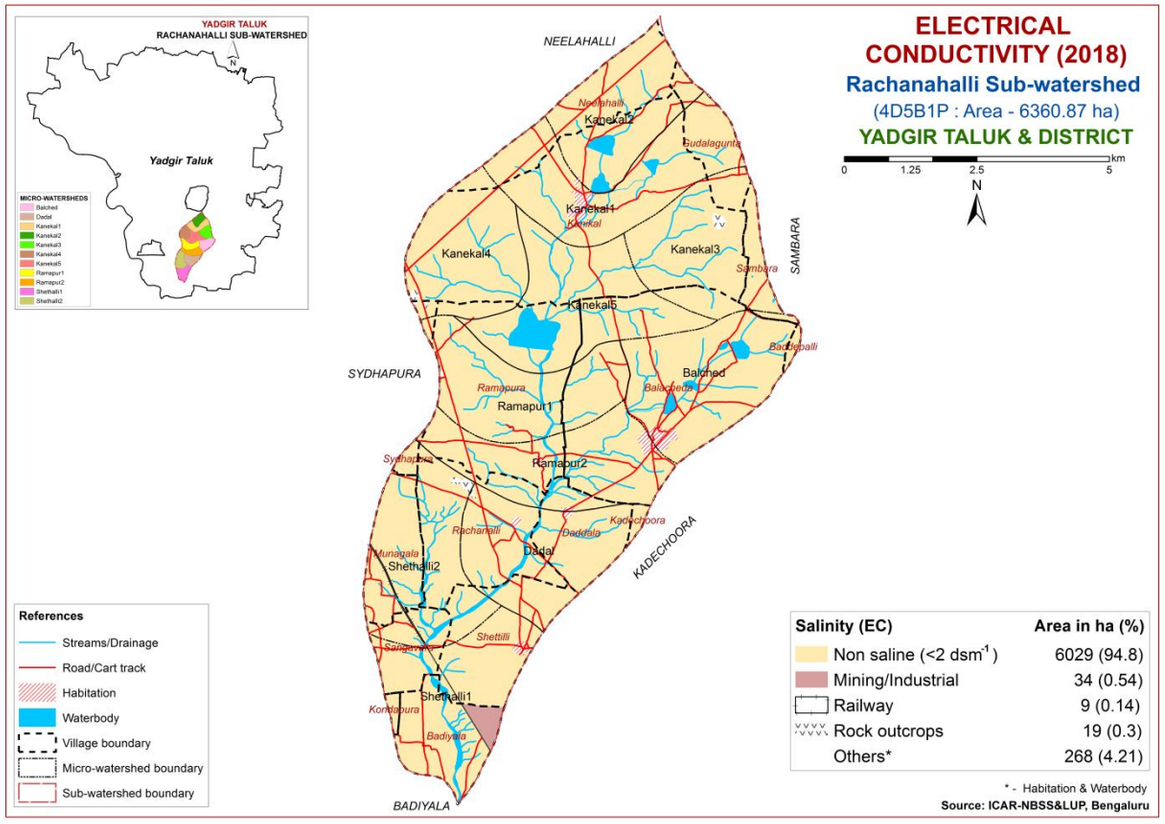
* - Habitation & Waterbody

References

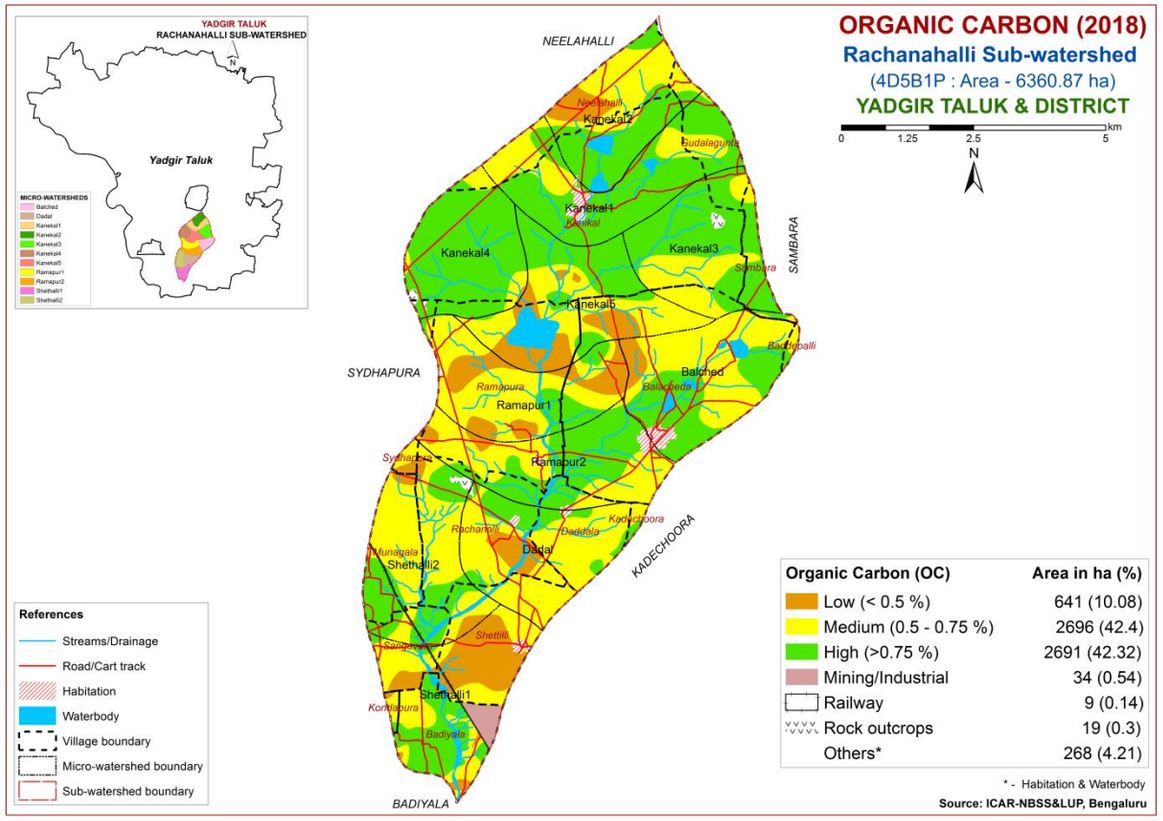
- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

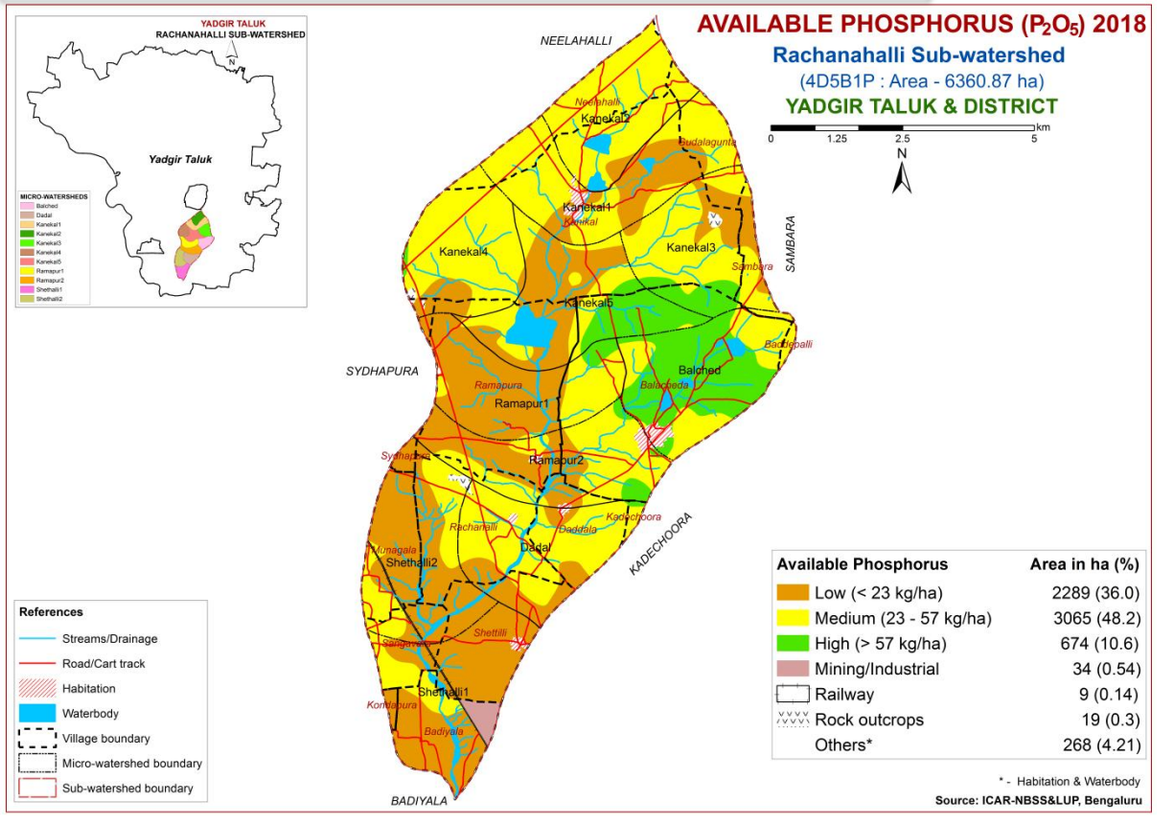
6.2. Electrical Conductivity (EC)



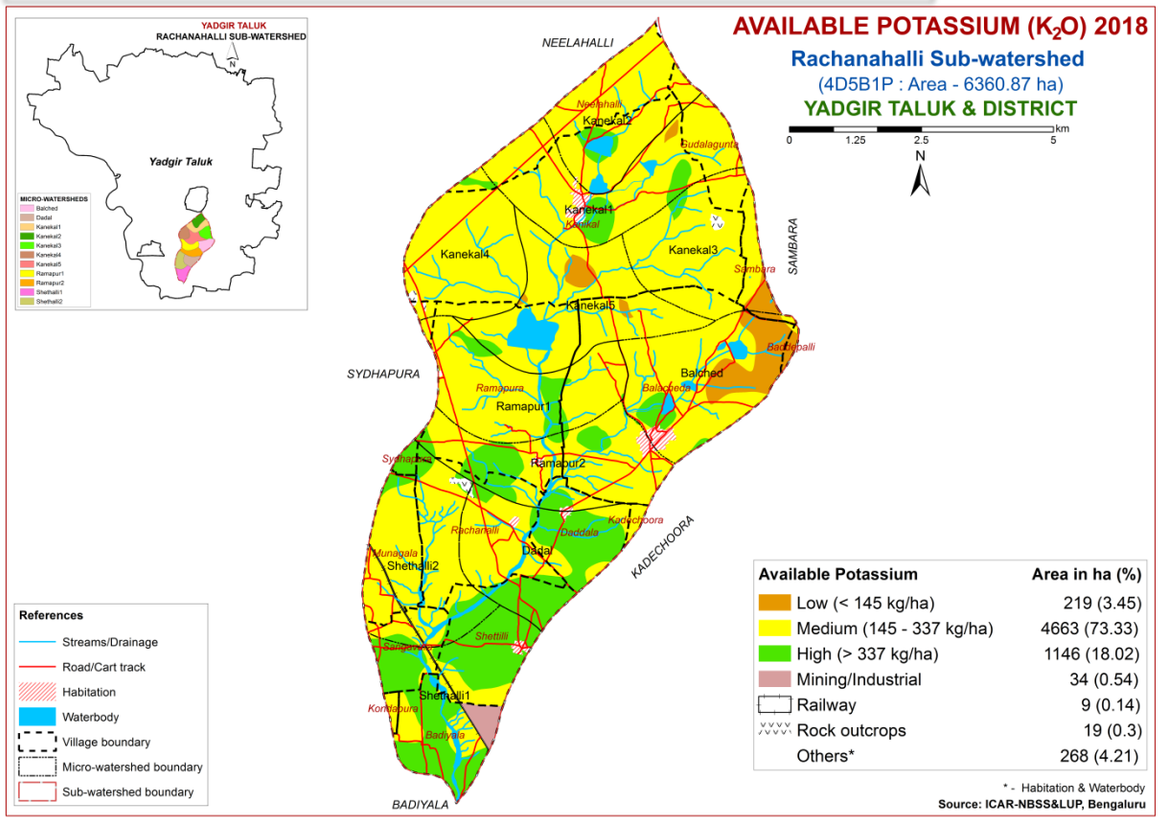
6.3. Organic Carbon



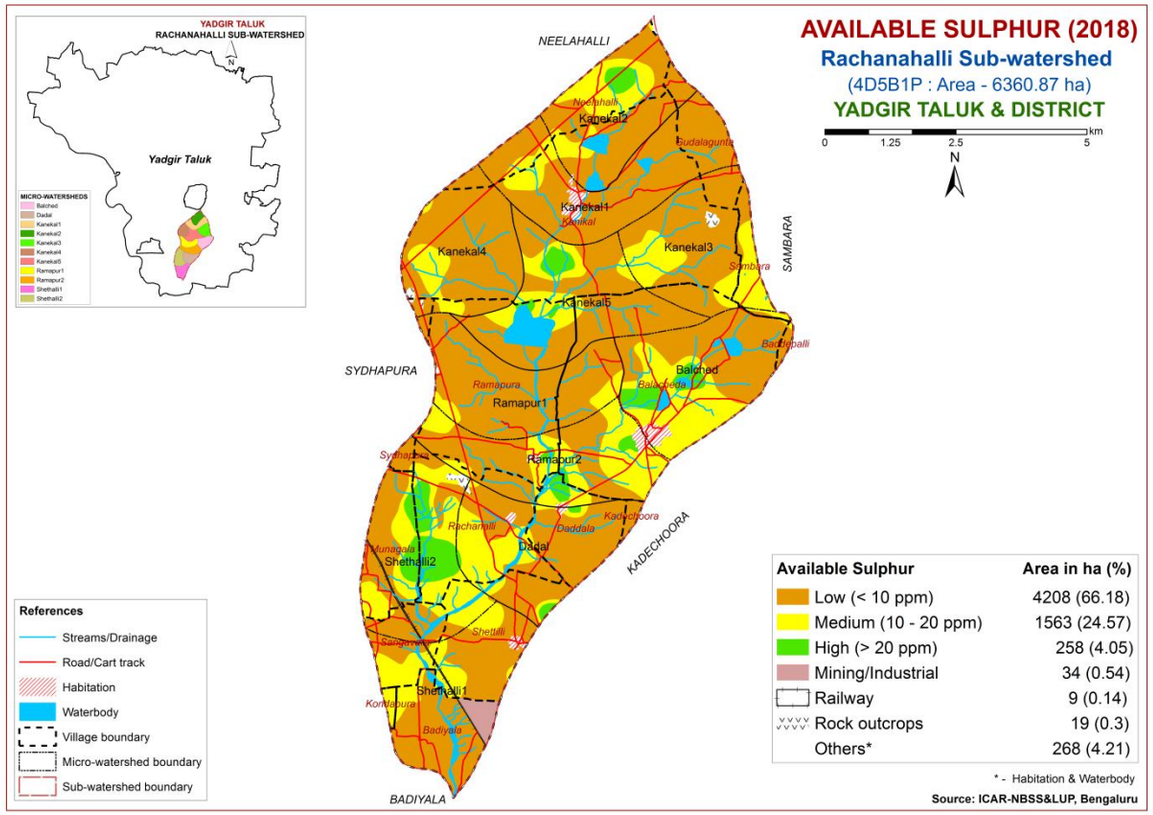
6.4. Available Phosphorus (P_2O_5)



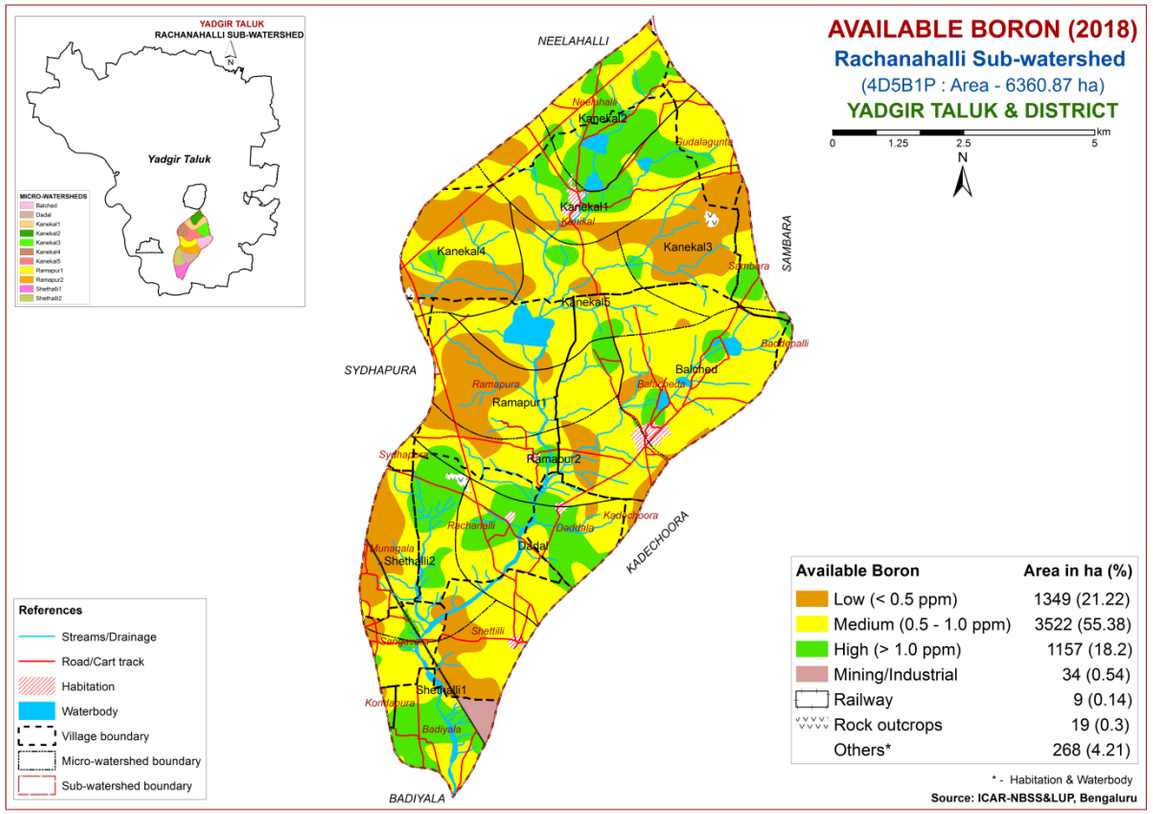
6.5. Available Potassium (K_2O)



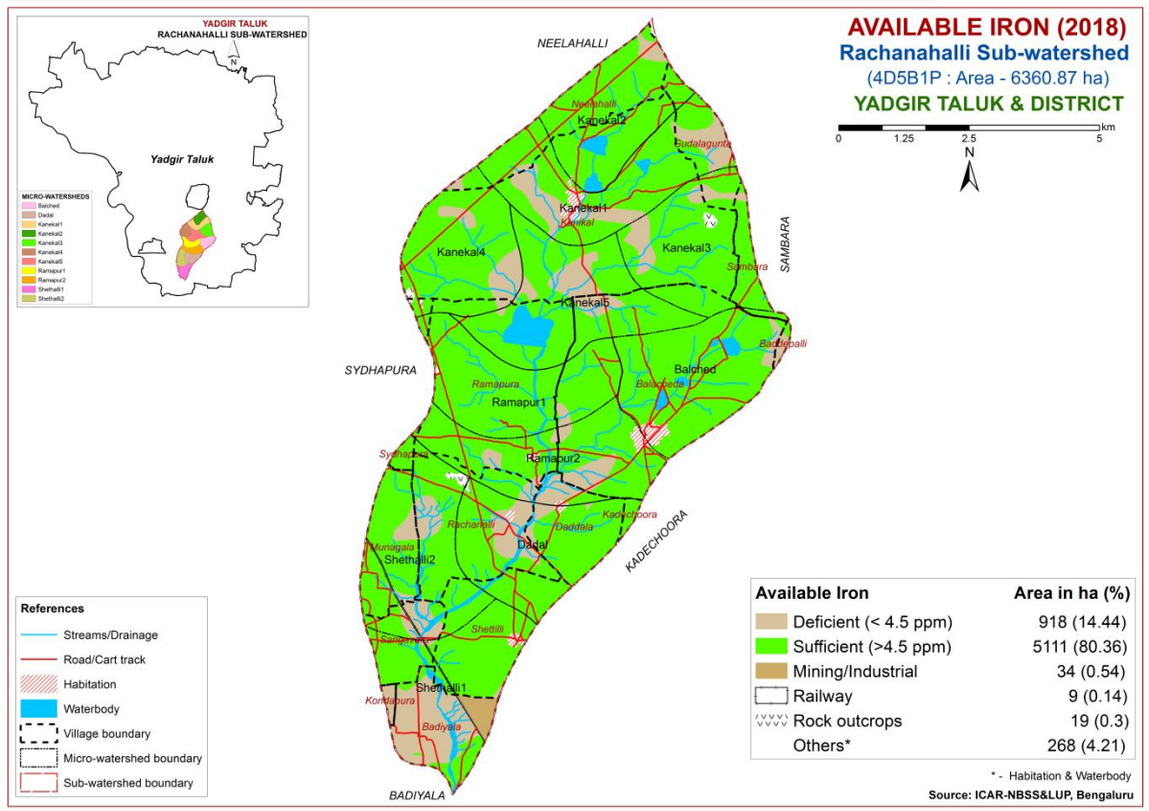
6.6. Available Sulphur



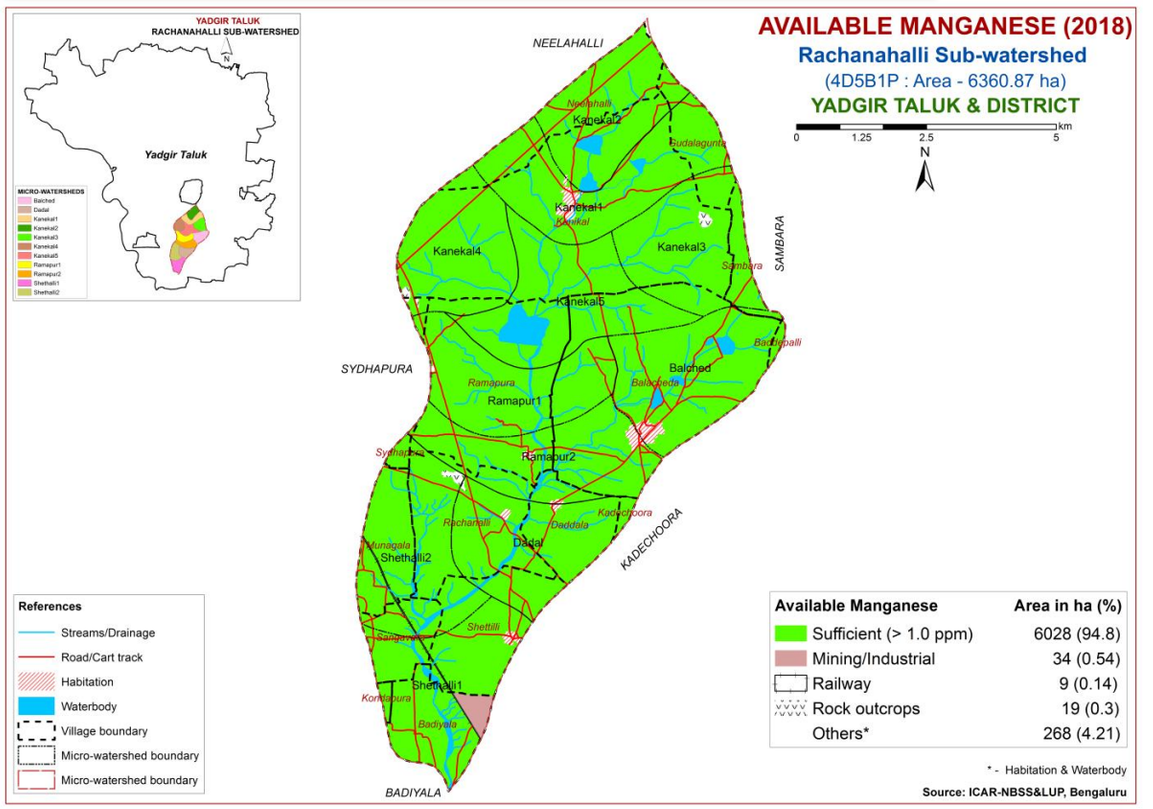
6.7. Available Boron



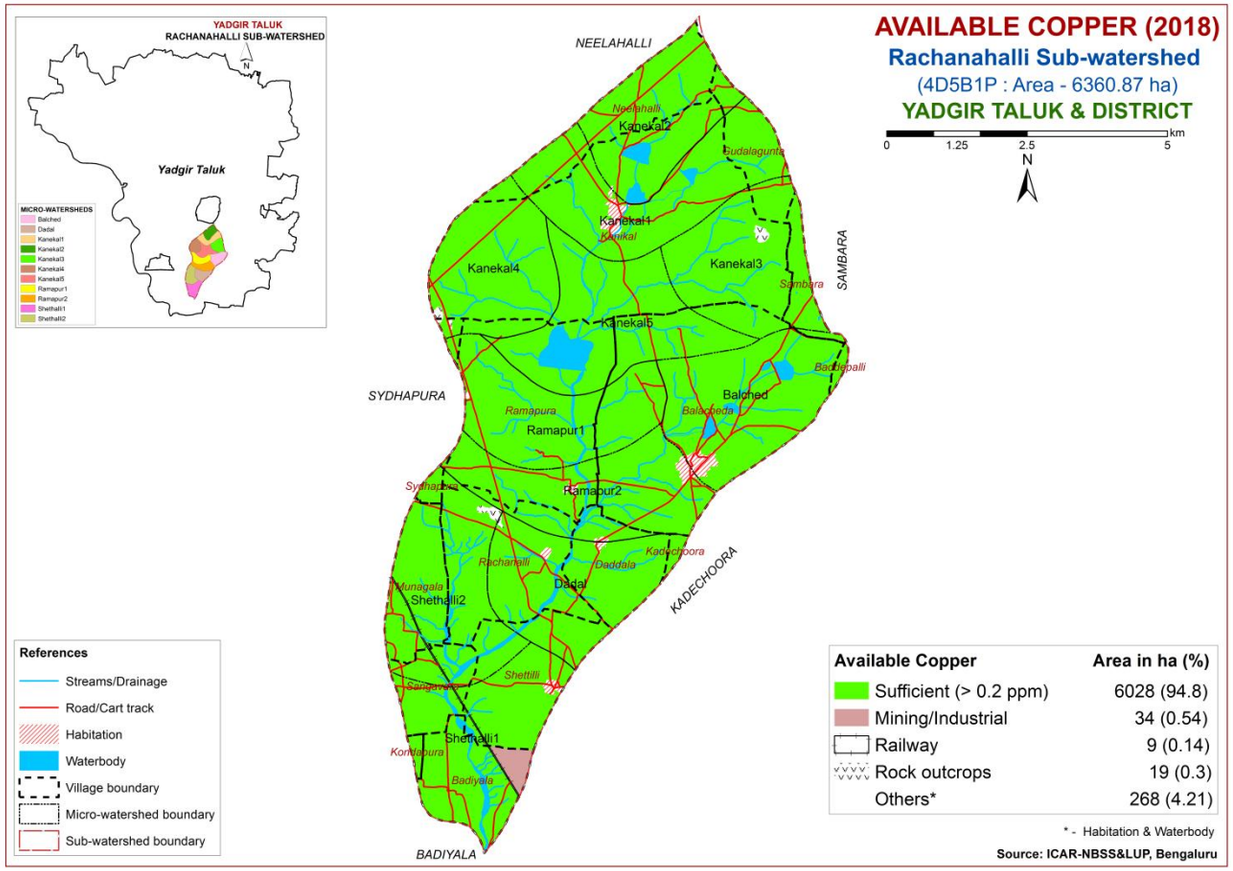
6.8. Available Iron



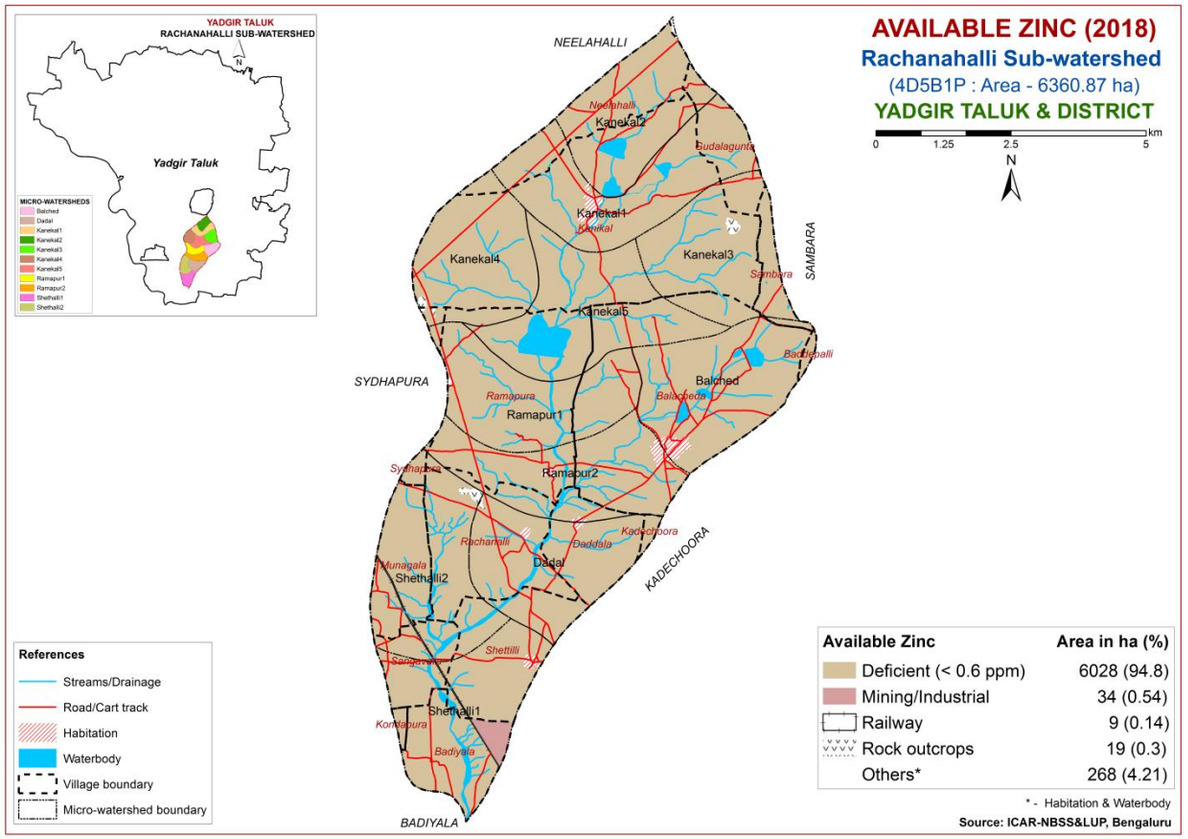
6.9. Available Manganese



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 form 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 bellow:

- N: P: K (N: P_2O_5: K_2O) **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

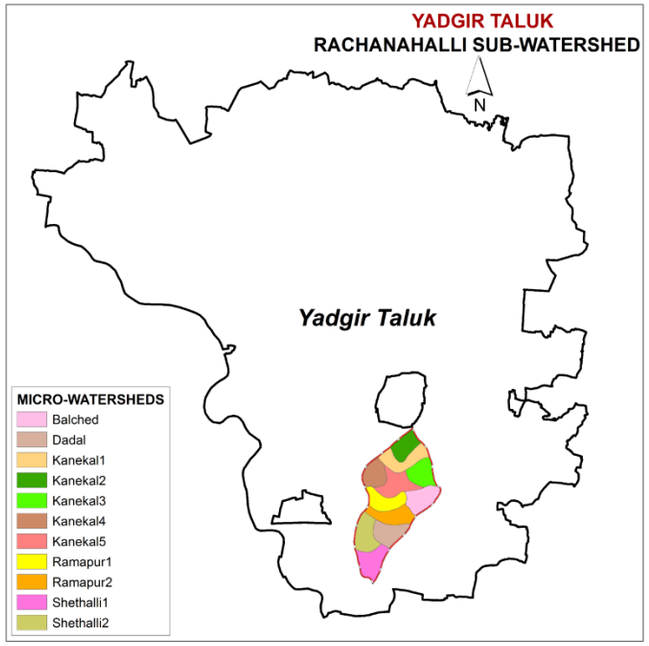
  100+25% for deficient soil.
  100% for medium available N content soil.
  100-25% for higher N content soil.

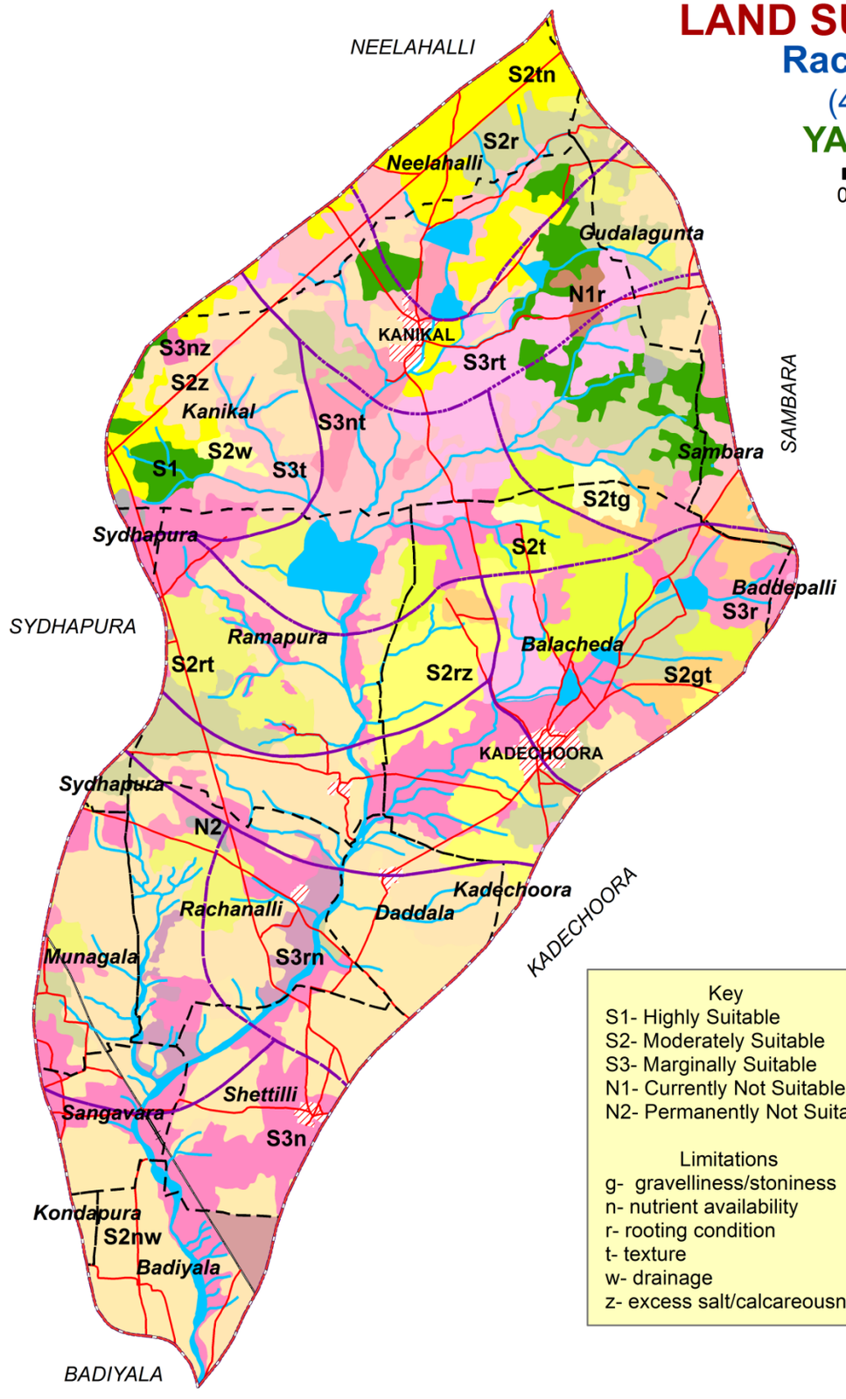
- Follow the same in case of P & K.

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 ($CaSO_4$. $2H_2O$)
5. Apply 405kg $MgSO_4$ 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 ($FeSO_4$) per ha to the iron deficient soils. In case of perennial Horticulture crops apply 3-5g/ litre $FeSo_4$ /plant as foliar spray.
8. Apply 30-40kg/ha – manganese sulfate ($MnSO_4$) as soil application to the manganese deficient soils. In case of perennial Horticulture crops apply 3-5 g/litre $MnSO_4$ /plant as foilar application.
9. Apply Zinc – 10-25 kg/ha –$ZnSO_4$ – 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 ($CuSO_4$) soil application for the copper deficient soils and for Perennial horticultural crops 3-5g/ litre – $CuSO_4$/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





LAND SUITABILITY FOR SORGHUM

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	231 (3.63)
S2r	578 (9.09)
S2t	240 (3.78)
S2w	20 (0.31)
S2z	1018 (16.0)
S2gt	160 (2.51)
S2nw	832 (13.08)
S2rt	283 (4.45)
S2rz	282 (4.43)
S2tg	44 (0.69)
S2tn	313 (4.92)
S3n	813 (12.78)
S3r	167 (2.63)
S3t	462 (7.26)
S3nt	121 (1.89)
S3nz	11 (0.17)
S3rn	83 (1.31)
S3rt	348 (5.47)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

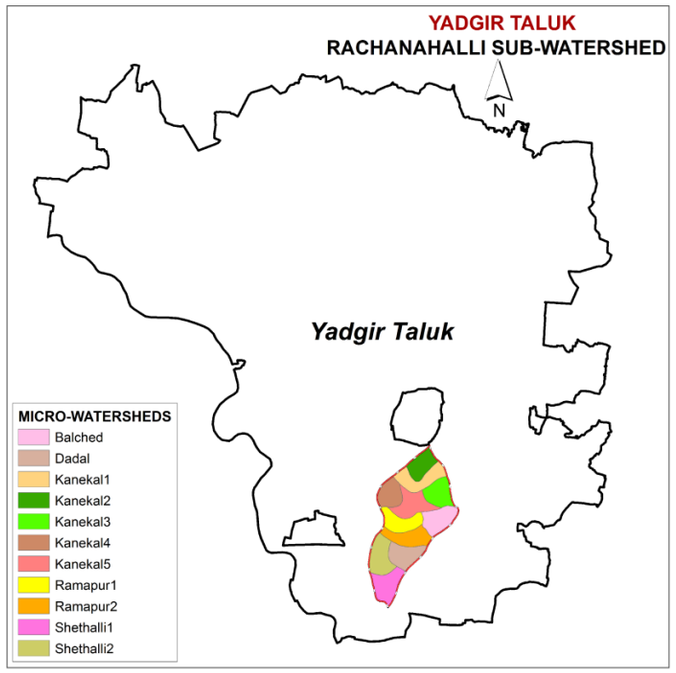
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

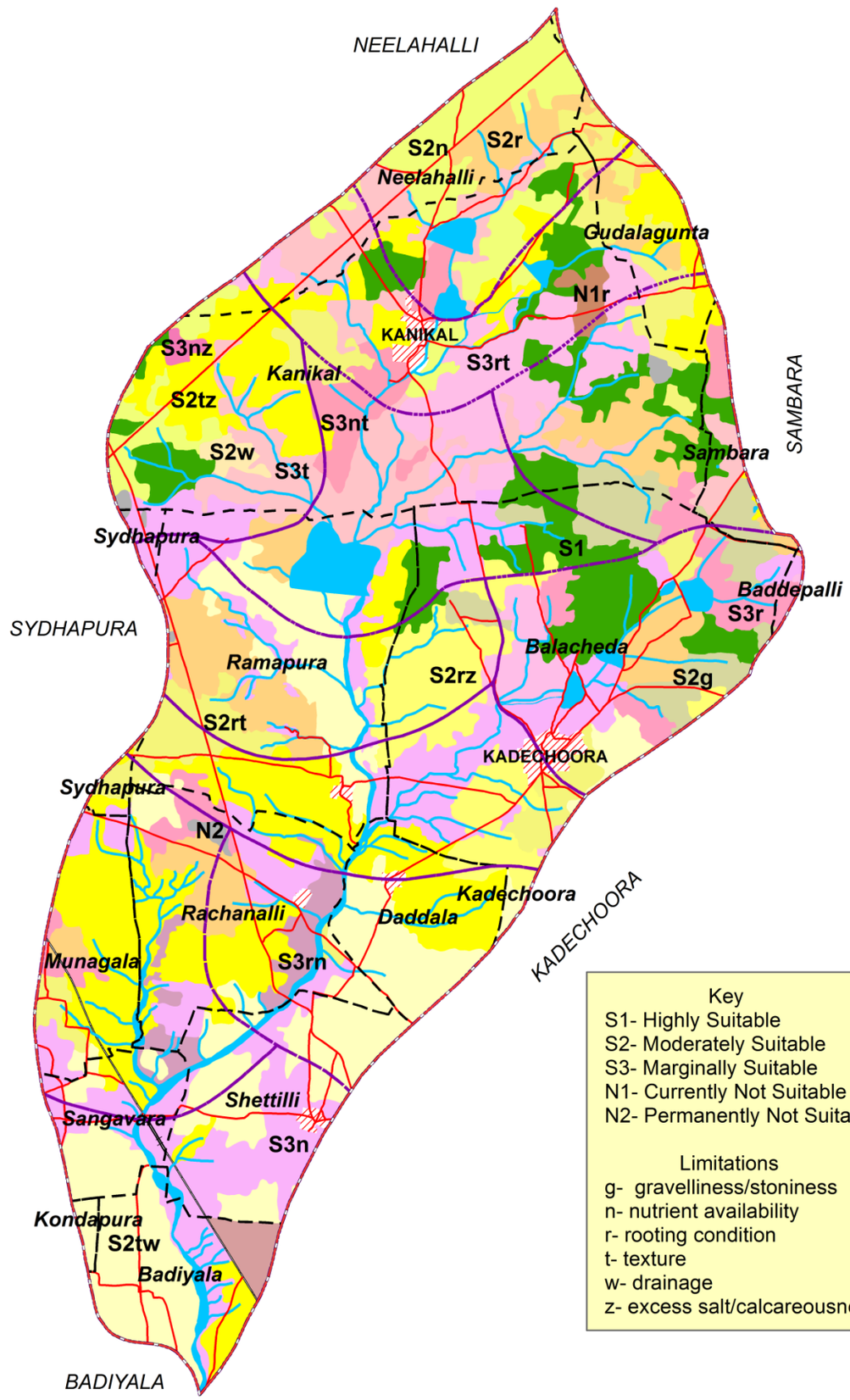
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.2. Land Suitability for Maize





LAND SUITABILITY FOR MAIZE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	204 (3.21)
S2n	313 (4.92)
S2r	483 (7.59)
S2w	20 (0.31)
S2rt	379 (5.95)
S2rz	282 (4.43)
S2tw	832 (13.08)
S2tz	1018 (16.0)
S3n	813 (12.78)
S3r	167 (2.63)
S3t	462 (7.26)
S3nt	121 (1.89)
S3nz	11 (0.17)
S3rn	83 (1.31)
S3rt	348 (5.47)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

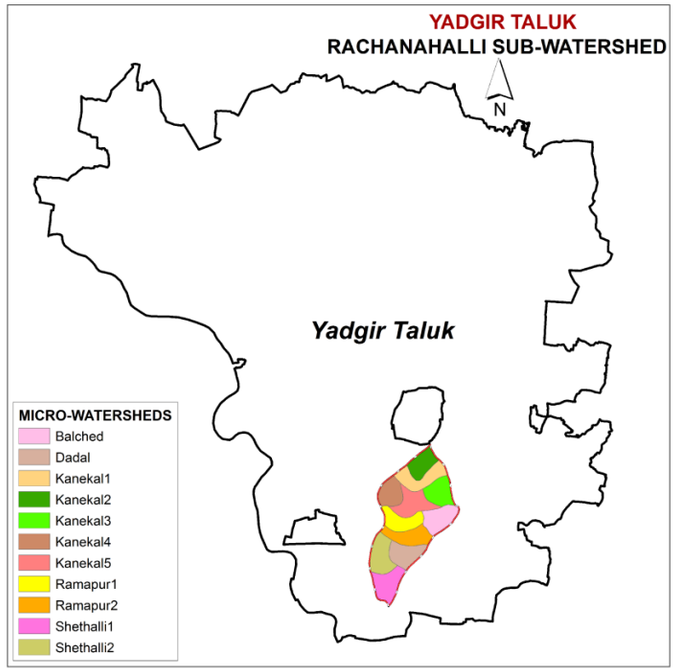
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

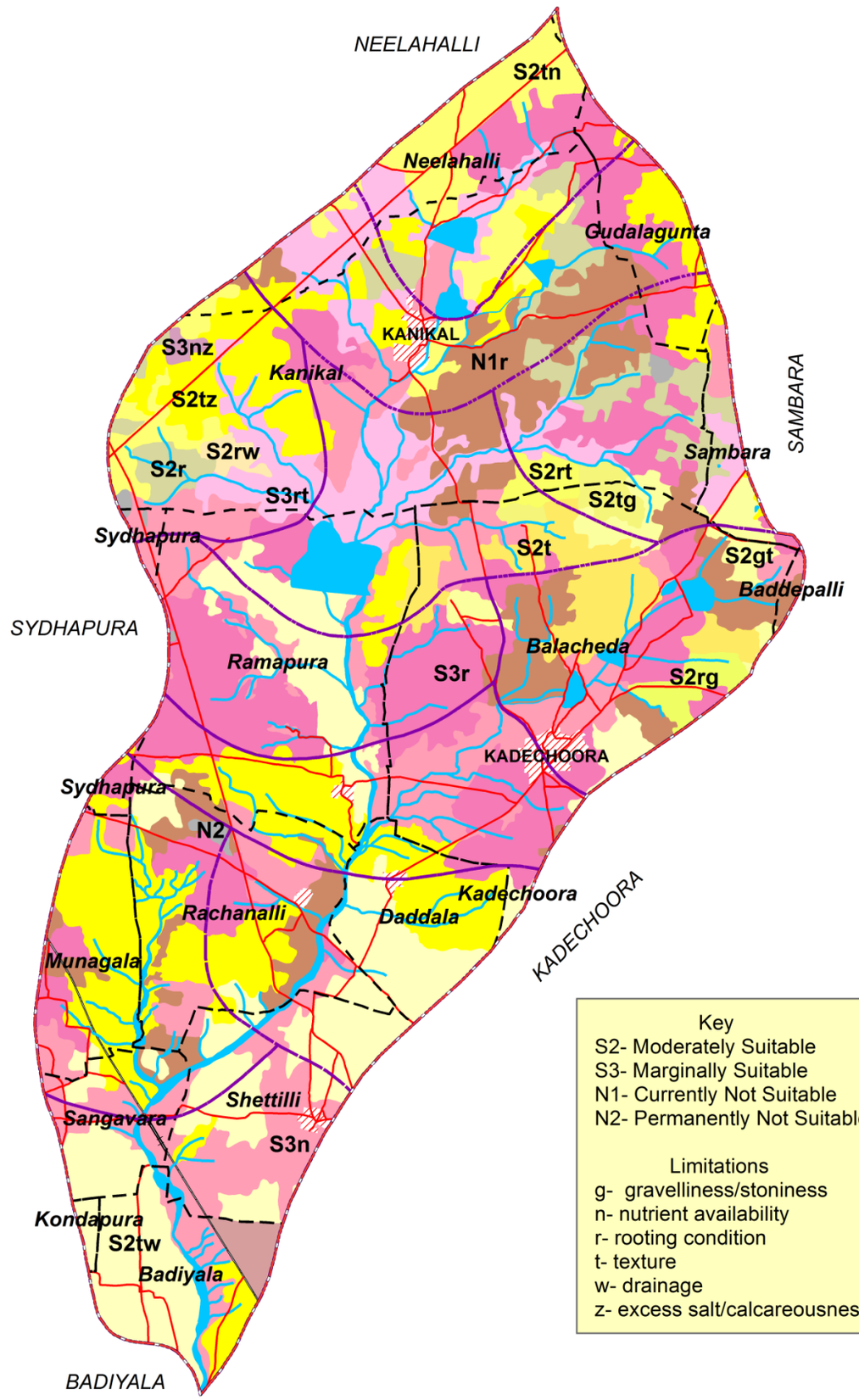
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.3. Land Suitability for Redgram





LAND SUITABILITY FOR REDGRAM

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S2r	231 (3.63)
S2t	203 (3.2)
S2gt	113 (1.78)
S2rg	47 (0.73)
S2rt	37 (0.58)
S2rw	20 (0.31)
S2tg	44 (0.69)
S2tn	313 (4.92)
S2tw	832 (13.08)
S2tz	1018 (16.0)
S3n	934 (14.68)
S3r	1143 (17.97)
S3nz	11 (0.17)
S3rt	462 (7.26)
N1r	623 (9.79)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

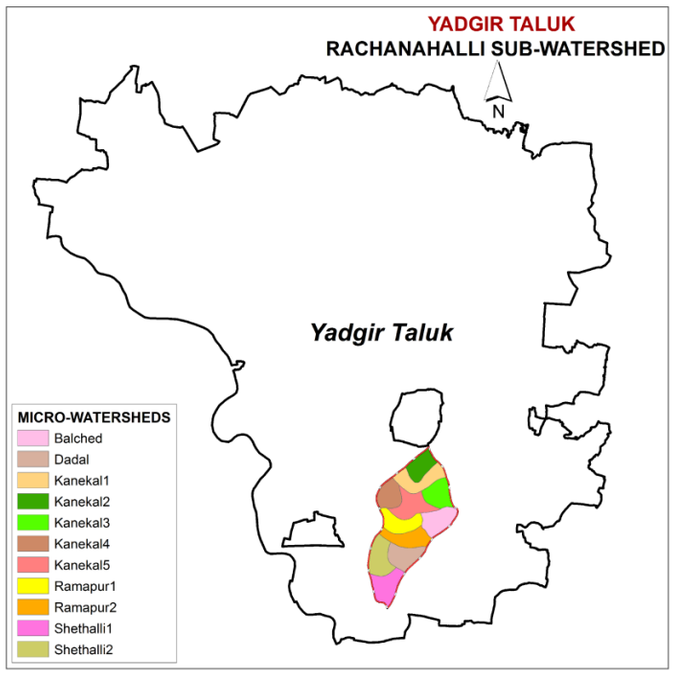
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

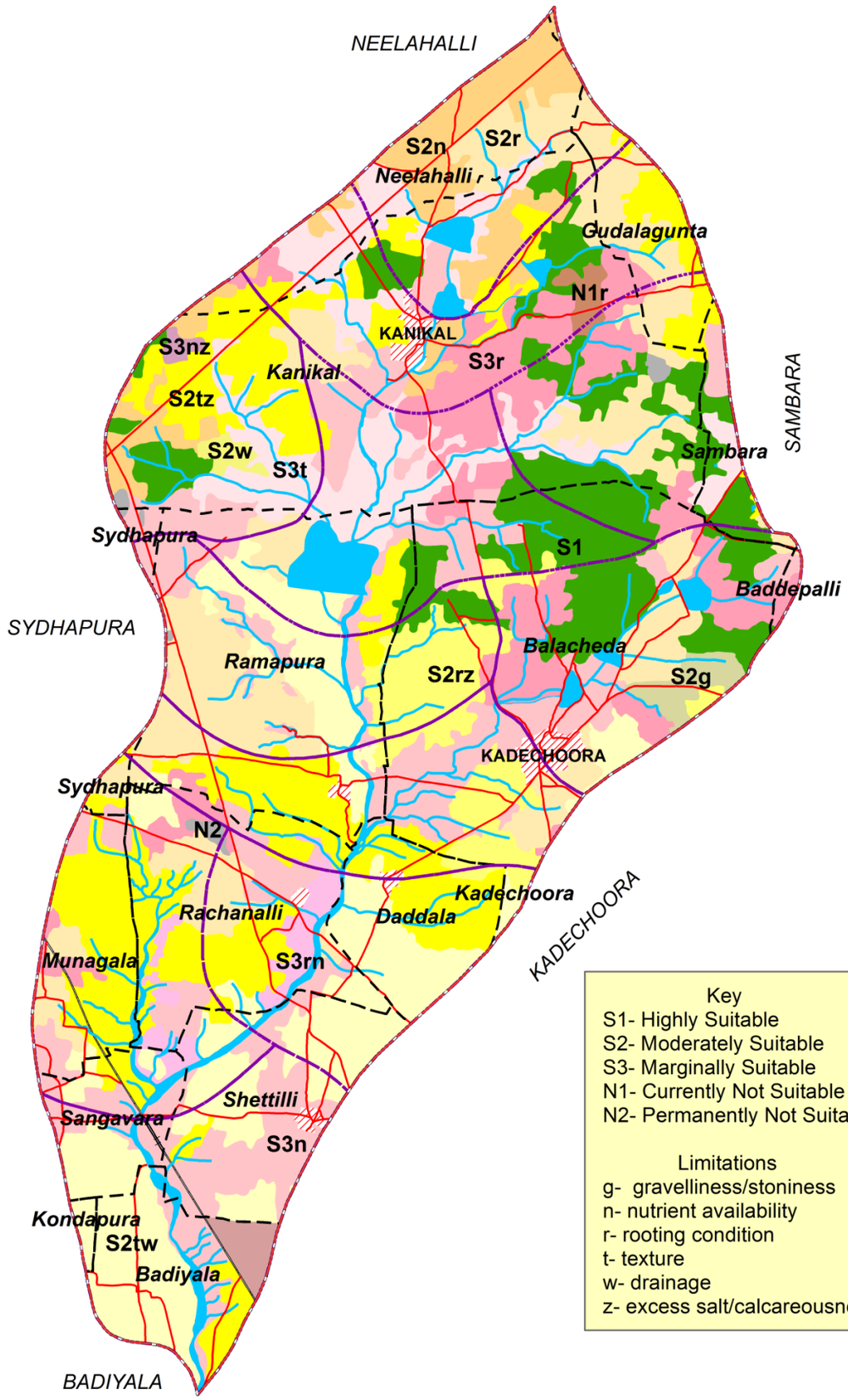
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.4. Land Suitability for Bajra





LAND SUITABILITY FOR BAJRA

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	629 (9.88)
S2g	47 (0.73)
S2n	313 (4.92)
S2r	861 (13.54)
S2w	20 (0.31)
S2rz	282 (4.43)
S2tw	832 (13.08)
S2tz	1018 (16.0)
S3n	934 (14.68)
S3r	515 (8.1)
S3t	462 (7.26)
S3nz	11 (0.17)
S3rn	83 (1.31)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

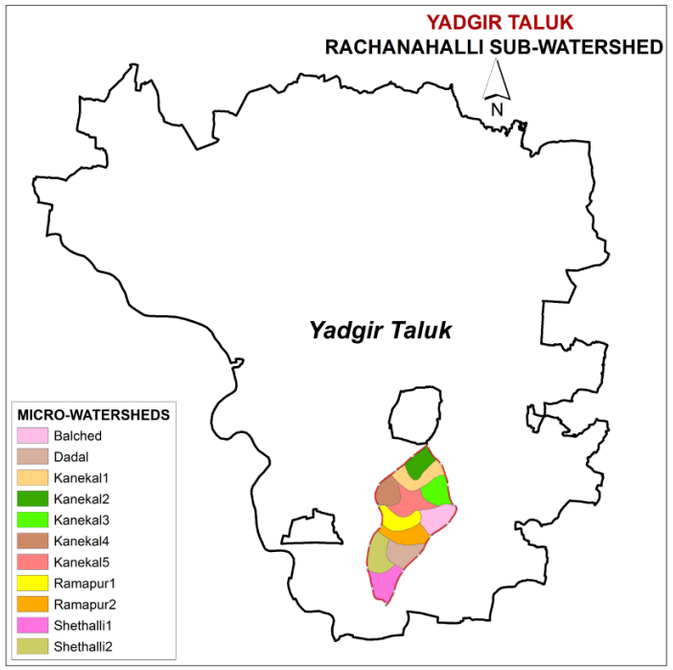
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

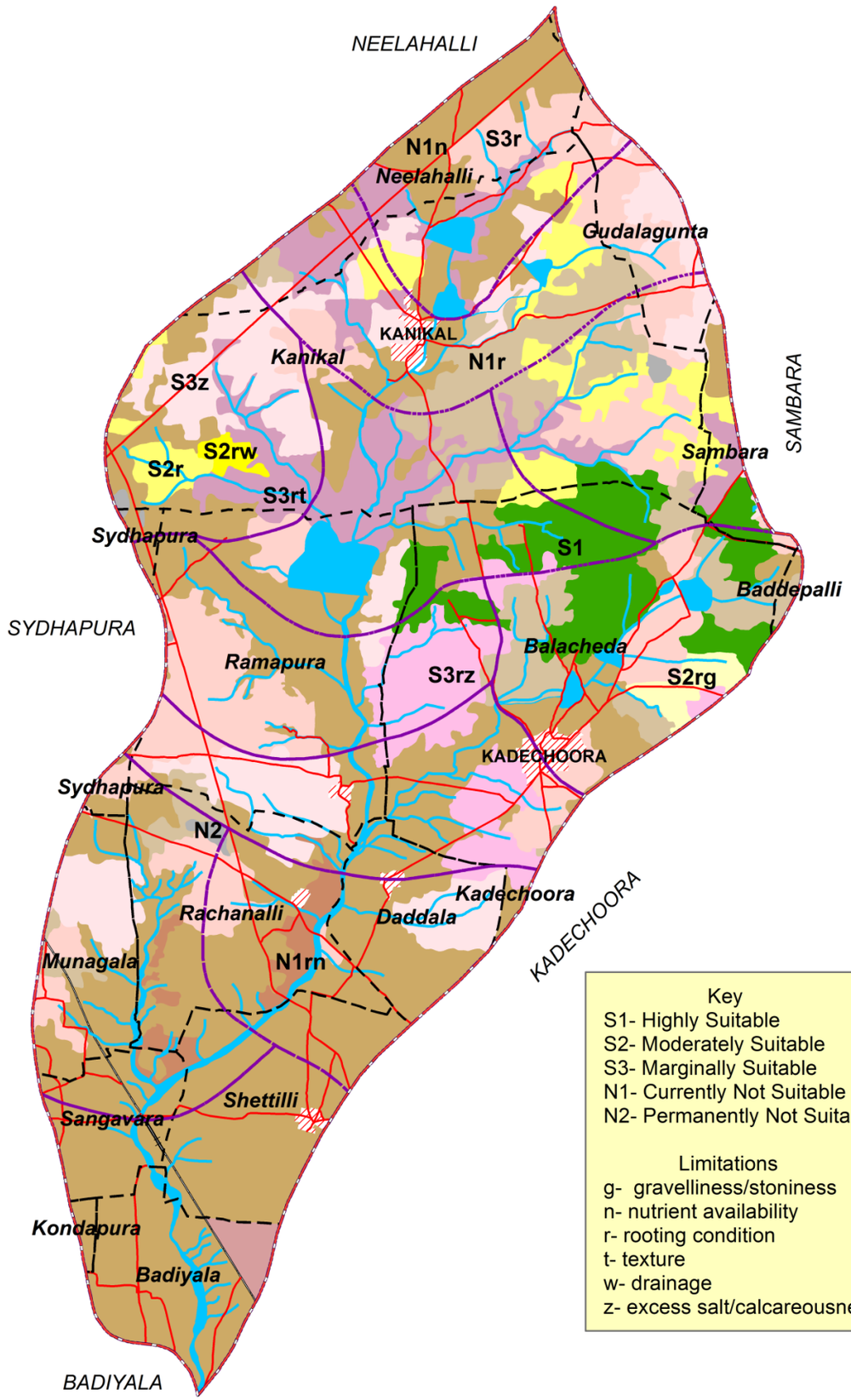
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.5. Land Suitability for Drumstick





LAND SUITABILITY FOR DRUMSTICK

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3r	861 (13.54)
S3z	656 (10.31)
S3rt	462 (7.26)
S3rz	282 (4.43)
N1n	2452 (38.54)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

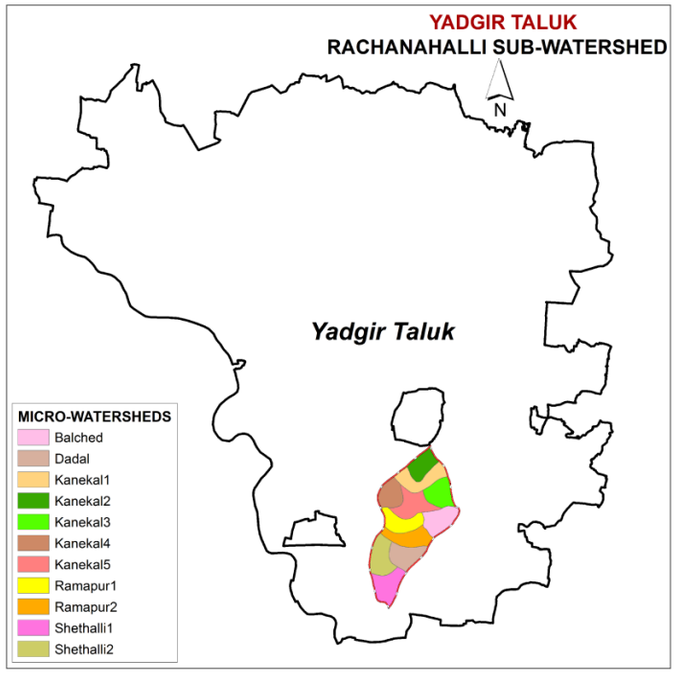
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

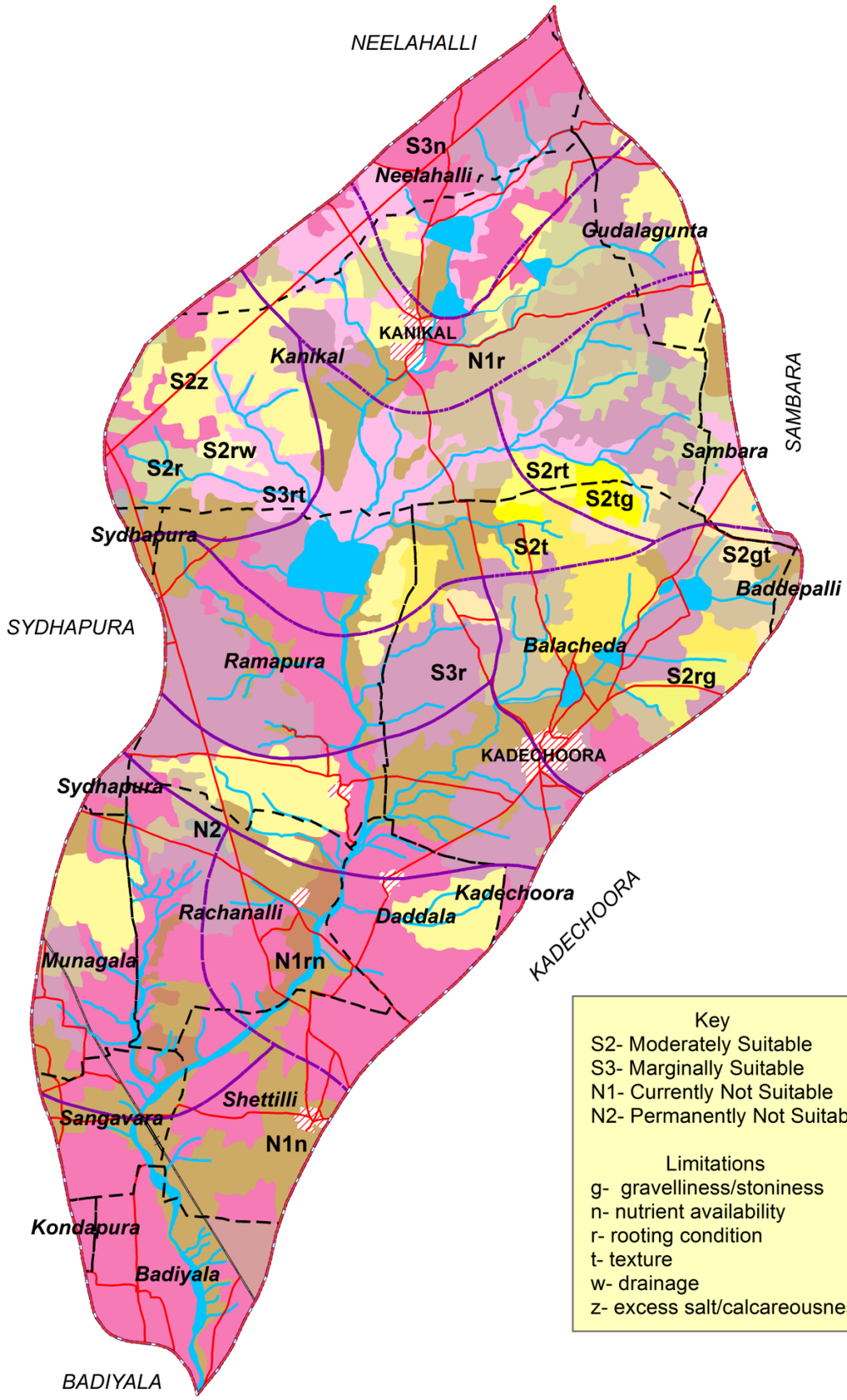
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

References

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

7.6. Land Suitability for Sunflower





LAND SUITABILITY FOR SUNFLOWER

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S2r	231 (3.63)
S2t	203 (3.2)
S2z	656 (10.31)
S2gt	113 (1.78)
S2rg	47 (0.73)
S2rt	37 (0.58)
S2rw	20 (0.31)
S2tg	44 (0.69)
S3n	1507 (23.69)
S3r	1143 (17.97)
S3rt	462 (7.26)
N1n	945 (14.85)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

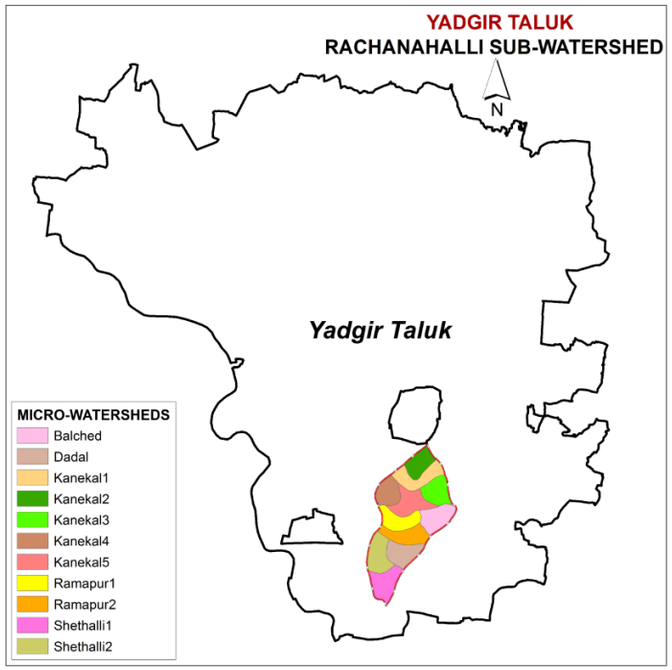
Source: ICAR-NBSS&LUP, Bengaluru

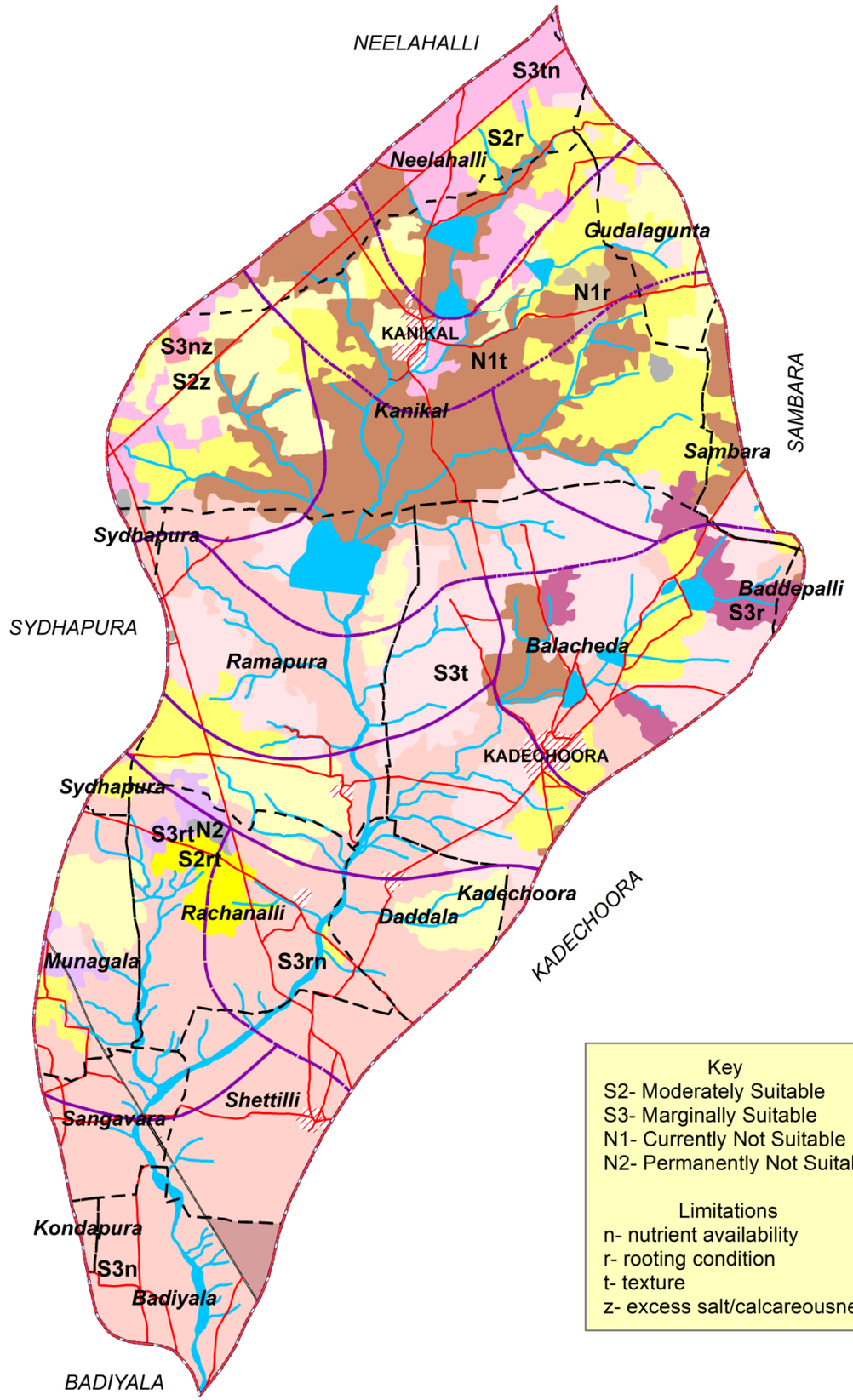
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

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

7.7. Land Suitability for Cotton





LAND SUITABILITY FOR COTTON

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S2r	829 (13.03)
S2z	656 (10.31)
S2rt	72 (1.13)
S3n	2007 (31.55)
S3r	115 (1.8)
S3t	938 (14.74)
S3nz	11 (0.17)
S3rn	83 (1.31)
S3rt	52 (0.82)
S3tn	313 (4.92)
N1r	25 (0.39)
N1t	930 (14.63)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

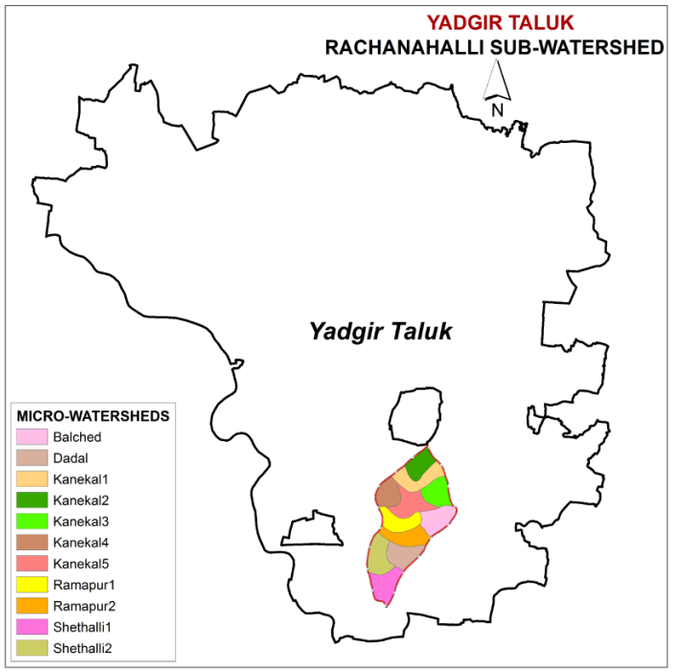
References

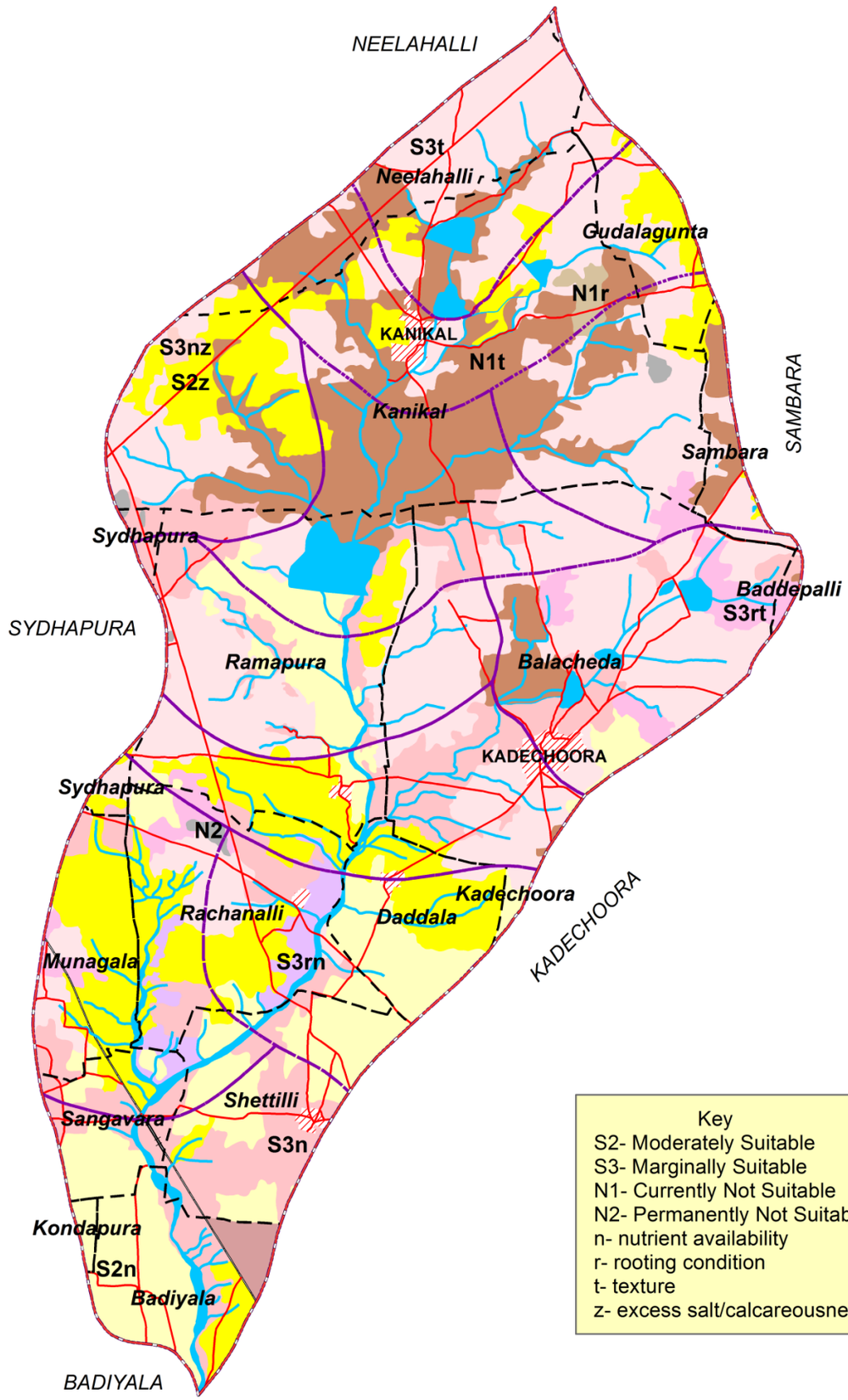
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

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

7.8. Land Suitability for Bengalgram





LAND SUITABILITY FOR BENGALGRAM

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

References

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

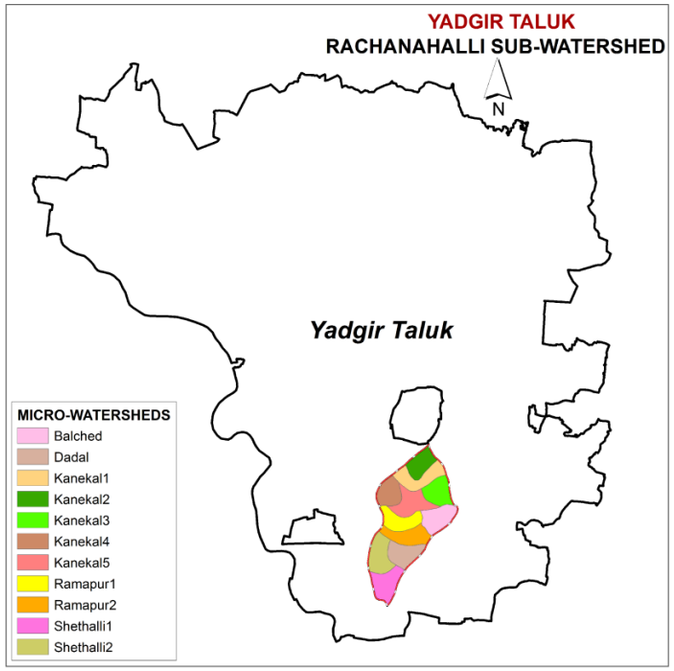
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable
n- nutrient availability
r- rooting condition
t- texture
z- excess salt/calcareousness

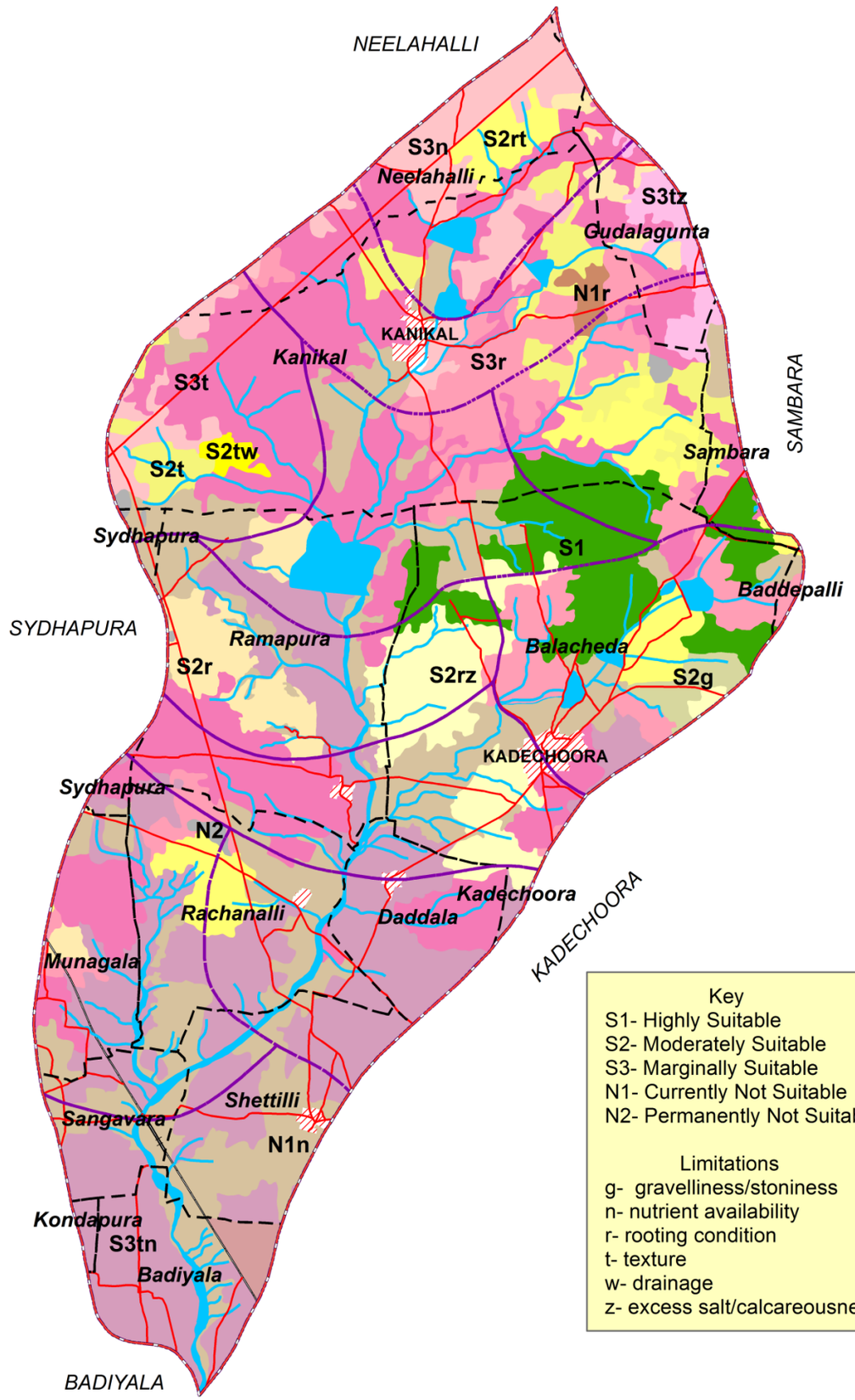
Suitability subclass	Area in ha (%)
S2n	832 (13.08)
S2z	1018 (16.0)
S3n	813 (12.78)
S3t	2151 (33.82)
S3nz	11 (0.17)
S3rn	83 (1.31)
S3rt	167 (2.63)
N1r	25 (0.39)
N1t	930 (14.63)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.9. Land Suitability for Groundnut





LAND SUITABILITY FOR GROUNDNUT

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	398 (6.25)
S2g	47 (0.73)
S2r	212 (3.33)
S2t	231 (3.63)
S2rt	271 (4.26)
S2rz	282 (4.43)
S2tw	20 (0.31)
S3n	313 (4.92)
S3r	515 (8.1)
S3t	1416 (22.26)
S3tn	1194 (18.77)
S3tz	80 (1.26)
N1n	1028 (16.16)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

References

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

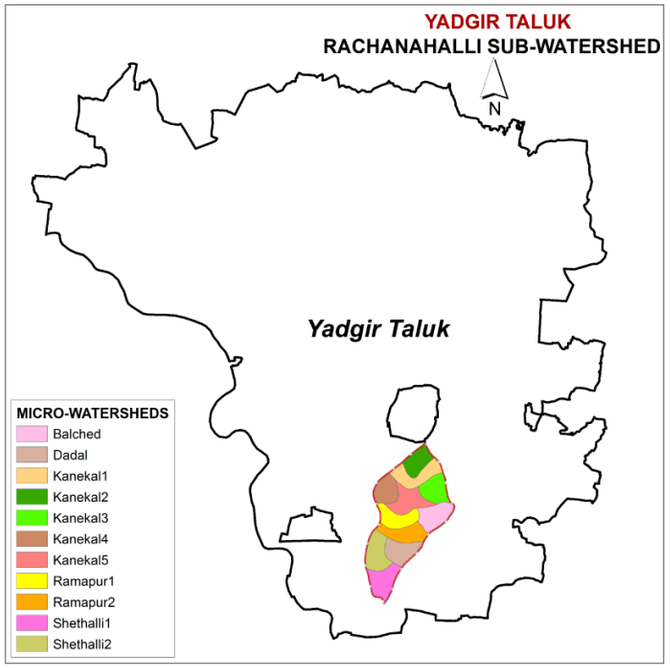
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

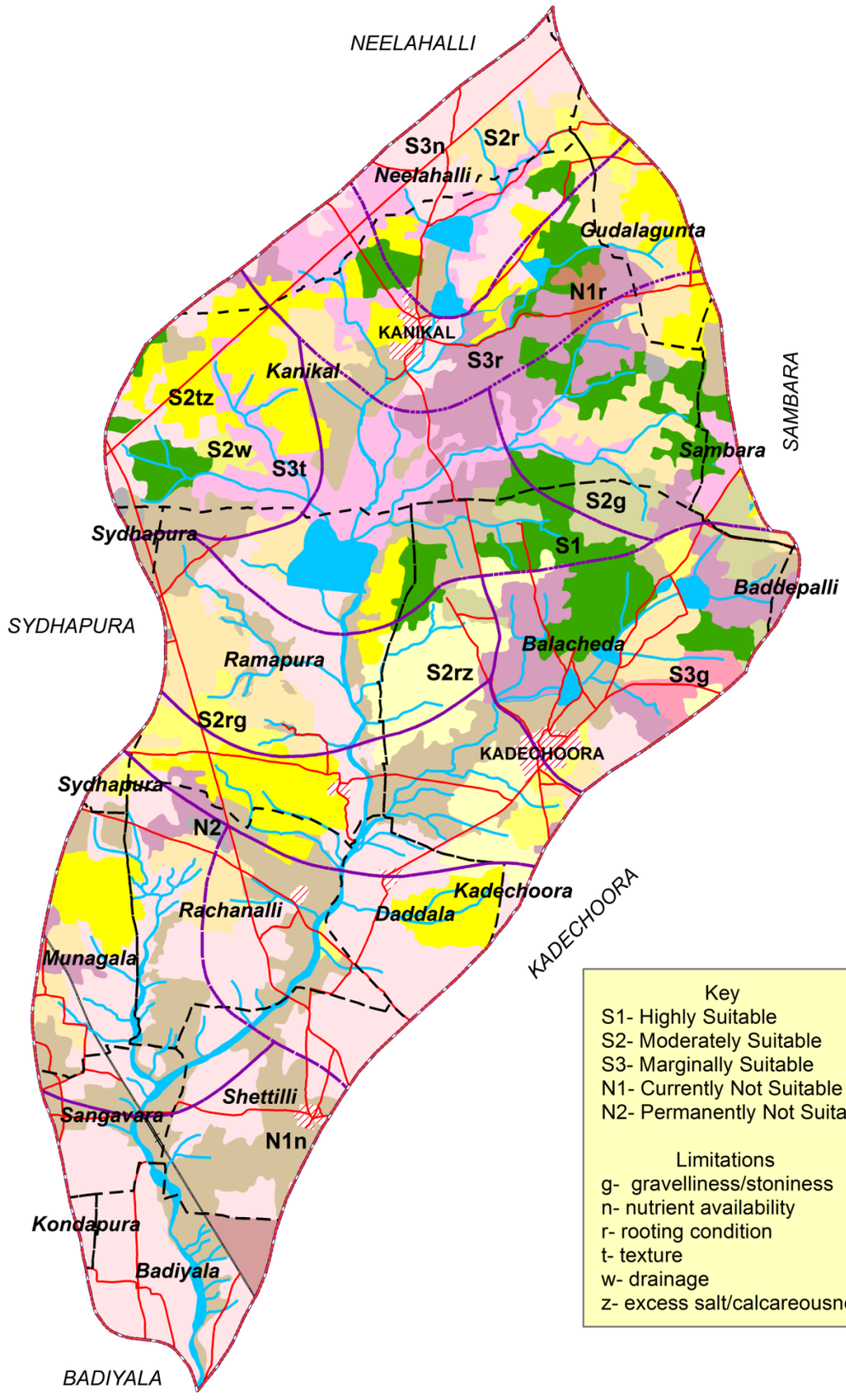
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.10. Land Suitability for Chilli





LAND SUITABILITY FOR CHILLI

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S2tz	656 (10.31)
S3g	47 (0.73)
S3n	1507 (23.69)
S3r	515 (8.1)
S3t	462 (7.26)
N1n	1028 (16.16)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

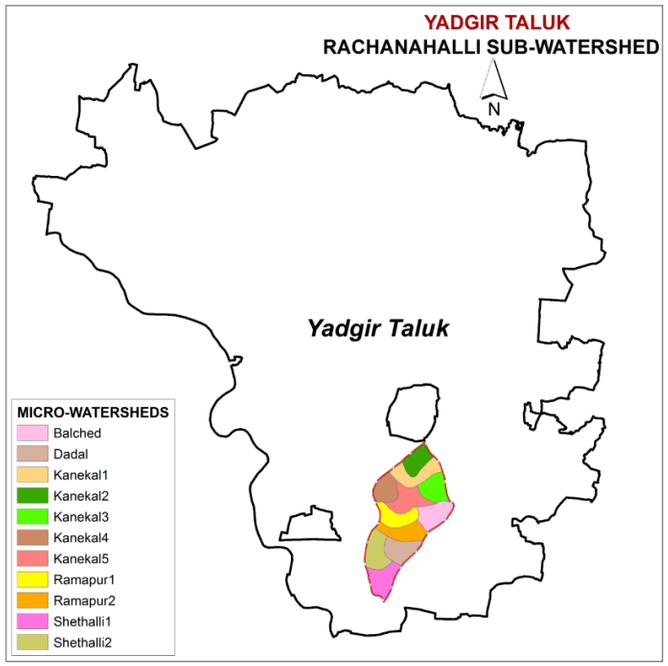
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

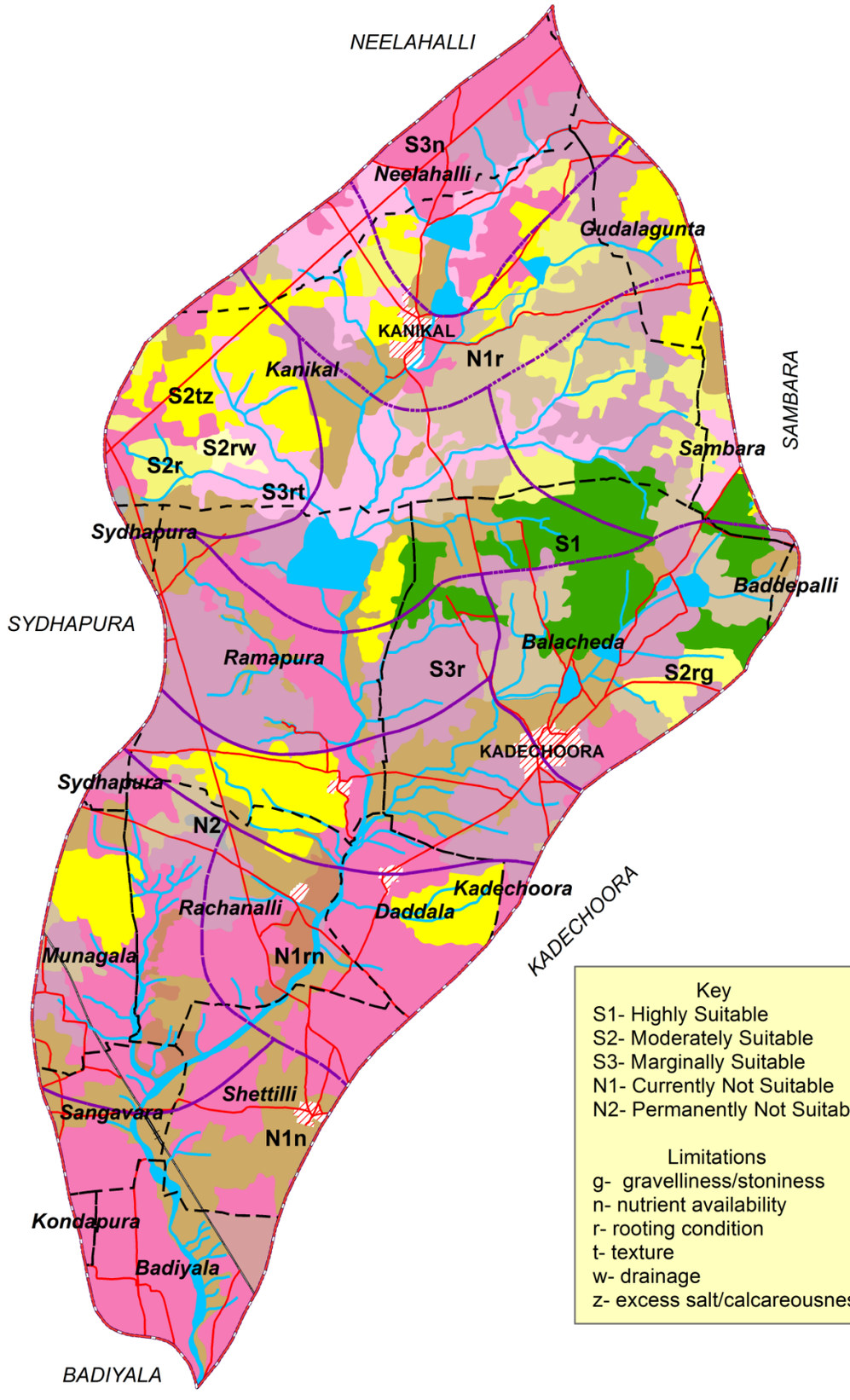
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

References

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

7.11. Land Suitability for Pomegranate





LAND SUITABILITY FOR POMEGRANATE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S2tz	656 (10.31)
S3n	1507 (23.69)
S3r	1143 (17.97)
S3rt	462 (7.26)
N1n	945 (14.85)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

References

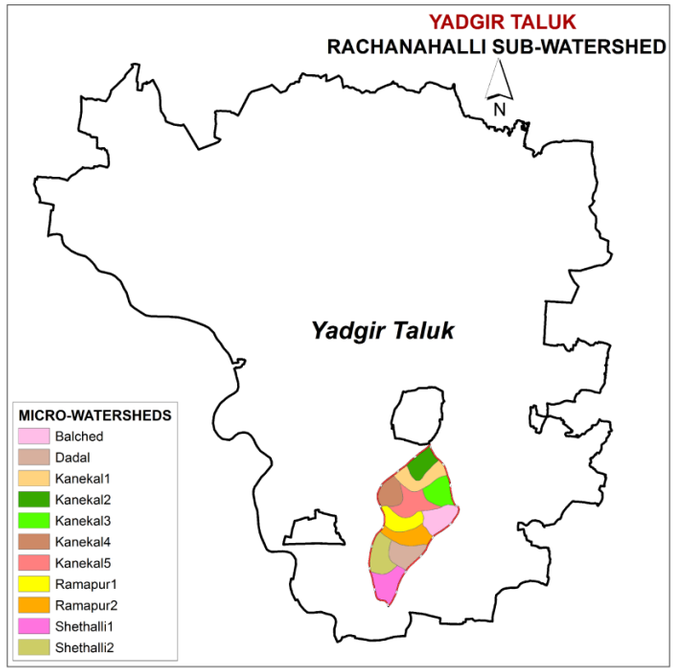
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

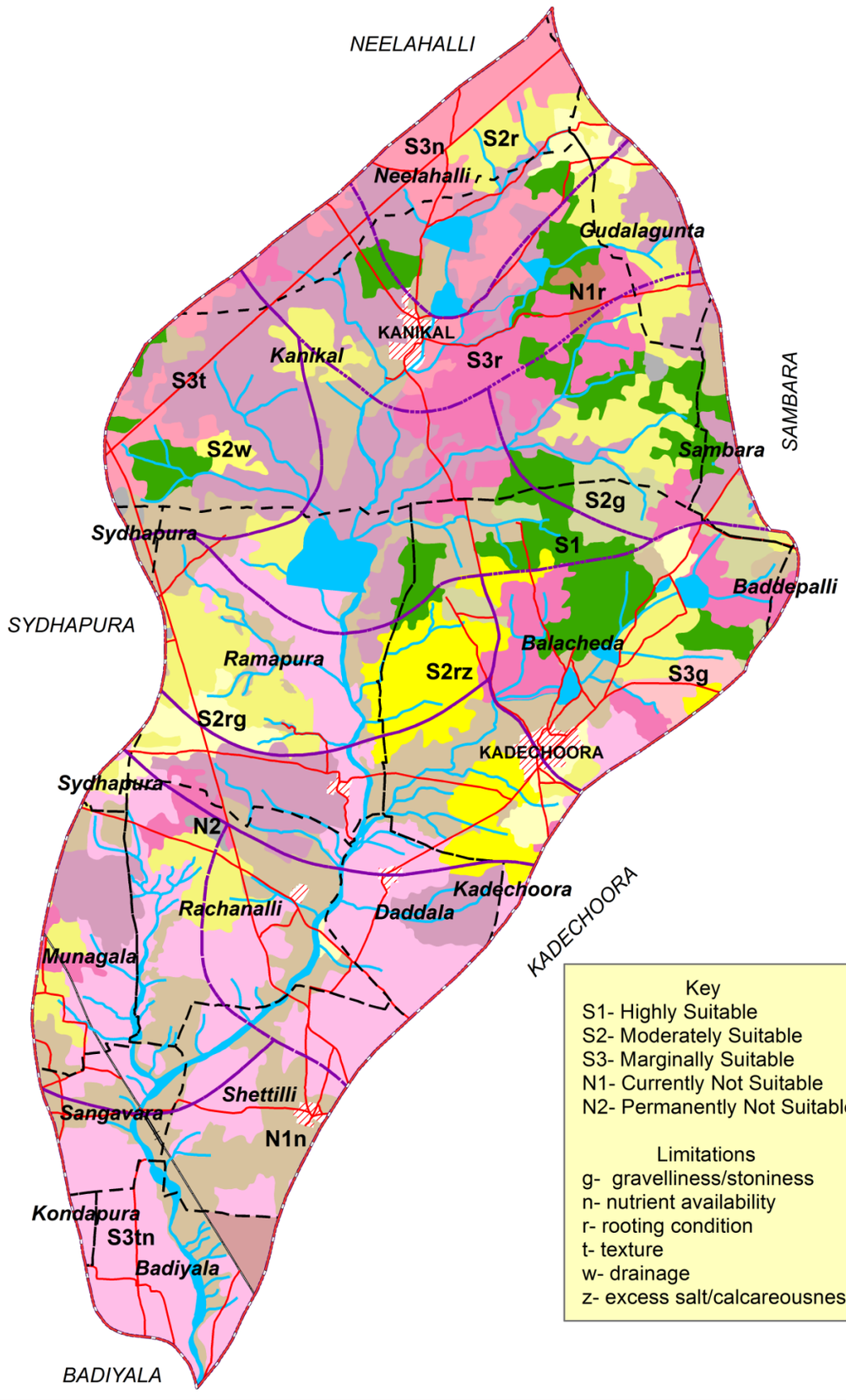
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

Source: ICAR-NBSS&LUP, Bengaluru

7.12. Land Suitability for Tomato





LAND SUITABILITY FOR TOMATO

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S3g	47 (0.73)
S3n	313 (4.92)
S3r	515 (8.1)
S3t	1118 (17.57)
S3tn	1194 (18.77)
N1n	1028 (16.16)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

References

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

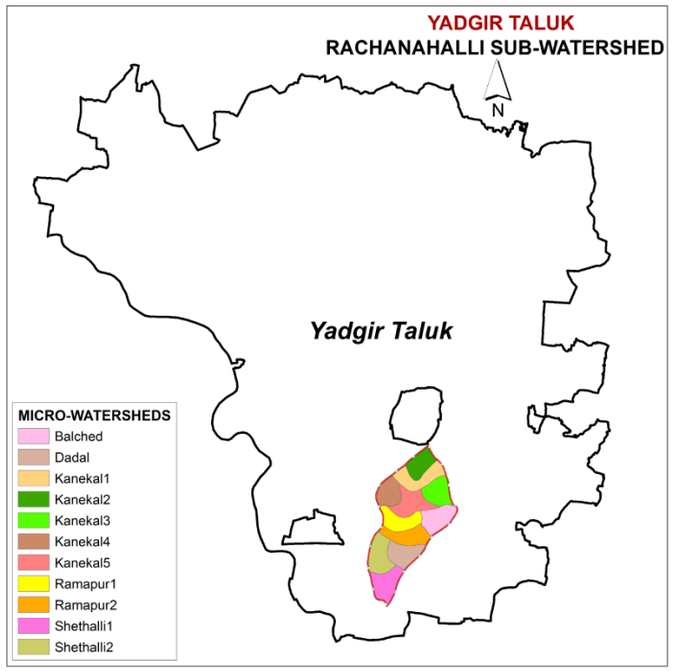
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

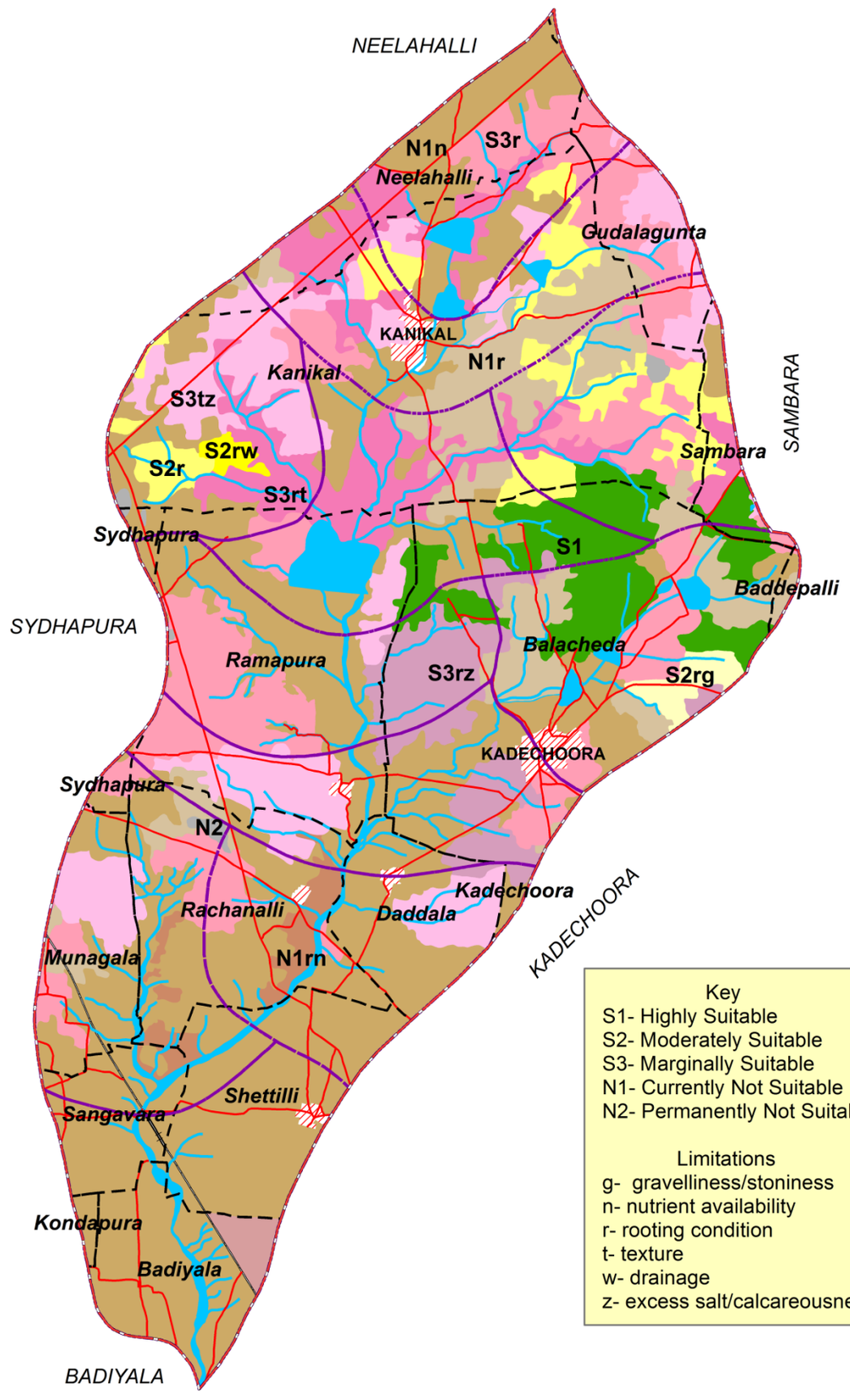
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.13. Land Suitability for Mulberry





LAND SUITABILITY FOR MULBERRY

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3r	861 (13.54)
S3rt	462 (7.26)
S3rz	282 (4.43)
S3tz	656 (10.31)
N1n	2452 (38.54)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

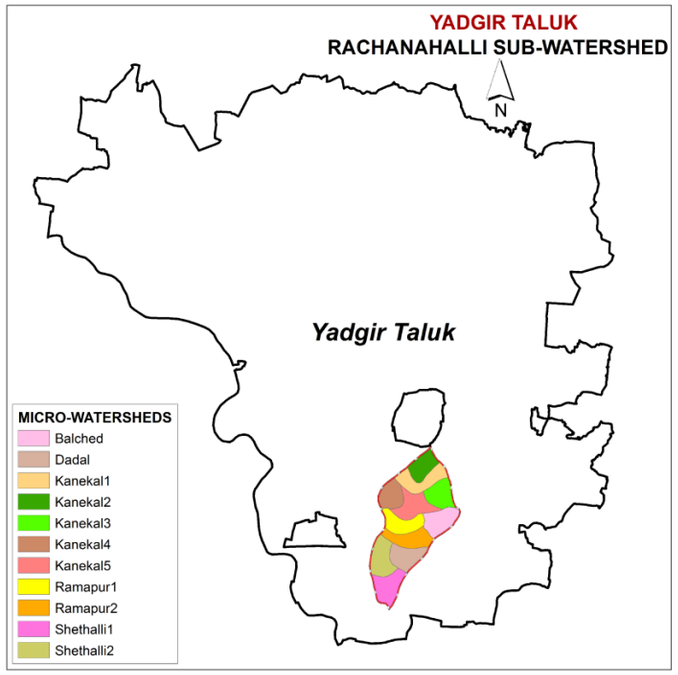
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

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

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

7.14. Land Suitability for Bhendi



LAND SUITABILITY FOR BHENDI

Rachanahalli Sub-watershed

(4D5B1P2d : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S2tz	656 (10.31)
S3g	47 (0.73)
S3n	1507 (23.69)
S3r	515 (8.1)
S3t	462 (7.26)
N1n	1028 (16.16)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

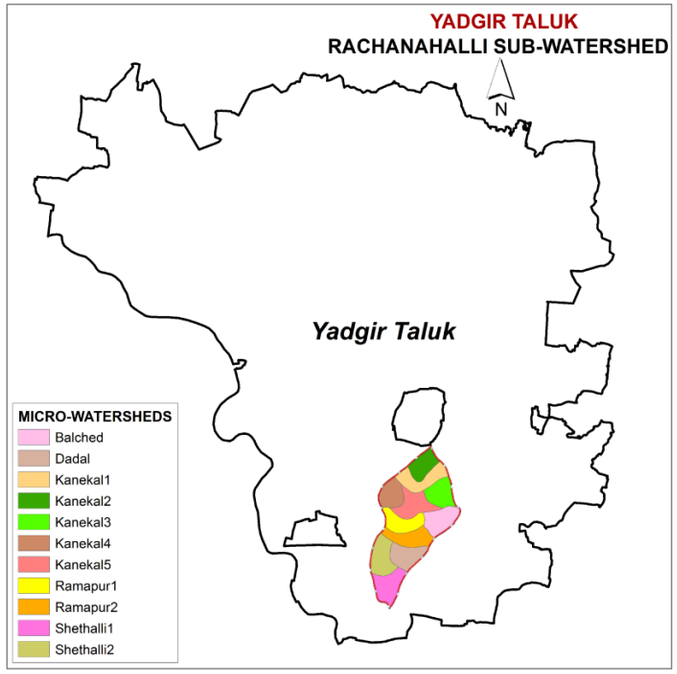
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

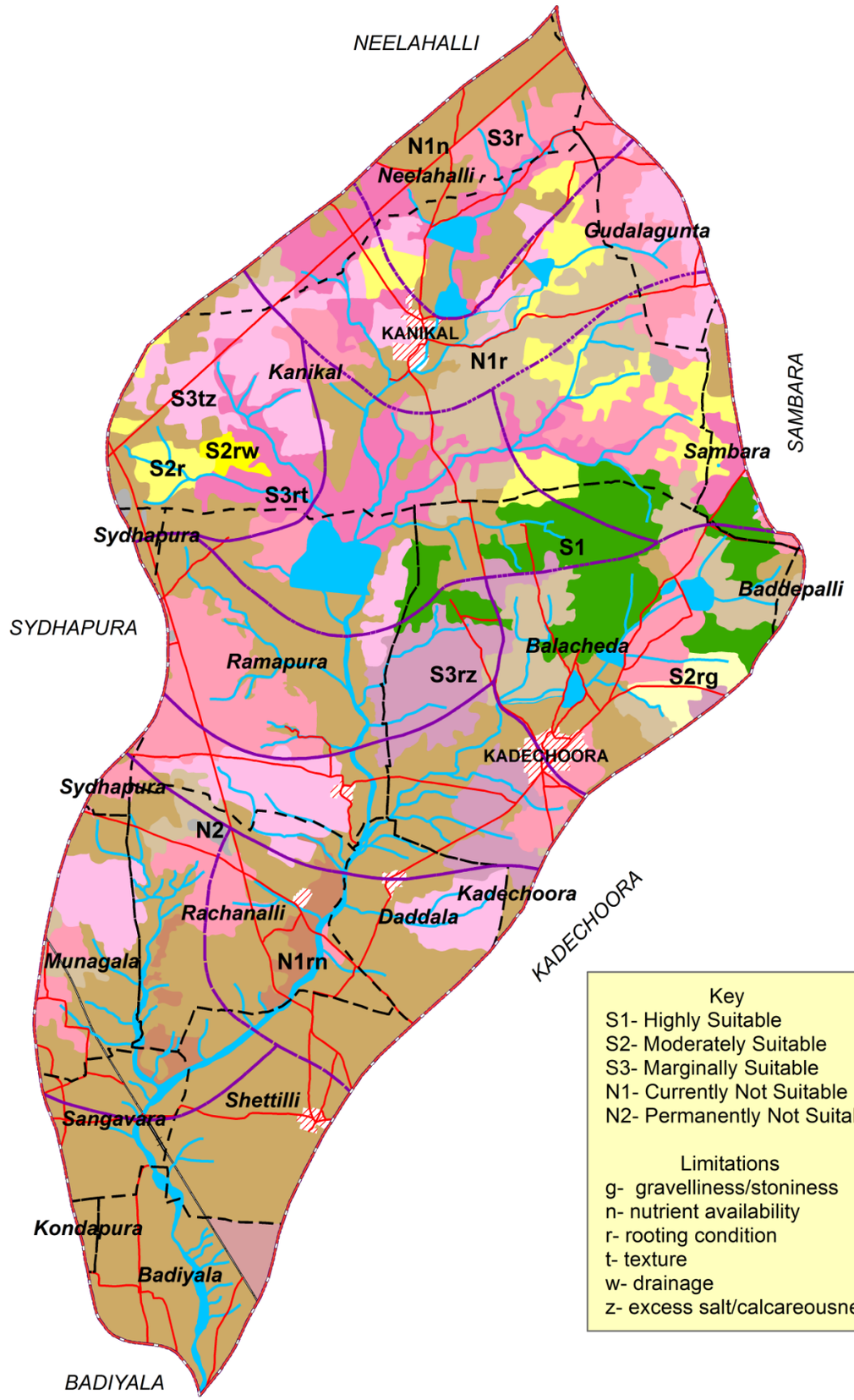
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

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

Source: ICAR-NBSS&LUP, Bengaluru

7.15. Land Suitability for Guava





LAND SUITABILITY FOR GUAVA

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

References

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

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

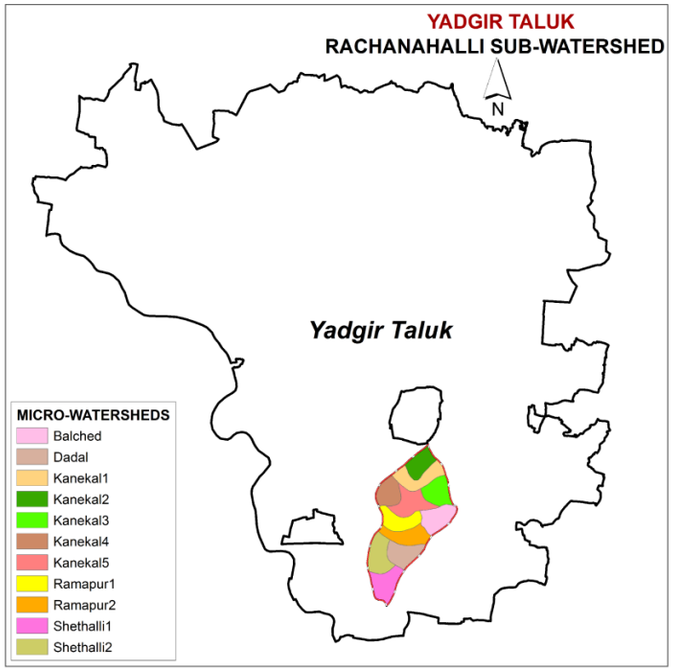
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

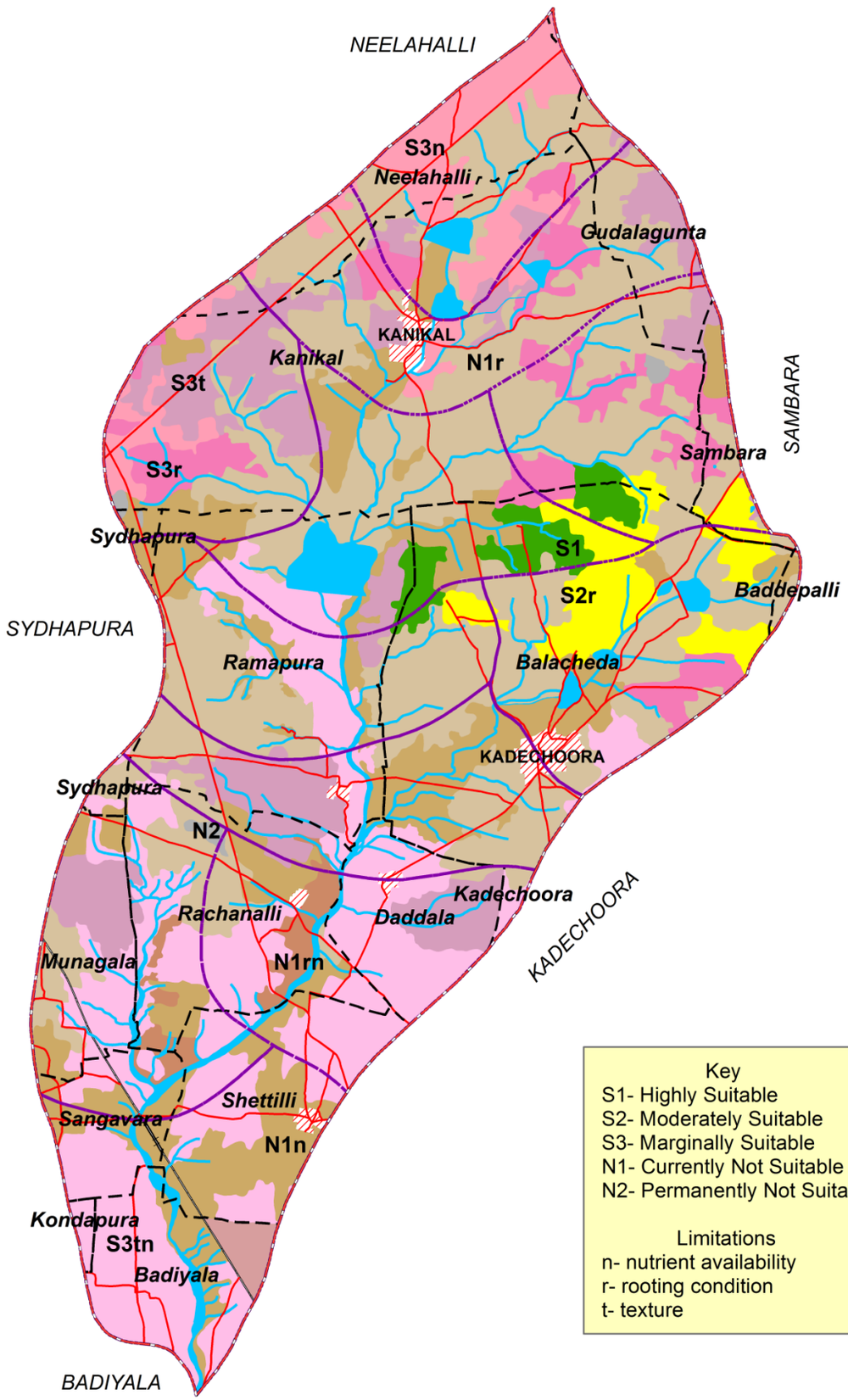
Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3r	861 (13.54)
S3rt	462 (7.26)
S3rz	282 (4.43)
S3tz	656 (10.31)
N1n	2452 (38.54)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.16. Land Suitability for Mango





LAND SUITABILITY FOR MANGO

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

References

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

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

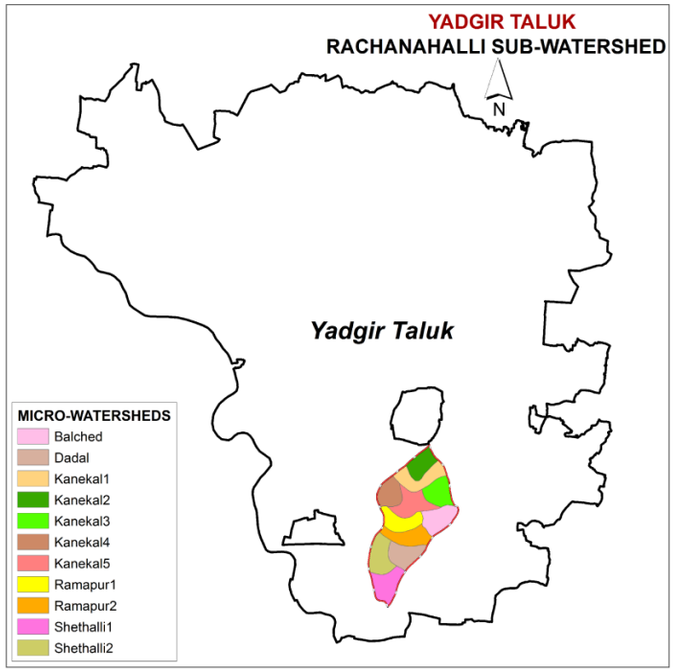
Limitations
n- nutrient availability
r- rooting condition
t- texture

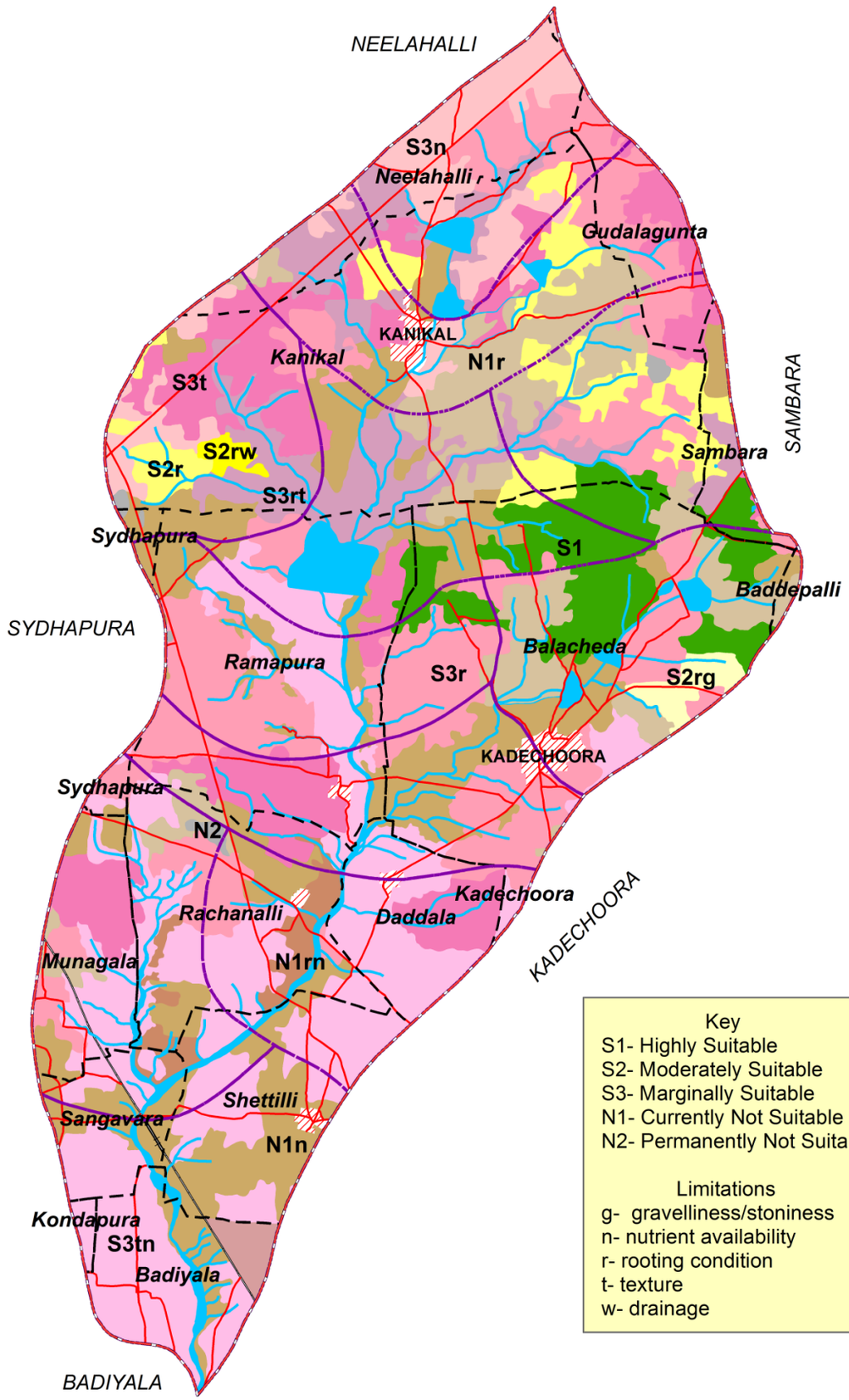
Suitability subclass	Area in ha (%)
S1	123 (1.93)
S2r	238 (3.74)
S3n	313 (4.92)
S3r	334 (5.25)
S3t	656 (10.31)
S3tn	1194 (18.77)
N1n	945 (14.85)
N1r	2145 (33.72)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.17. Land Suitability for Sapota





LAND SUITABILITY FOR SAPOTA

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

References

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

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

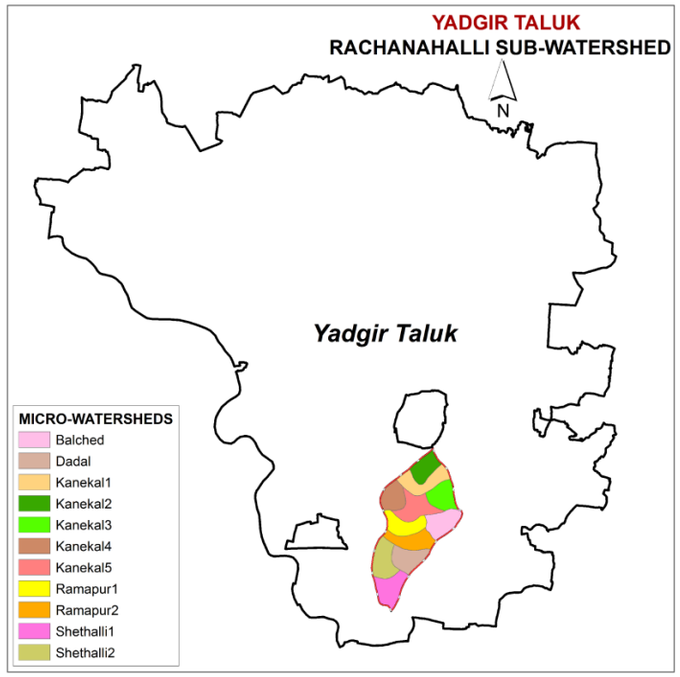
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage

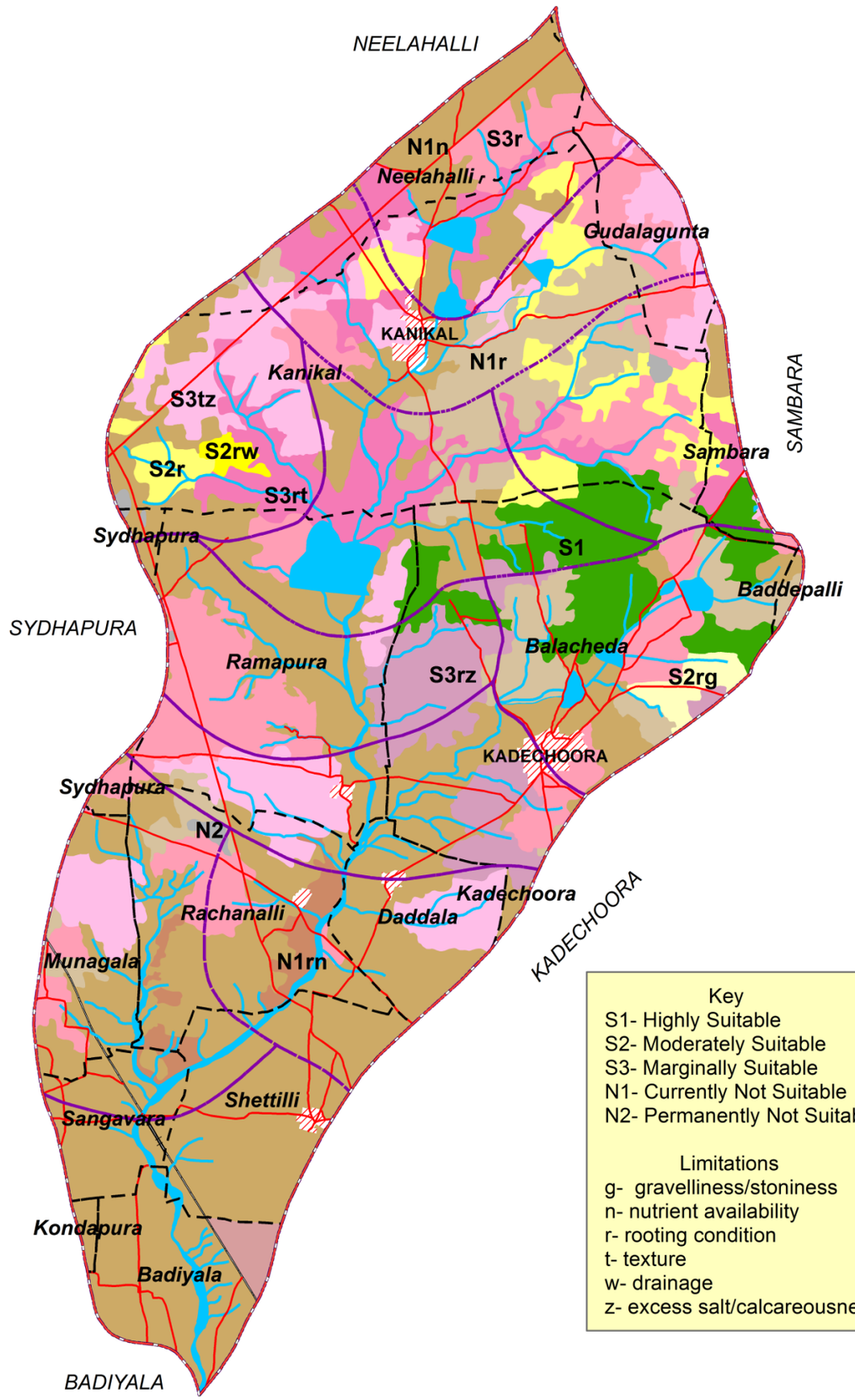
Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3n	313 (4.92)
S3r	1143 (17.97)
S3t	656 (10.31)
S3rt	462 (7.26)
S3tn	1194 (18.77)
N1n	945 (14.85)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.18. Land Suitability for Jackfruit





LAND SUITABILITY FOR JACKFRUIT

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3r	861 (13.54)
S3rt	462 (7.26)
S3rz	282 (4.43)
S3tz	656 (10.31)
N1n	2452 (38.54)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

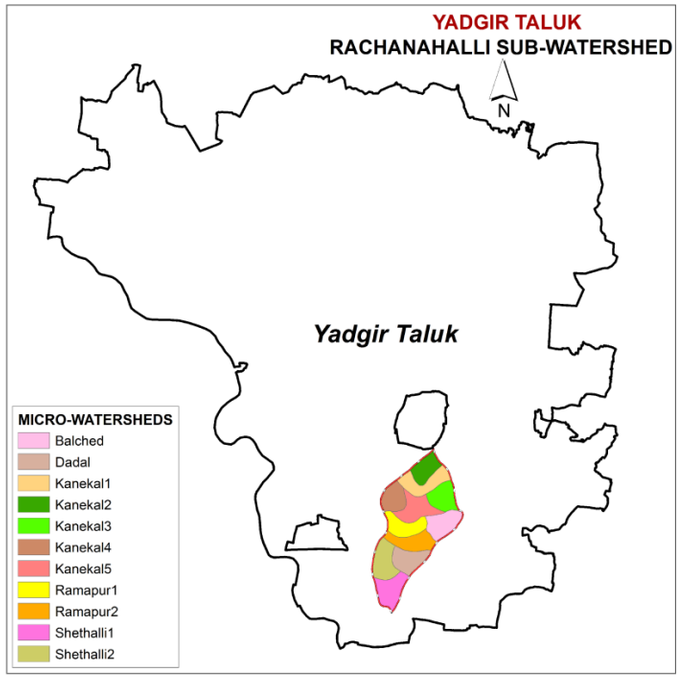
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

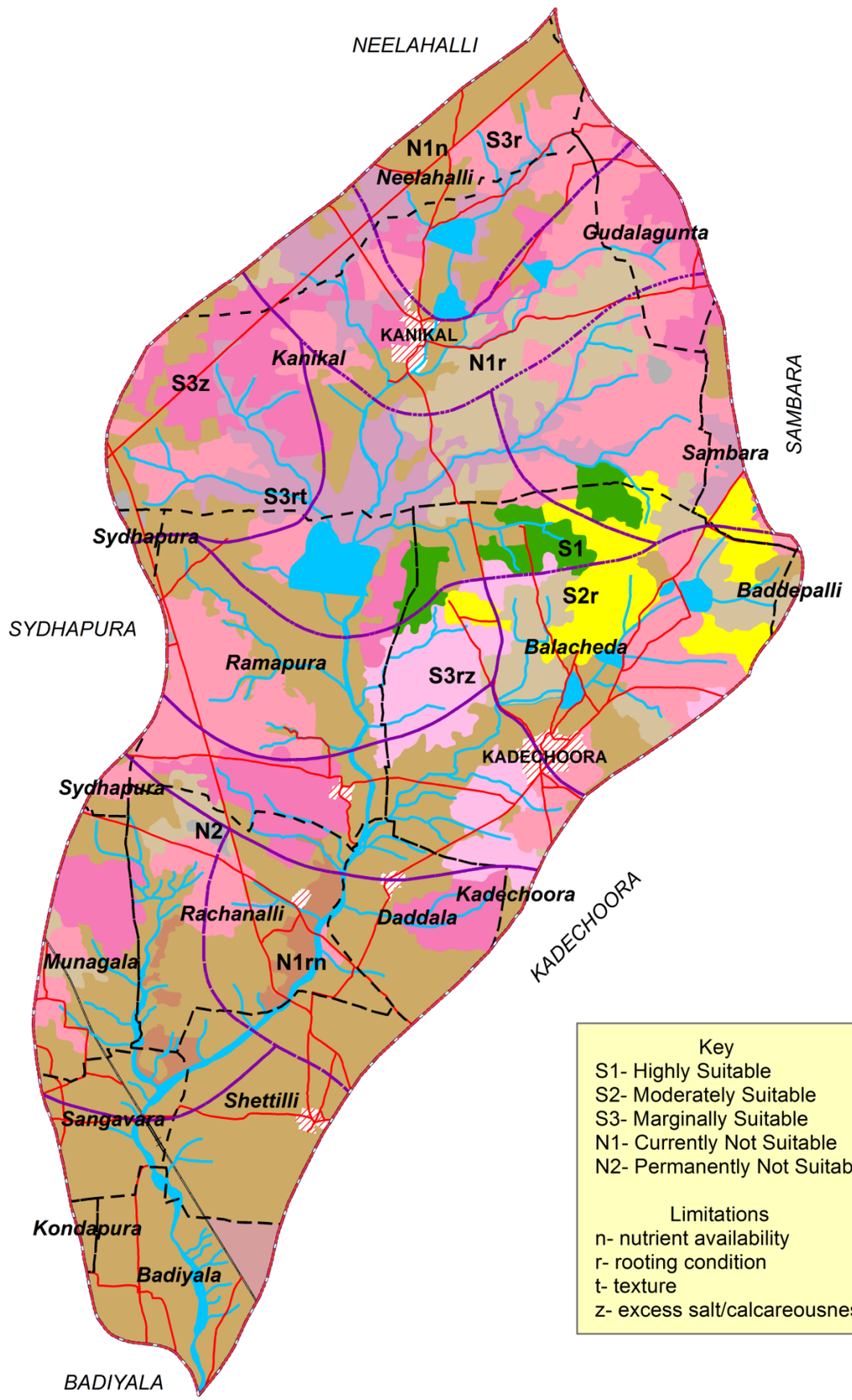
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

References

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

7.19. Land Suitability for Jamun





LAND SUITABILITY FOR JAMUN

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

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

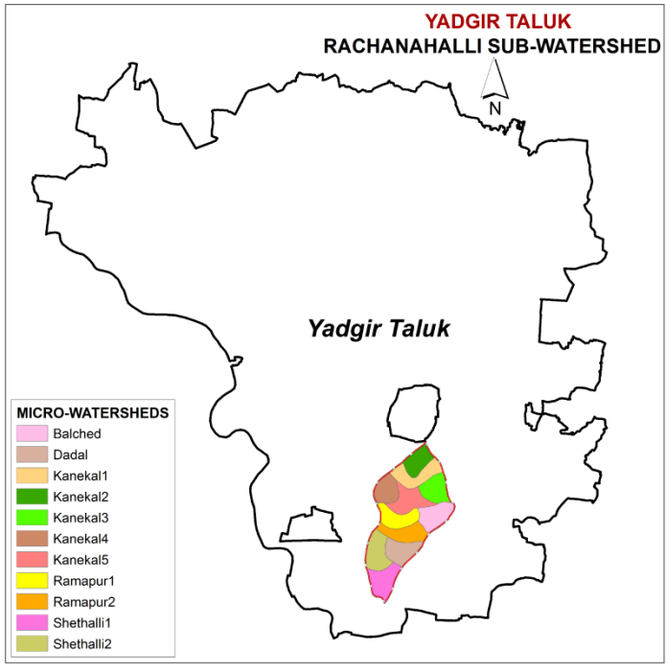
Suitability subclass	Area in ha (%)
S1	123 (1.93)
S2r	238 (3.74)
S3r	1195 (18.79)
S3z	656 (10.31)
S3rt	462 (7.26)
S3rz	282 (4.43)
N1n	2452 (38.54)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

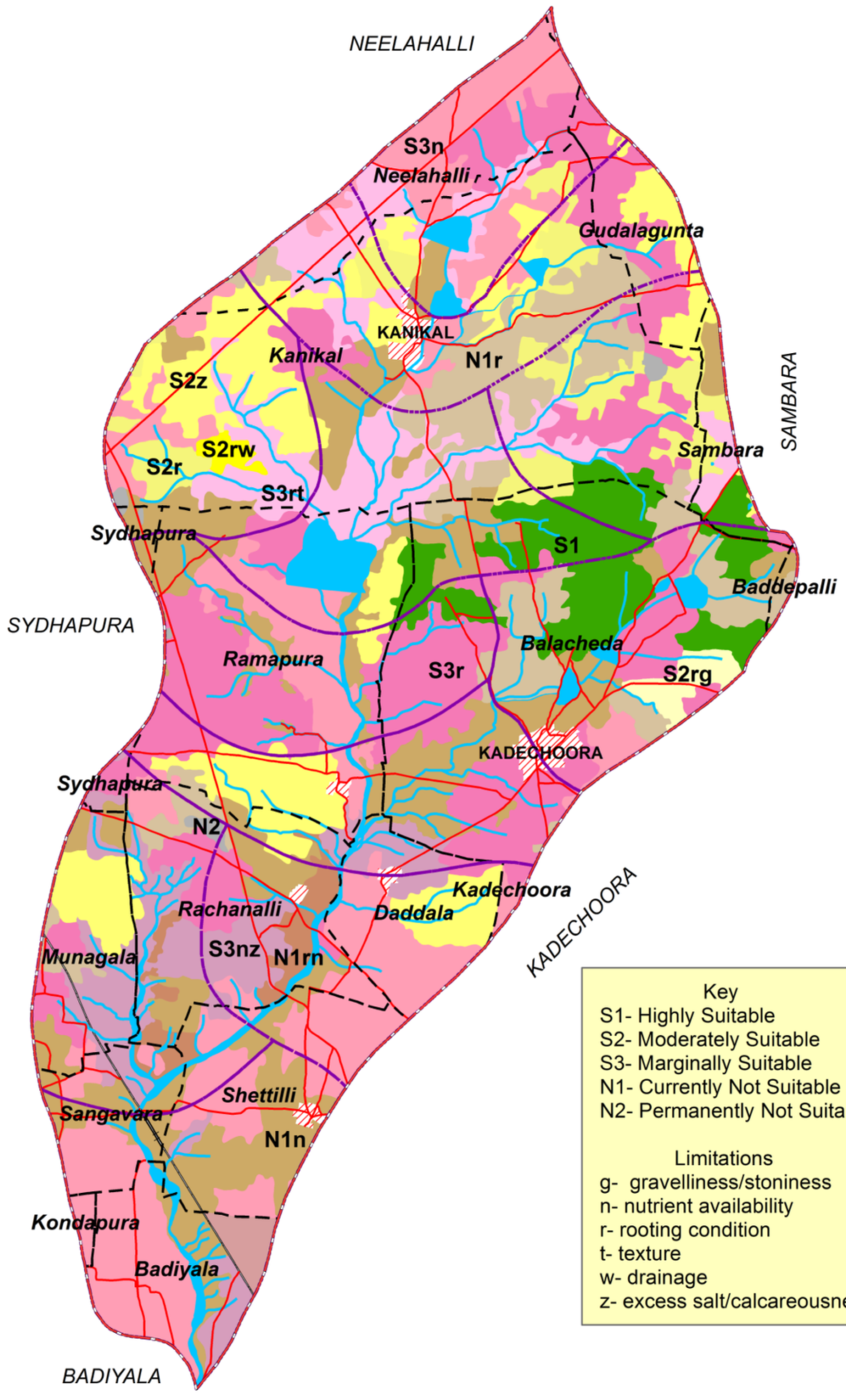
* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

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

7.20. Land Suitability for Musambi





LAND SUITABILITY FOR MUSAMBI

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2z	656 (10.31)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3n	1145 (18.0)
S3r	1143 (17.97)
S3nz	362 (5.69)
S3rt	462 (7.26)
N1n	945 (14.85)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

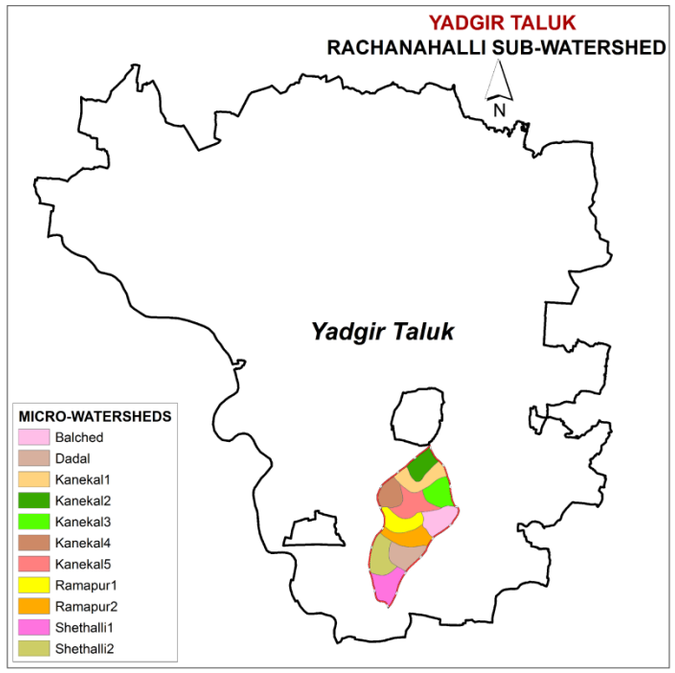
Source: ICAR-NBSS&LUP, Bengaluru

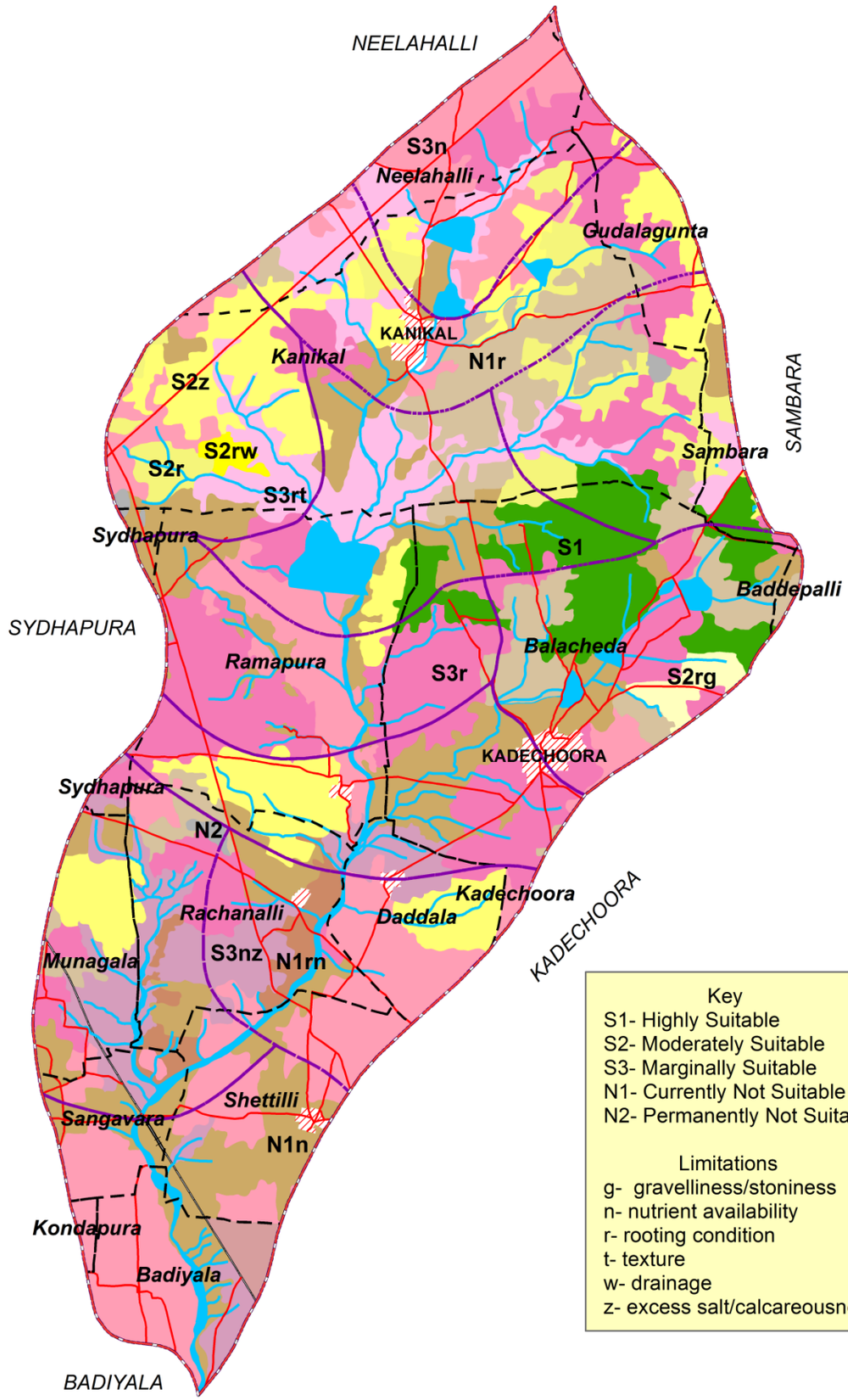
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

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

7.21. Land Suitability for Lime





LAND SUITABILITY FOR LIME

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	361 (5.67)
S2r	268 (4.21)
S2z	656 (10.31)
S2rg	47 (0.73)
S2rw	20 (0.31)
S3n	1145 (18.0)
S3r	1143 (17.97)
S3nz	362 (5.69)
S3rt	462 (7.26)
N1n	945 (14.85)
N1r	540 (8.49)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

References

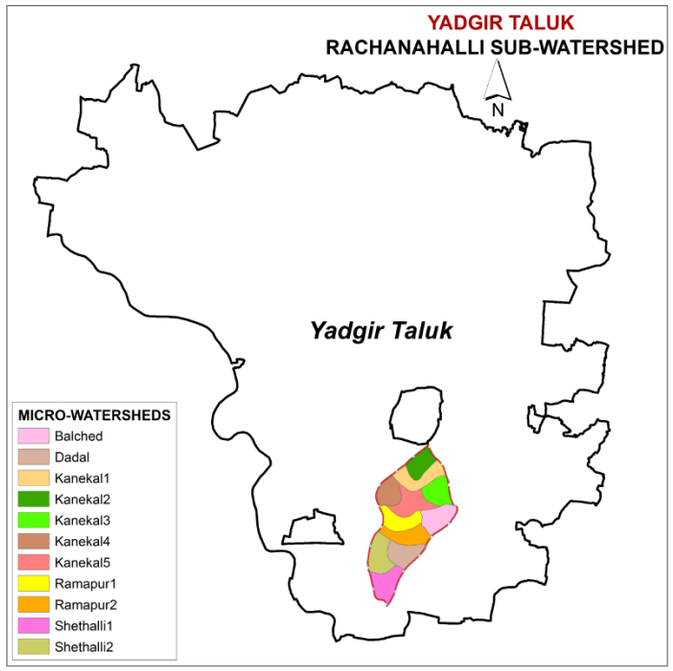
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

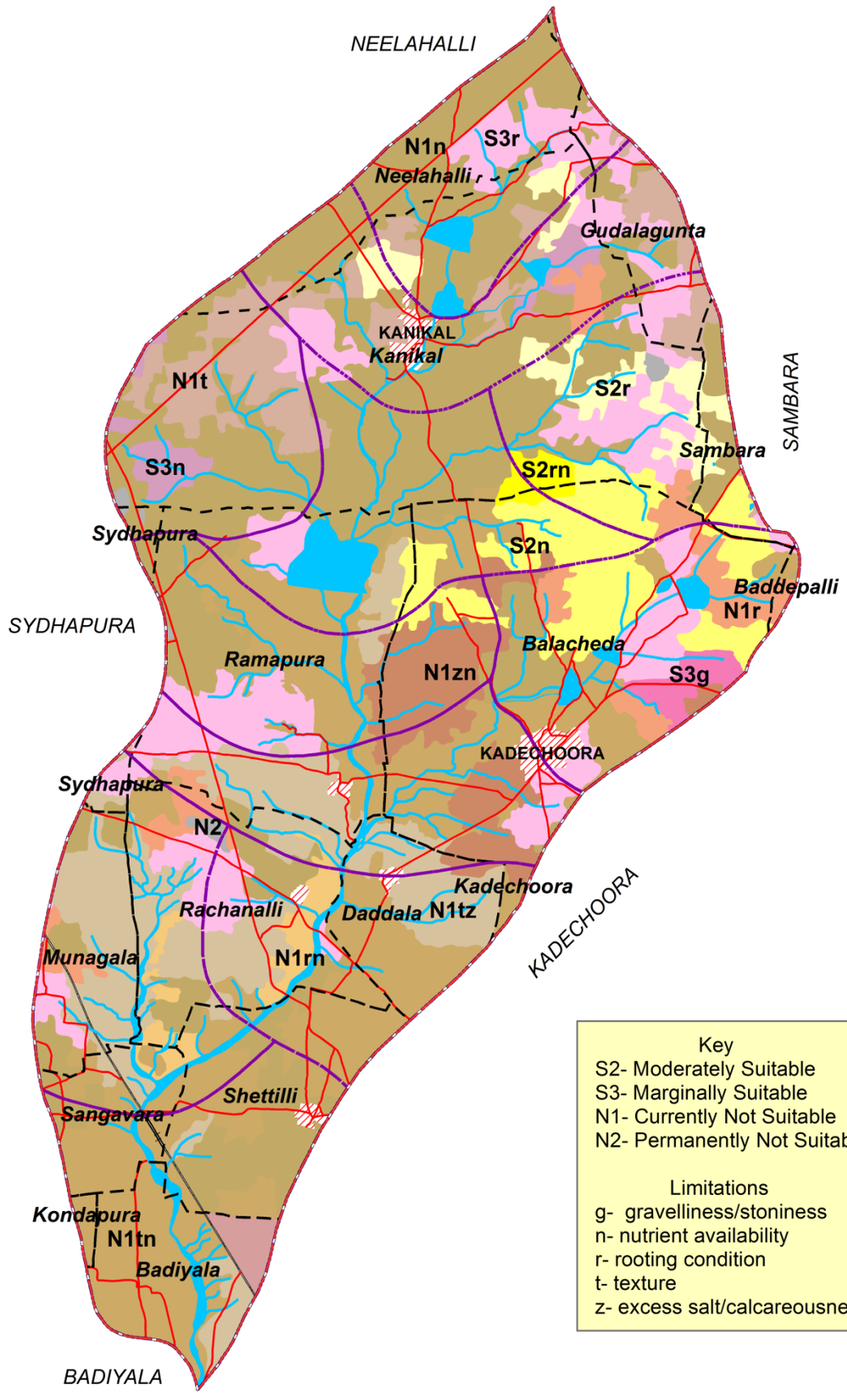
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

Source: ICAR-NBSS&LUP, Bengaluru

7.22. Land Suitability for Cashew





LAND SUITABILITY FOR CASHEW

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S2n	361 (5.67)
S2r	155 (2.43)
S2rn	37 (0.58)
S3g	47 (0.73)
S3n	76 (1.2)
S3r	733 (11.52)
N1n	1807 (28.41)
N1r	192 (3.02)
N1t	343 (5.39)
N1rn	83 (1.31)
N1tn	1240 (19.5)
N1tz	674 (10.6)
N1zn	282 (4.43)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

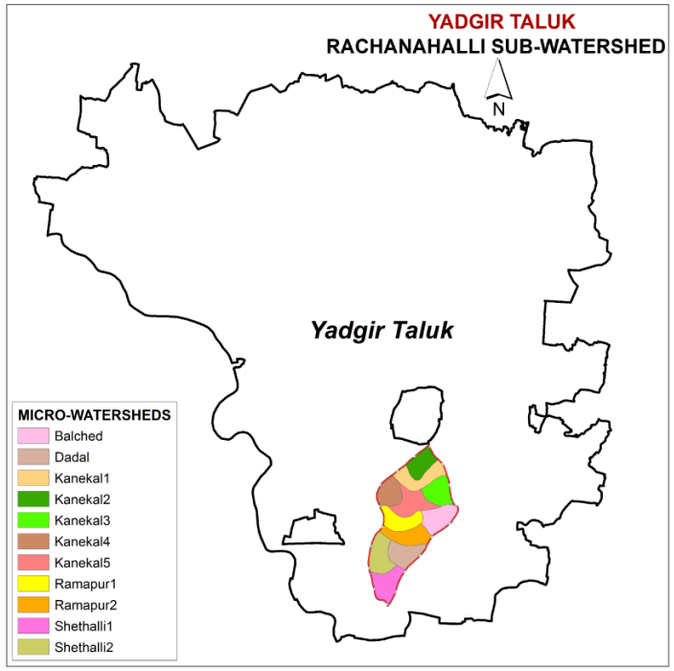
References

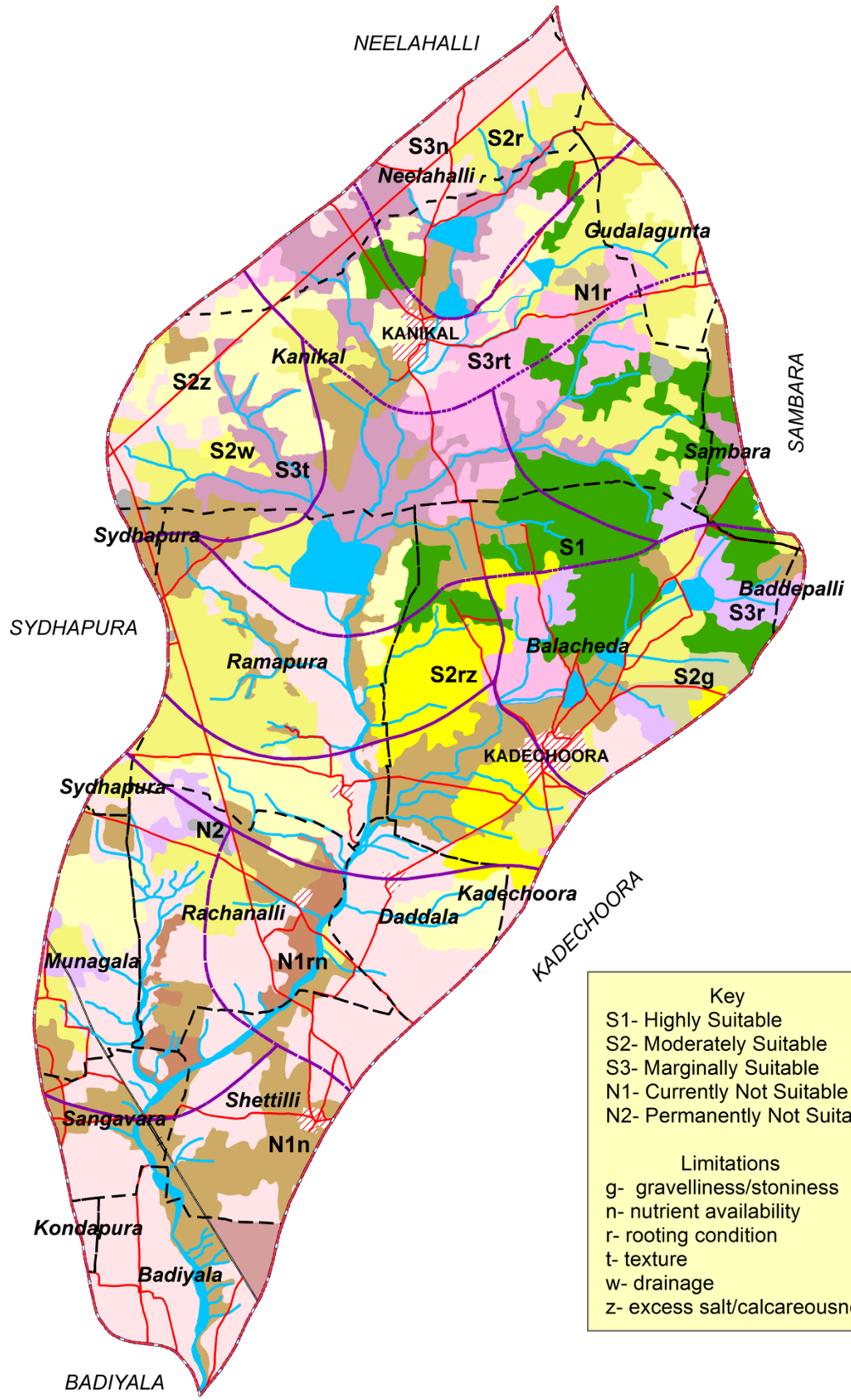
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Key
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

7.23. Land Suitability for Custard Apple





LAND SUITABILITY FOR CUSTARD APPLE

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	552 (8.68)
S2g	47 (0.73)
S2r	938 (14.74)
S2w	20 (0.31)
S2z	656 (10.31)
S2rz	282 (4.43)
S3n	1507 (23.69)
S3r	167 (2.63)
S3t	462 (7.26)
S3rt	348 (5.47)
N1n	945 (14.85)
N1r	25 (0.39)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

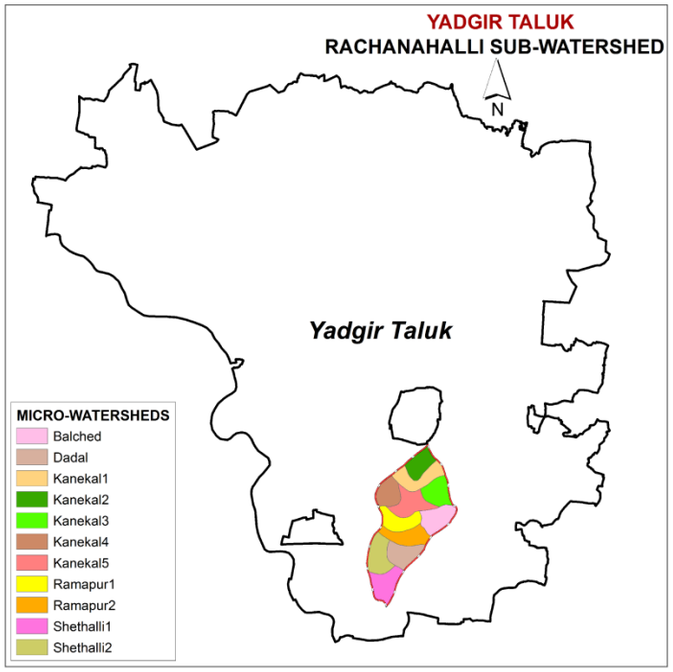
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

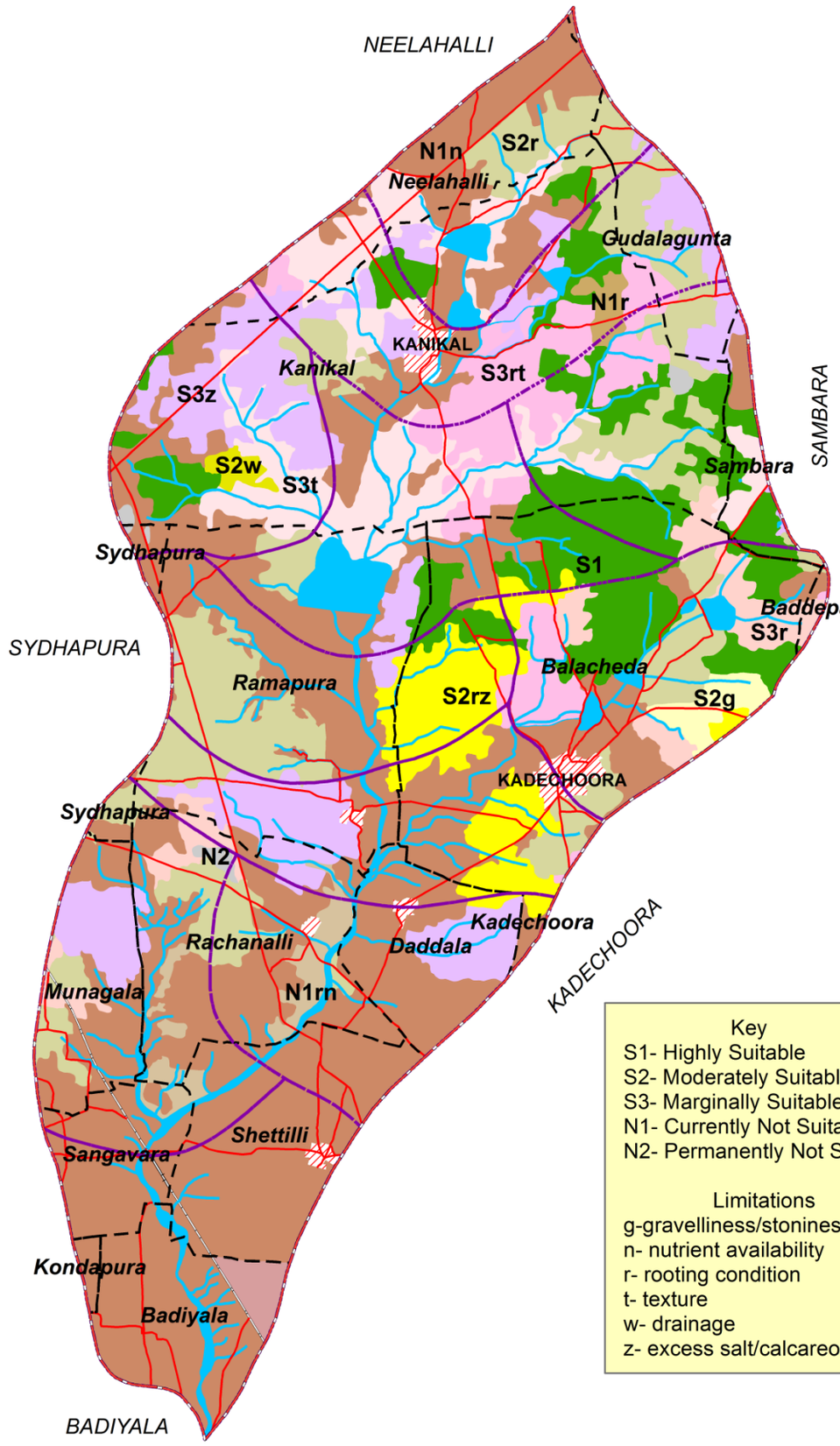
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.24. Land Suitability for Amla





LAND SUITABILITY FOR AMLA

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	629 (9.89)
S2g	47 (0.73)
S2r	861 (13.54)
S2w	20 (0.31)
S2rz	282 (4.43)
S3r	167 (2.63)
S3t	462 (7.27)
S3z	656 (10.31)
S3rt	348 (5.47)
N1n	2450 (38.52)
N1r	25 (0.39)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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

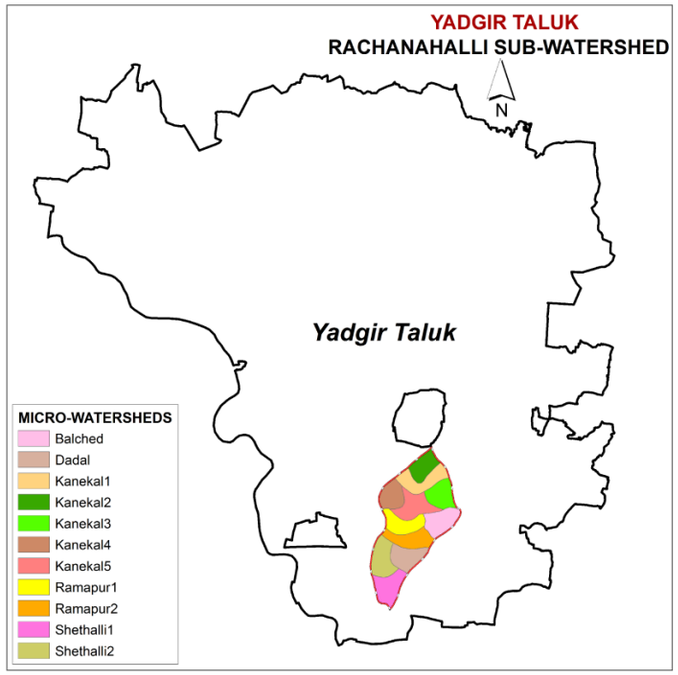
Limitations
g-gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

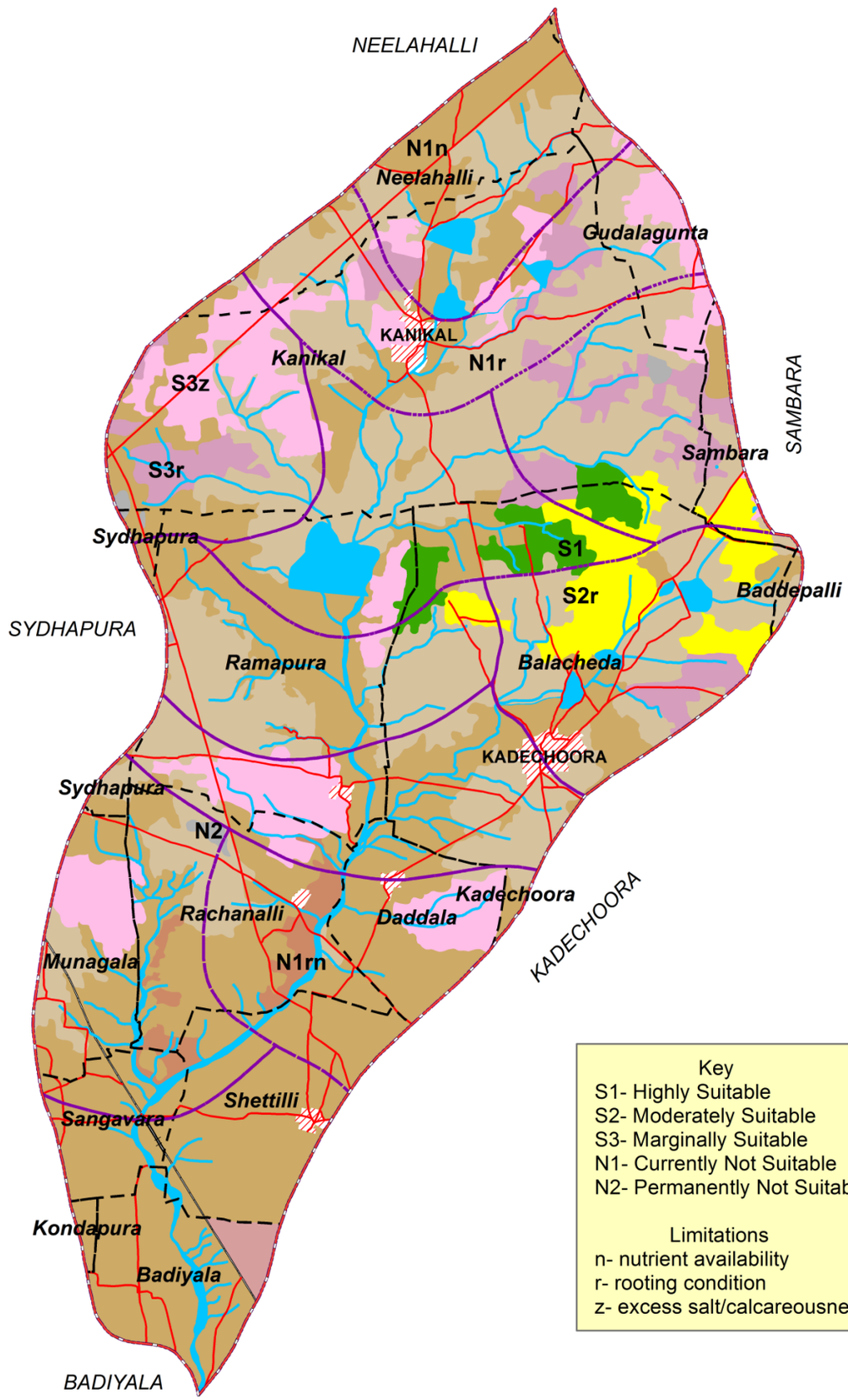
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.25. Land Suitability for Tamarind





LAND SUITABILITY FOR TAMARIND

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

References

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

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

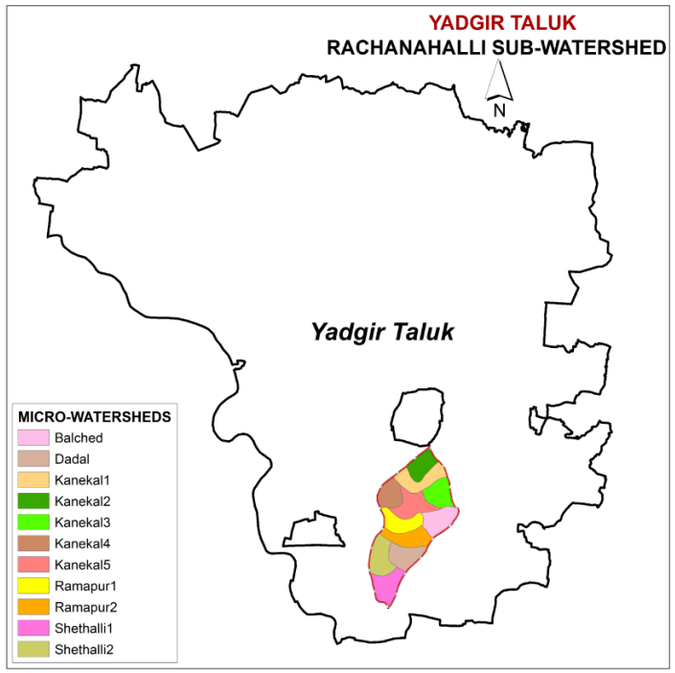
Limitations
n- nutrient availability
r- rooting condition
z- excess salt/calcareousness

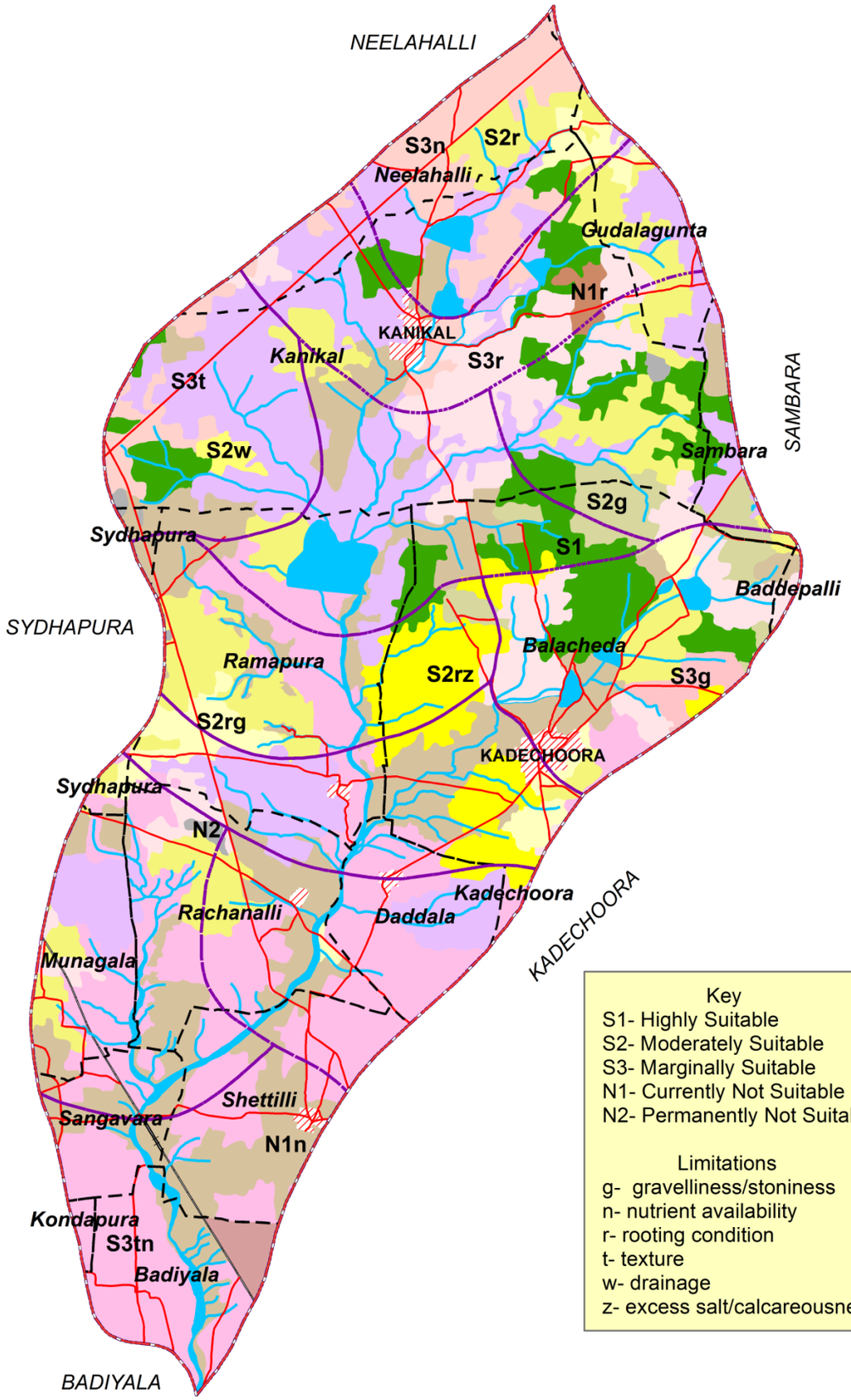
Suitability subclass	Area in ha (%)
S1	123 (1.93)
S2r	238 (3.74)
S3r	334 (5.25)
S3z	656 (10.31)
N1n	2452 (38.54)
N1r	2145 (33.72)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.26. Land Suitability for Brinjal





LAND SUITABILITY FOR BRINJAL

Rachanahalli Sub-watershed

(4D5B1P2d : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S3g	47 (0.73)
S3n	313 (4.92)
S3r	515 (8.1)
S3t	1118 (17.57)
S3tn	1194 (18.77)
N1n	1028 (16.16)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

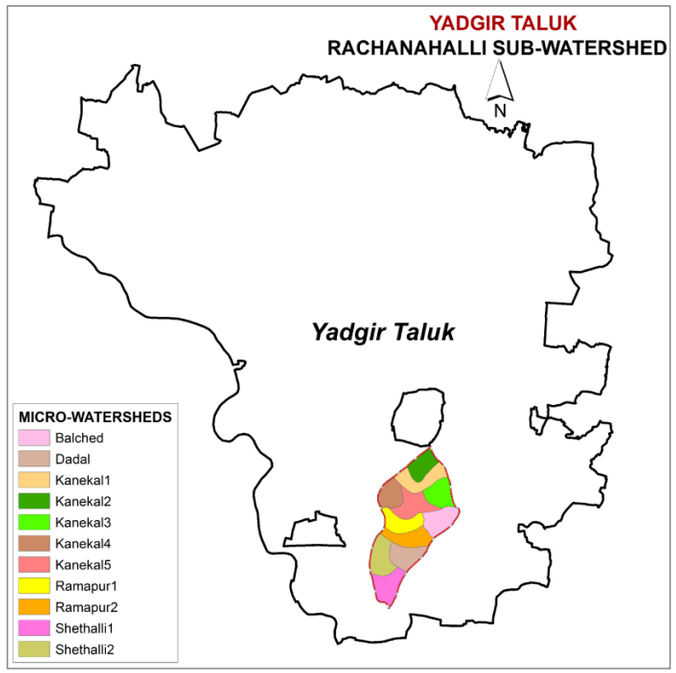
Source: ICAR-NBSS&LUP, Bengaluru

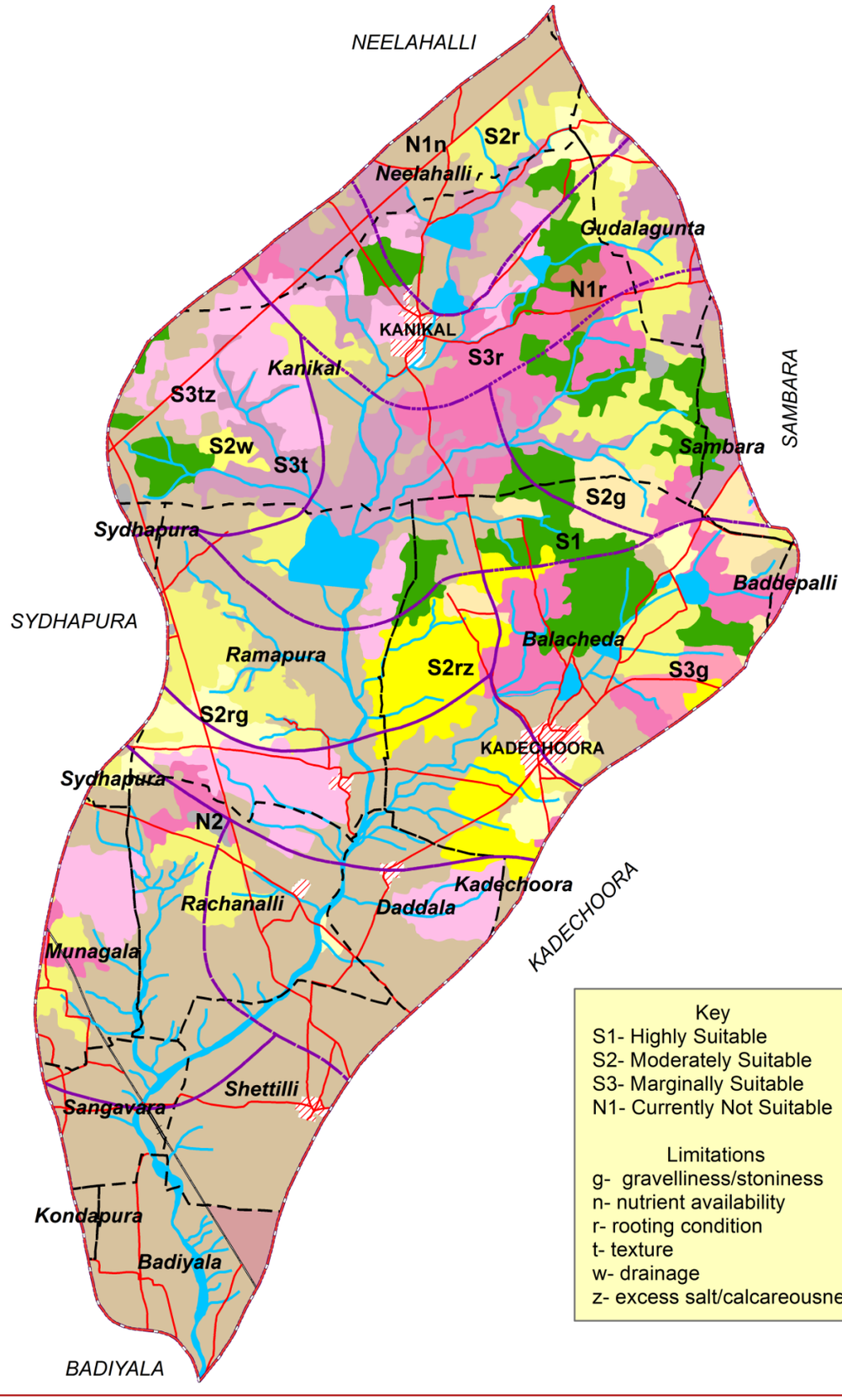
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

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

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

7.27. Land Suitability for Onion





LAND SUITABILITY FOR ONION

Rachanahalli Sub-watershed

(4D5B1P2d : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

km
0 1 2 4
N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S3g	47 (0.73)
S3r	515 (8.1)
S3t	542 (8.52)
S3tz	576 (9.05)
N1n	2535 (39.85)
N1r	25 (0.39)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

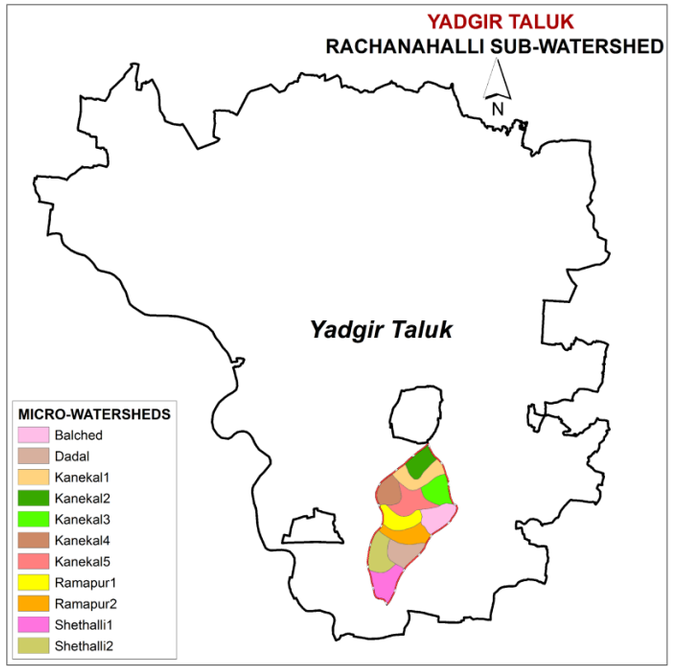
Source: ICAR-NBSS&LUP, Bengaluru

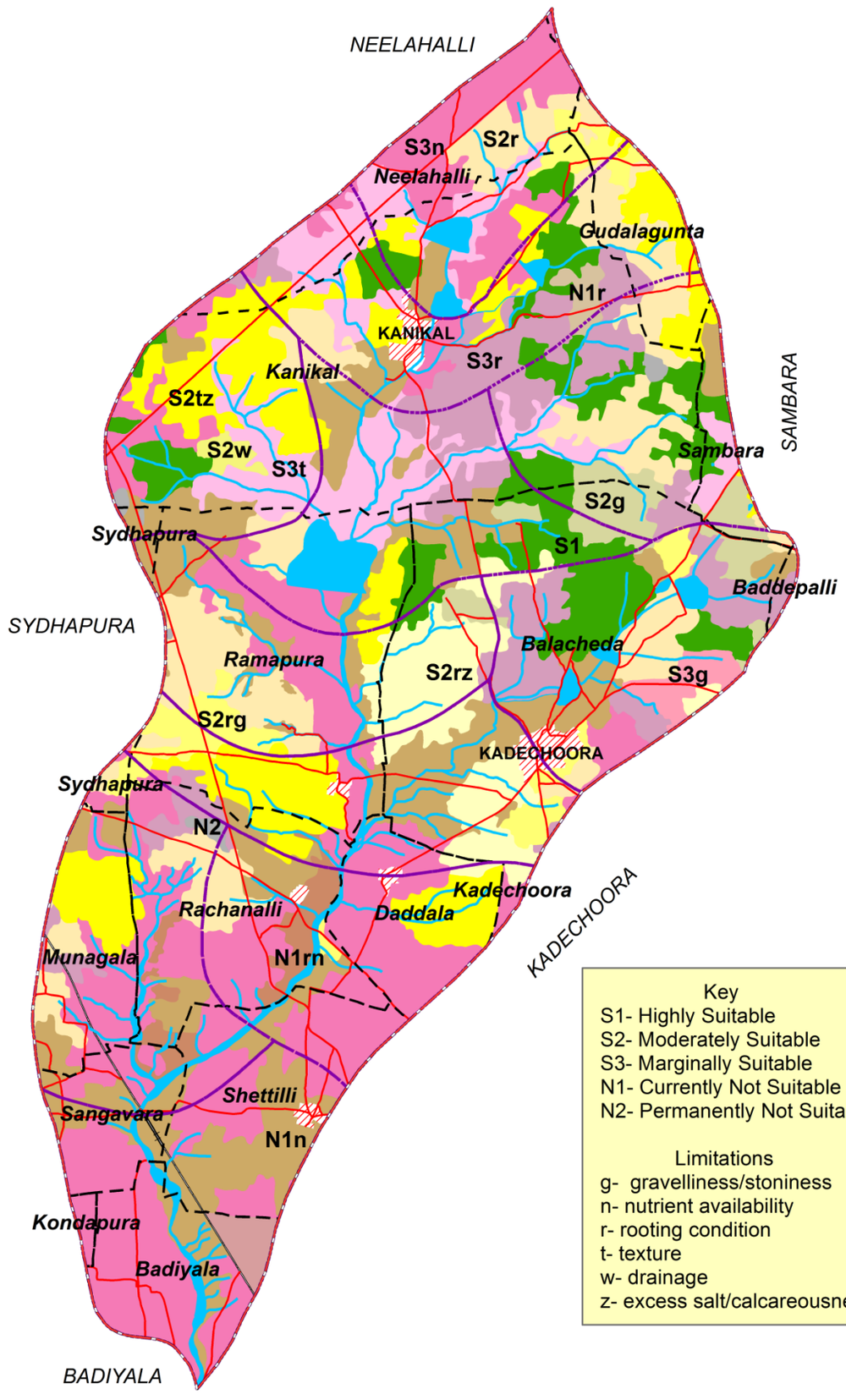
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

7.28. Land Suitability for Marigold





LAND SUITABILITY FOR MARIGOLD

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S2tz	656 (10.31)
S3g	47 (0.73)
S3n	1507 (23.69)
S3r	515 (8.1)
S3t	462 (7.26)
N1n	945 (14.85)
N1r	25 (0.39)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

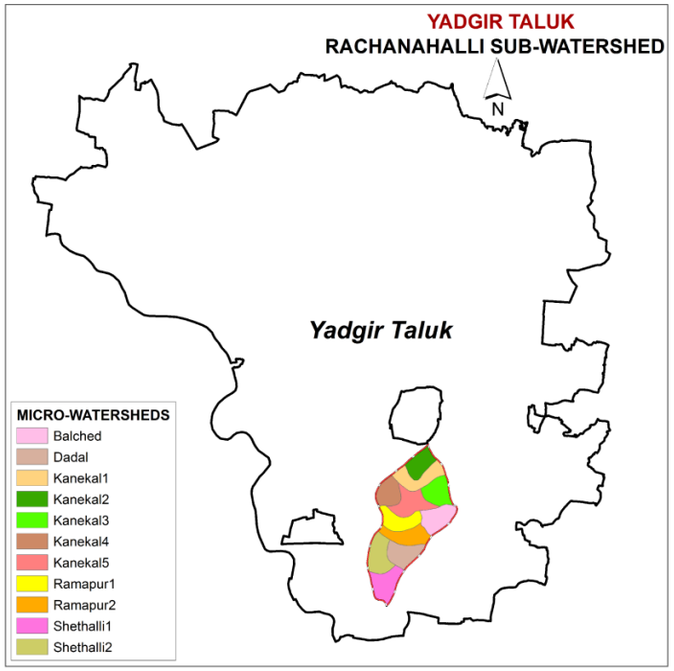
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable
N2- Permanently Not Suitable

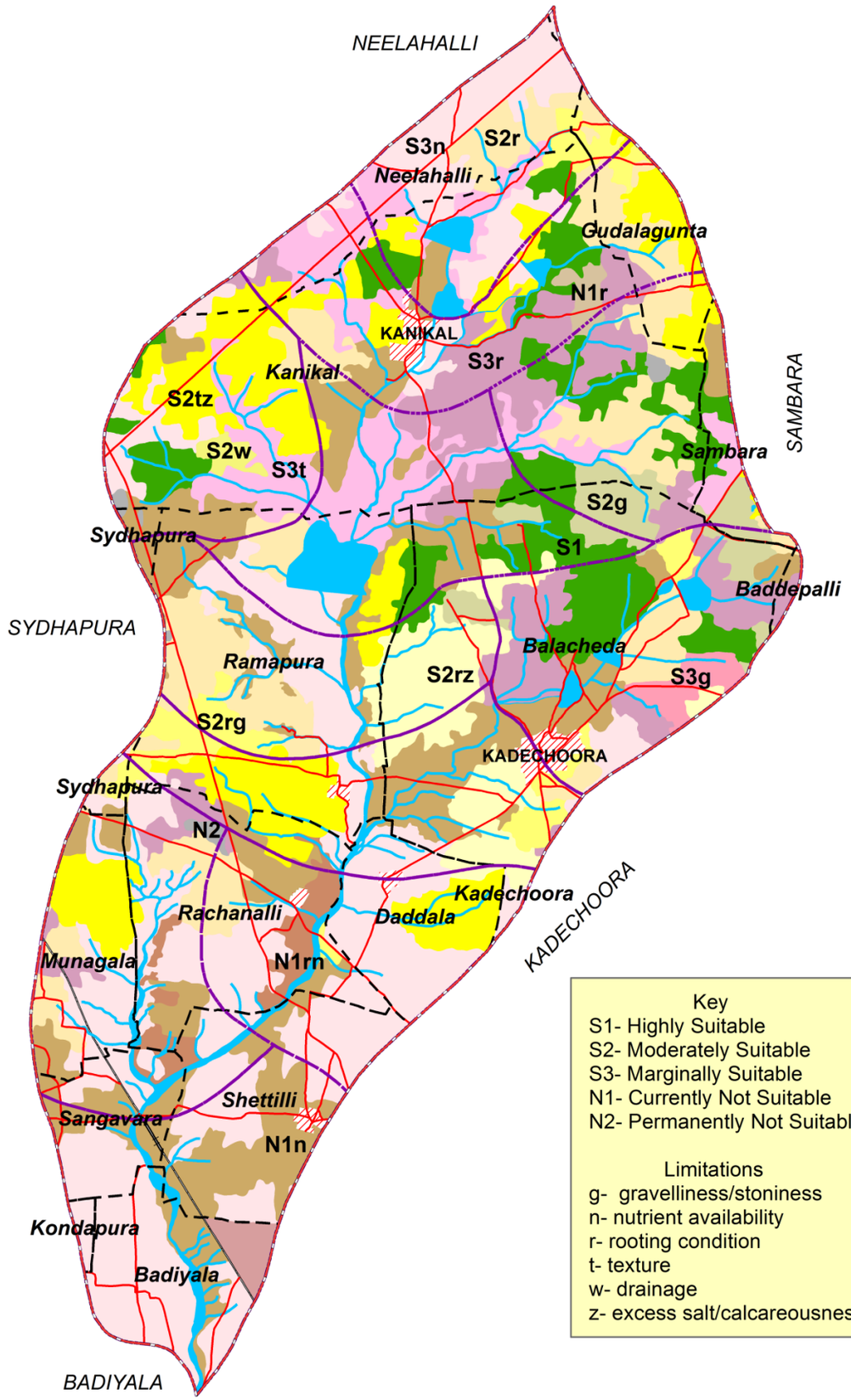
Limitations
g- gravelliness/stoniness
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

References

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

7.29. Land Suitability for Chrysanthemum





LAND SUITABILITY FOR CHRYSANTHEMUM

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

Suitability subclass	Area in ha (%)
S1	471 (7.41)
S2g	157 (2.48)
S2r	681 (10.7)
S2w	20 (0.31)
S2rg	180 (2.83)
S2rz	282 (4.43)
S2tz	656 (10.31)
S3g	47 (0.73)
S3n	1507 (23.69)
S3r	515 (8.1)
S3t	462 (7.26)
N1n	945 (14.85)
N1r	25 (0.39)
N1rn	83 (1.31)
N2	19 (0.3)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Others*	268 (4.21)

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
w- drainage
z- excess salt/calcareousness

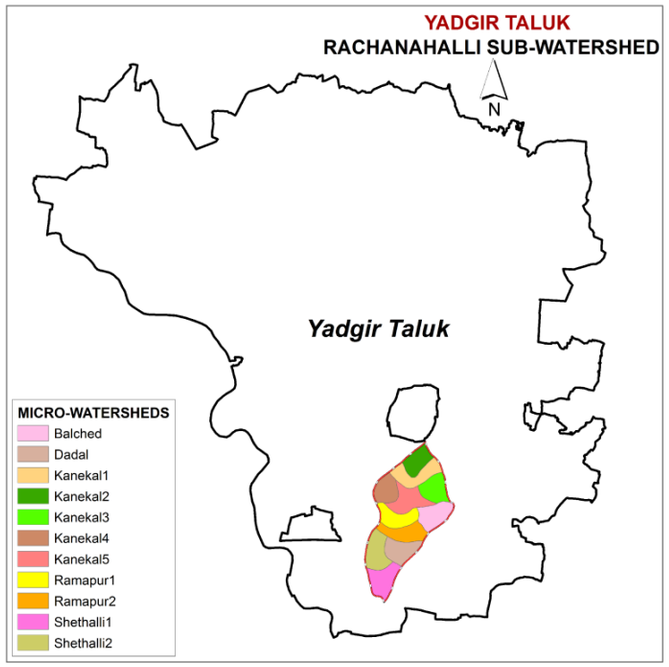
References
- Road/Cart track
- Streams/Drainage
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

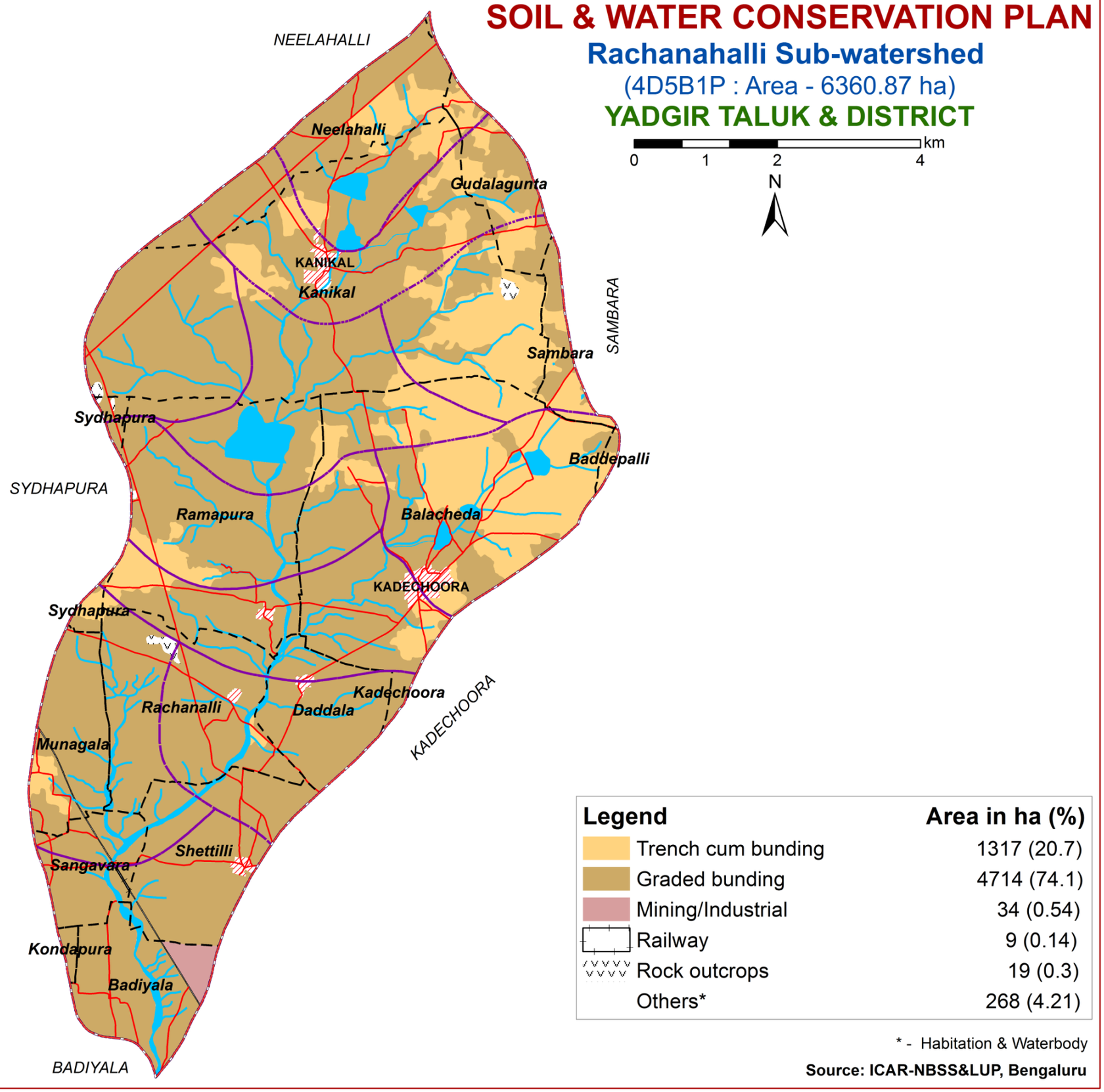
* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

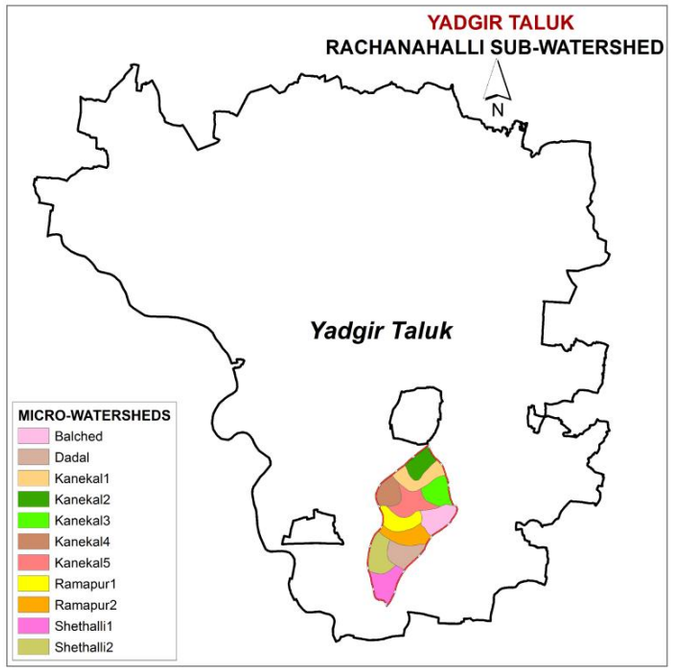
8. Soil and Water Conservation Measures

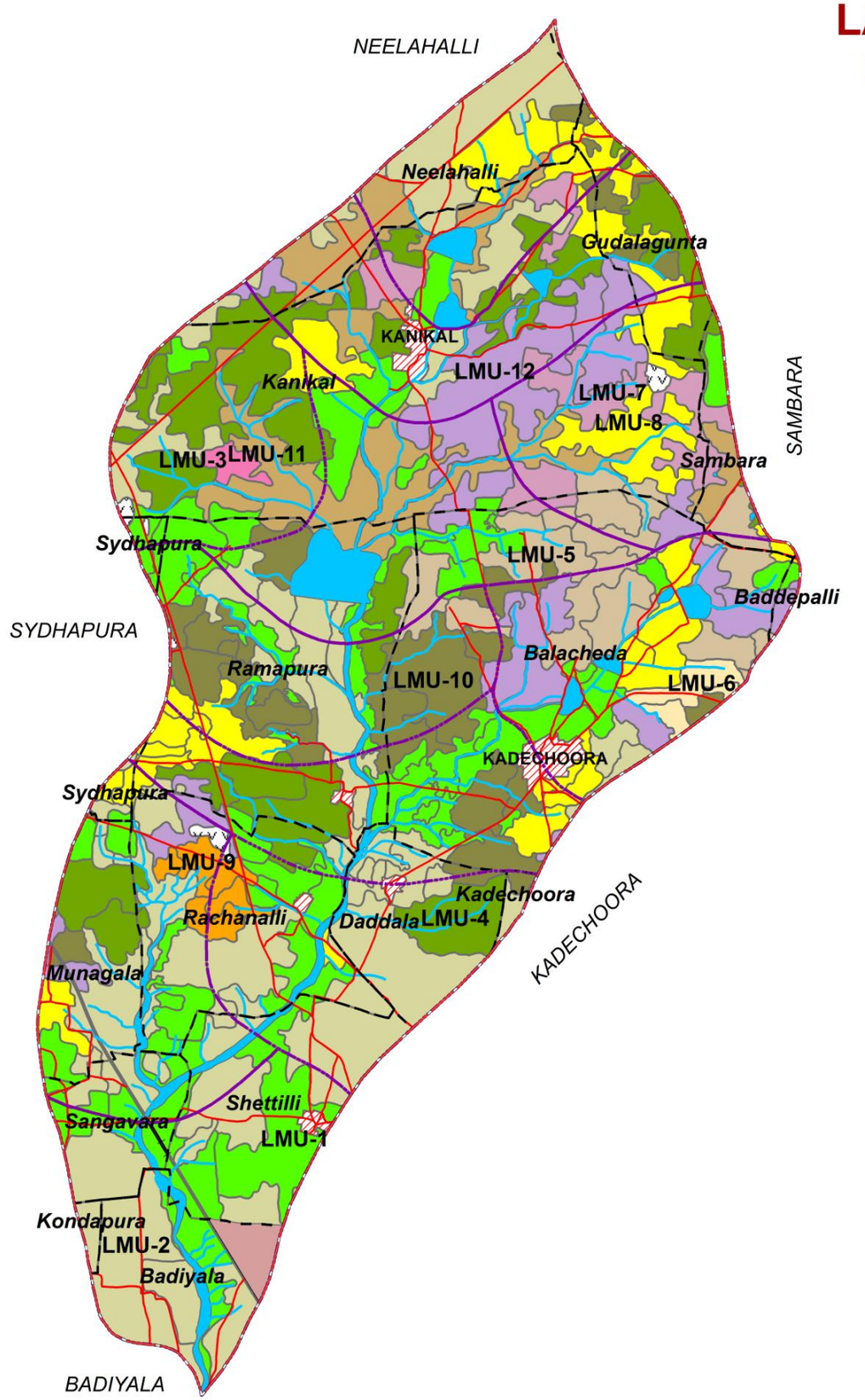
8.1. Soil & Water Conservation Plan





9. Land Management Units





References

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

LAND MANAGEMENT UNITS

Rachanahalli Sub-watershed

(4D5B1P : Area - 6360.87 ha)

YADGIR TALUK & DISTRICT

0 1 2 4 km

N

LMU	Area in ha (%)
LMU-1	1047 (16.47)
LMU-2	1507 (23.69)
LMU-3	20 (0.31)
LMU-4	732 (11.51)
LMU-5	361 (5.67)
LMU-6	47 (0.73)
LMU-7	192 (3.01)
LMU-8	578 (9.09)
LMU-9	72 (1.13)
LMU-10	494 (7.76)
LMU-11	462 (7.26)
LMU-12	540 (8.49)
Mining/Industrial	34 (0.54)
Railway	9 (0.14)
Rock outcrops	19 (0.3)
Others*	268 (4.21)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

NOTE: *Proposed Crop Plan for LMUs are given in Table*

10. Table. Proposed Crop Plan for Rachanahalli Sub-watershed, Yadgir Hobli, Yadgir Taluk, Yadgir District based on soil-site–crop suitability Assessment

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
1	35.GWDiB2 42.YDRcB2 43.YDRiB2 51.ANRbB2g1 53.ANRhB2 55.ANRiB2 56.ANRiB3g1 67.GDLcB3 77.RHNcB2 79.RHNmB2 97.MYPhB2 98.MYPiB2g1 104.TMKiB2 105.TMKiB3 (Sodic soils)	**Badiyala:** 23/3,28,29,32,33,34,50,531 **Balacheda:** 4,5,6,7,8,9,10,11,12,13,14,15,47,152,161,174,176,177,178,179,180, 181,182,183,184,185,186/1,186/2,187,22,23,232,234,236,237/1, 26,27,28,282,285,286,287,288,289,29,290,291,292,293,294,295, 296,297,298,299,30,300,301,302,303,304,305,306,307,308,309,31, 312,32,325,33,331,332,333,334,336,339/2,368,372,373,374,375, 376,378,379,381,388,389,390,391,392,393,394,395,396,397,398, 399,400,401,402,403,404,405,406,878,79,8,80, 83,84 **Kanikal:** 102,103,104,105,106,107,108,109,110,111,112,113,114,115,116, 126,127,128,129,130,132,176,200,201,209,226,254,255/1,255/2, 255/3,347,433,434,435,436,437,438,439,440,441,446,447,448,449, 450,451,452,453,454,455,456,457/2,459,460,461,462,463,464,465, 466,48,49,5,50,51,54,55,56,57/1,57/2,58,86 **Munagala :** 215,222,223,224,225,65,68,70 **Rachanalli :** 10,11,112,113,114/1,114/2,119,120,121,122,123,124,13,14,15,16, 17,18,19,2,20,21,22,23,24,25,26,27,28,29,3,30,31,32/1,32/2,35,4, 40,41,42,43,50,6,62,63,64,65,66,69,70,72/2,80,81,86,90/1,90/2, 90/3,91/1,91/2 **Ramapura:** 103,104,114,136,137/1,145,146,147,148,149,169,51/1,51/2,56,67, 68,69,70,71,72,73,74,77,78,79,80,86,91 **Sambara:** 26,27,28/1,28/2,30/2,30/3,31 **Sangavara:** 12,23,25,26,27,29,36,37,38,39,44,45,48,49,50 **Shettilli:** 1,102,103/1,103/2,109,110/1,110/2,111,112,113,118,119,121,122, 123,124/1,124/2,126,127,128,131/1,131/2,132,133,134,136,137, 138,139,140,141/1,141/2,17,2,20,21,25,26,27/1,27/2,29,3/1,3/2, 30,31/1,32/2,32,33,36,4,43,44/1,5,76,77,88/1,89/1,89/2,90,91 **Sydhapura :** 90,91,92,93,96,97,157	-	**Agri-Silvi-Pasture** 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

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
2	57.MDGcB2 58.MDGiB2 61.MDRmB2 84.KDRcB2 85.KDRcB3 87.KDRiB2 89.KDRmB2 92.HGNcB2 93.HGNiB2 95.HGNmB2 (Deep to very deep strongly alkaline soils)	**Badiyala :** 159,160,161,23/1,23/2,24,25,26,27,30,49,51/1,51/2,523,524,525,526,527,528,529,530,532,533,534,535,536,537,538,539,540,541,542,543,544,545/1,545/2,546,547,548,549,550,551,552,553,554,566,567,568,569,570,571,572,573, 575 **Balacheda :** 192,193,211,212,213,228,230,231,243,249,329,330 **Daddala :** 8,9,10,11,12,13,14,15/1,15/2,16,17/1,17/2,18,19,2,3,4,41,42,45,46,47,48,49,5,50,53,54,55,56,57,58,59,60,61/1,61/2,62,63,64,65,66,67,68,69,70,71/1,71/2,72,73,74,75, 76, 77,78 **Gudalagunta :** 86,87,88 **Kadechoora :** 287,291,292,293 **Kanikal :** 6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,24,25,26,27,28,29,30,31,32,33,34,43,44,45,46,47,66,68,164,172,173,179,180,182,183,185,186,187,188,192,207,208,271,272,275,280,281,282,292,293,294,397,398,400,401,402,403,442, 443,444 **Kondapura:** 15,16,17,18,19 **Munagala :** 69,82,83,84,85,86,87,88,91,217,218,219,220, 221 **Neelahalli :** 193,195,196,198,218,236,237,238,239,240,257,258,259,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,295,297,298,299,300,301,302,303/1,303/2,304,306,307,308,309,310, 311,348,350,368,377,378 **Rachanalli :** 101,107,108,109,12,36,37,38,44,45,46,47,48,49,51,52,53,55,56,57,58,59,60,61,67,68,71,72/1,73,74,75,76,77,78,79,8/1,8/2,82,83/1,83/2,85,9,96,98 **Ramapura:** ,31,75,76,87,88,89,90,94,105,106/1,106/2,106/3,134,137/2,137/5,138,139,140/1,140/2,141,142,143,144,150,151,152,153,154,155,156/1,156/2,157,158,159,160,161,162,163,164/1,164/2,165,166,167,168,170,171,183,184,186,187,188/1,188/2,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,220,221,222,223,224,225,226,227,228,229,230,231,232, 233,234, 239 **Sangavara:** 141,24,28,30,31,32,33,34,35,40, 41/1,41/2,42,43,47,51,52,53,54,55,56,57,58,59,60 **Shettilli :** 10,104,105,106,107,108,11,114,115,116,117,12,120,125,129,13,130,135,14,15,16,18,19,22,23,24,28,34,35,37,38,39,40,41,42/1,42/2,42/3,42/4,44/2,45/1,45/2,46,47/1,47/2,48,49,50,51,52/1,52/2,53,54,55,56,57,58,59,6,60,61,64,7,8,9, 92 **Sydhapura:** 158,159	Sorghum, Maize, Bajra	**Agri-Silvi-Pasture** 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

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
3	99.KDHcB2 (Moderately deep, lowland sandy clay soils)	**Kanikal :** 143,156,163	Maize, Sorghum, Sunflower, Groundnut, Red gram, Bajra	**Fruit crops:** Amla, Tamarind **Vegetables:** Tomato, Onion**,** Bhendi, Chilli, Brinjal, Drumstick,, Coriander **Flowers:** Marigold, Chrysanthemum	Providing proper drainage, addition of organic manures, green leaf manuring, suitable conservation practises
4	32.HSLcB2 33.HSLiB2 47.NGPbB2 48.NGPiB2 49.NGPmB2 62.BMNmB2 90.SWRcB2 91.SWRmB2 (Moderately deep to very deep, black calcareous clay soils)	**Daddala :** 21,22,23,24,25,27/1,27/2,28,29,30,31,32,33, 34,35,36,37,38,39,40,43,44,51,52 **Gudalagunta :** 36,37,39,40,41,42,48,49,50,51,52,55,56,57, 58,60,62, 68,78 **Kanikal :** 124,125,133,134,135,136,148,149,150,151, 152,154,162,166,167,168,169,170,171,174, 175,177,178,181,189,190,191,193,194,195, 196,197,198,199,202,203,206,211,212,213, 214,215,216,217,218,219,220,221,227,229, 231,233,234,248,249,250,251,265,266,268, 269,295,296,298,299,300,379,387,389,391, 392,394,395,396,399,404,405,406,409 ,410,412,416,417,418 **Munagala :** 71,72,73,74,75,77,78,79,80,81,92,94,95 **Neelahalli :** 197,219,221,222,225 **Rachanalli :** 5,7,84,100/1,100/2,115,116,117, 118, **Ramapura:** 1,3,4,10,11,12,13/1,13/2,14/1,14/2,15,16, 17,18,24,25,26,27,28,115,120,121,123,124, 125,126,127,185,19,2/1,2/2,20,21,219,22, 23,235/1,235/2,236, 48,5,6,7,8/1,8/2,9 **Sambara :** 20,45,66/2,69	Maize, sorghum, Sunflower, Cotton, Red gram, Bengalgram, Bajra	**Fruit crops:** Lime, Musambi, Custard apple, Pomegranate **Vegetables:** Chilli, Bhendi **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
5	44.GDGbB2 45.GDGbB3g1 46.GDGiB2 64.BMDcB2 65.BMDiB2g1 (Deep to very deep, red sandy clay loam soils)	**Balacheda :** 100,101/1,101/2,102,103,104,105,106, 107,108,111,112,113,114,115,116,117, 119,120,121,122,132,135,149,150,151, 156,158,159,160,162,168,169,170,358, 363,365,366,367,377,382,383,58,60,61 ,62,63,64,65,66/1,66/2,67,68,72,75,77, 81,85,86,88,89,90,91,93,94,95, 96,97,98/1,98/2,98/3,99 **Kanikal :** 331,332,338,339 **Ramapura :** 116,122 **Sambara :** 41,42,43,44,67,68	Sunflower, Sorghum, Maize, Groundnut, Red gram, Bajra	**Fruit crops:** Mango, Musambi, Sapota, Tamarind, Pomegranate, Amla, Custard apple, Guava, Jackfruit, Jamun, Lime **Vegetables:** Tomato, Onion**,** Bhendi, Chilli, Brinjal, Drumstick, Coriander **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
6	39.KBDbB3 (Moderately deep, red gravelly sandy clay loam soils)	**Balacheda :** 131,172,188,189,190,196,199,201	Groundnut, Bajra, Horse gram, Castor, Mulberry	**Fruit crops:** Musambi, Lime, Jamun, Jackfruit Amla, Custard apple, Tamarind **Vegetable crops:** Drumstick, Curry leaves	Drip irrigation, mulching, suitable soil and water conservation practises (Crescent Bunding with Catch Pit etc)
7	38.BLCiB2 40.PGPcB2 41.PGPiB2 (Moderately deep red sandy clay to sandy clay loam soils)	**Balacheda :** 92 **Kanikal:** 252,257,258,259,260,261,262,263,264, 286, 288,297,315,316,317,319,326,327,334, 340, 341,342, 343,344,346,362,363,368,370, 371,384,458 **Sambara:** 32/1,32/2,37	Sunflower, Sorghum, Maize, Groundnut, Red gram, Bajra	**Fruit crops:** Musambi, Sapota, Pomegranate, Amla, Custard apple, Guava, Jackfruit, Jamun, Lime **Vegetables:** Tomato, Onion**,** Bhendi, Chilli, Brinjal, Drumstick, Coriander **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
8	25.DPLcB2 26.DPLiB2 27.YLRbB2 29.YLRcB2g1 31.YLRiB2 (Moderately shallow, sandy clay soils)	**Baddepalli :** 546 **Balacheda :** 118,124,125,126,127,128,129,130/1, 130/2,133,134,136,137,138,140,141, 142,143,144,148,153,154,173,229,233, 241,242,244,245/1,245/2,246,247,248, 263,264,265,266 **Gudalagunta :** 38,43,44,45,47,59,64,66,67,69,70,72, 73, 74,75,76,77,81,82 **Kanikal:** 131,222,223,224,225/1,225/2,243,244, 245,246,287,289,291,304,314,321,322, 323,324,325,328,333,335,336,337,355, 356,357,359,360 **Munagala :** 206,207,211,212,213,214,216 **Neelahalli :** 241,242,244,245,246,247,248,249,250, 251,252,253,254,255,256, 261 **Rachanalli :** 34 **Ramapura :** 32,33,34,35,36,38,39,40,41,42,43,44, 45, 46,47,49,50,57 **Sambara :** 71 **Sydhapura :** 149,154,155,156,160,161	Maize, sorghum Groundnut, Bajra, Cotton	**Fruit crops:** Amla, Custard apple **Vegetables:** Tomato, Chilli, Brinjal, Bhendi, Onion **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
13	73.BLDcB2 75.BLDiB1g1 (Moderately shallow, clay loam soils)	**Munagala :** 99 **Rachanalli :** 54,87,88,89,92,93,94,95,97,99, 103,104	Maize, sorghum Groundnut, Bajra, Cotton	**Fruit crops:** Amla, Custard apple **Vegetables:** Tomato, Chilli, Brinjal, Bhendi, Onion **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
10	14.HLGbB2g1 15.HLGbB3 16.HLGcB2 18.HLGiB2g1 19.HLGiB3g1 20.JNKcB2 21.JNKcB2g1 70.RMPcB2 71.RMPiB2 (Moderately shallow, sandy clay loam soils)	**Balacheda :** 200,260,261,262,267,268,269,270, 271,272,274,275,276,277,278,279, 280,281,310,311,313,314,315,316, 317,318,319,320,321,322,323,324, 326,327,328,337,338,339/1,340,34 1,342,343,344,345,346,347,348,34 9,350,351,352,353,354,355,356,35 7,359,360,361,362,364,380,384,38 6,55,73,76 **Daddala:** 20/1,20/2,26 **Gudalagunta :** 61,63,71,83,84,85,96 **Kadechoora :** 285,286 **Kanikal :** 290 **Munagala :** 210,90,96,97/2 **Neelahalli :** 260 **Ramapura :** 100,101,102,107,108,128,129,130, 131,132,133,135,137/4,172,173, 174,175,176,177,178,179,180,181, 182/1,182/2,52,53,54,55,58,59,60, 61,62,65,66,81,82,83,84,85,92,93,9 5,96,97,98,99	Maize, sorghum Groundnut, Bajra	**Fruit crops:** Amla, Custard apple **Vegetables:** Tomato, Chilli, Brinjal, Bhendi, Onion **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices

To be continued….

LMU. No	Soil Map Units	Survey Number	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
11	11.SBRcB2 12.SBRcC3g1 (Moderately shallow, loamy sand soils)	**Balacheda :** 369 **Kanikal :** 84,85,87,88,89,90,91,92,93,94,95,96,97,98,99, 100,101,117,118,119,120,121,122,123,137,138 ,139,140,141,142,144,145,146,147,153,155, 157,158,159,160,161,165,210,235,236,237,238 ,239,240,241,242,247,253,256,267,270,276, 279,283,284,285,350,351,352,353,354,358,361 ,374,445, 457/1, **Neelahalli :** 216,223,224,227,228,229,230,231,232,233,234 /1,234/2,235,243,305,351,352,353/1,353/2, 354/1,354/2,355/1,355/2,356/1,356/2,357,358 ,359,360,361,362/1,362/2,363,364,365,366, 367,369,370 **Ramapura :** 111,112,113 **Sambara:** 34,35,36,38,39,40	-	**Agri-Silvi-Pasture:** Hybrid Napier*, Styloxanthes hamata, Styloxanthes scabra*	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
12	1.BDPiB2 3.BDLbC3 5.BDLiB2 9.VNKcB2 68.KYTcB2 (Shallow to very shallow, soils)	**Baddepalli :** 458,461,462,463 **Balacheda:** 39,41,43,44,45,46,47,48,49,50,51,52,53,54,56, 57,59,69,70,71,74,87,109,110,147,155,157,16, 163,164,165,166,167,17,172,18,19,191,194, 195,20,21,24,25,258,34,35,36,37,370,371,38, 385,387 **Gudalagunta:** 46,65 **Kanikal:** 22,23,59,60,61,62,63,64,65,67,69,70,71,72,73, 74,75,76,77,78,79,80,81,82,83,301,302,303, 305,306,307,308,309,310,311,312,313,320,329 ,330,345,348,349,364,365,366,367,369,372, 373,375,376,377,378,380,381,382,383,385,386 ,388,393,407,408,411,413,414,415,419,420, 421,422,423,424,425, 426,427 **Munagala:** 198,199,209,89,97/1,98 **Neelahalli:** 200,217,220,226 **Rachanalli:** 102,106,110,111 **Ramapura:**29,30	-	**Agri-Silvi-Pasture**:s Hybrid Napier*, Styloxanthes hamata, Styloxanthes scabra*	Use of short duration varieties, sowing across the slope, drip irrigation is recommended

PART-B

Hydrological Inventory of Rachanahalli 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

THE WORLD BANK

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

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

ICAR - NBSS & LUP

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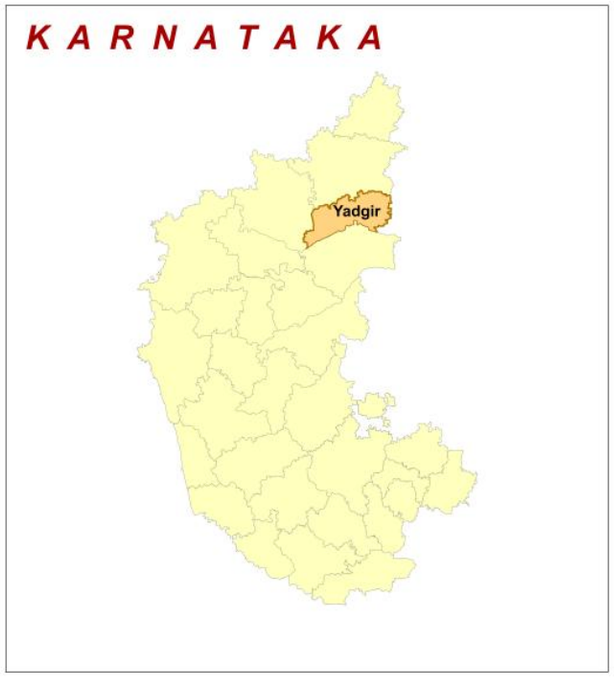
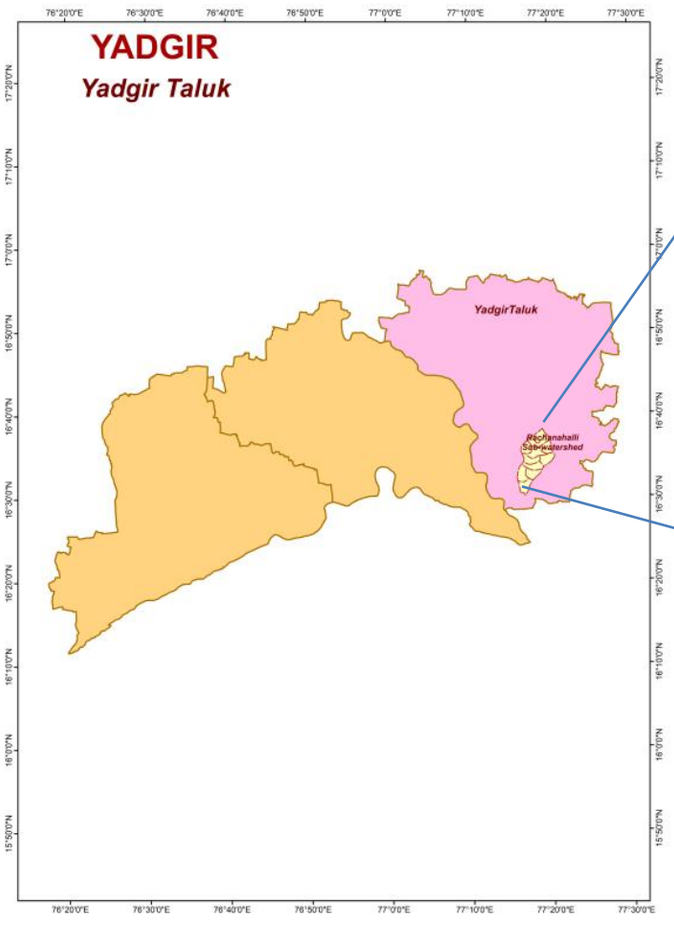
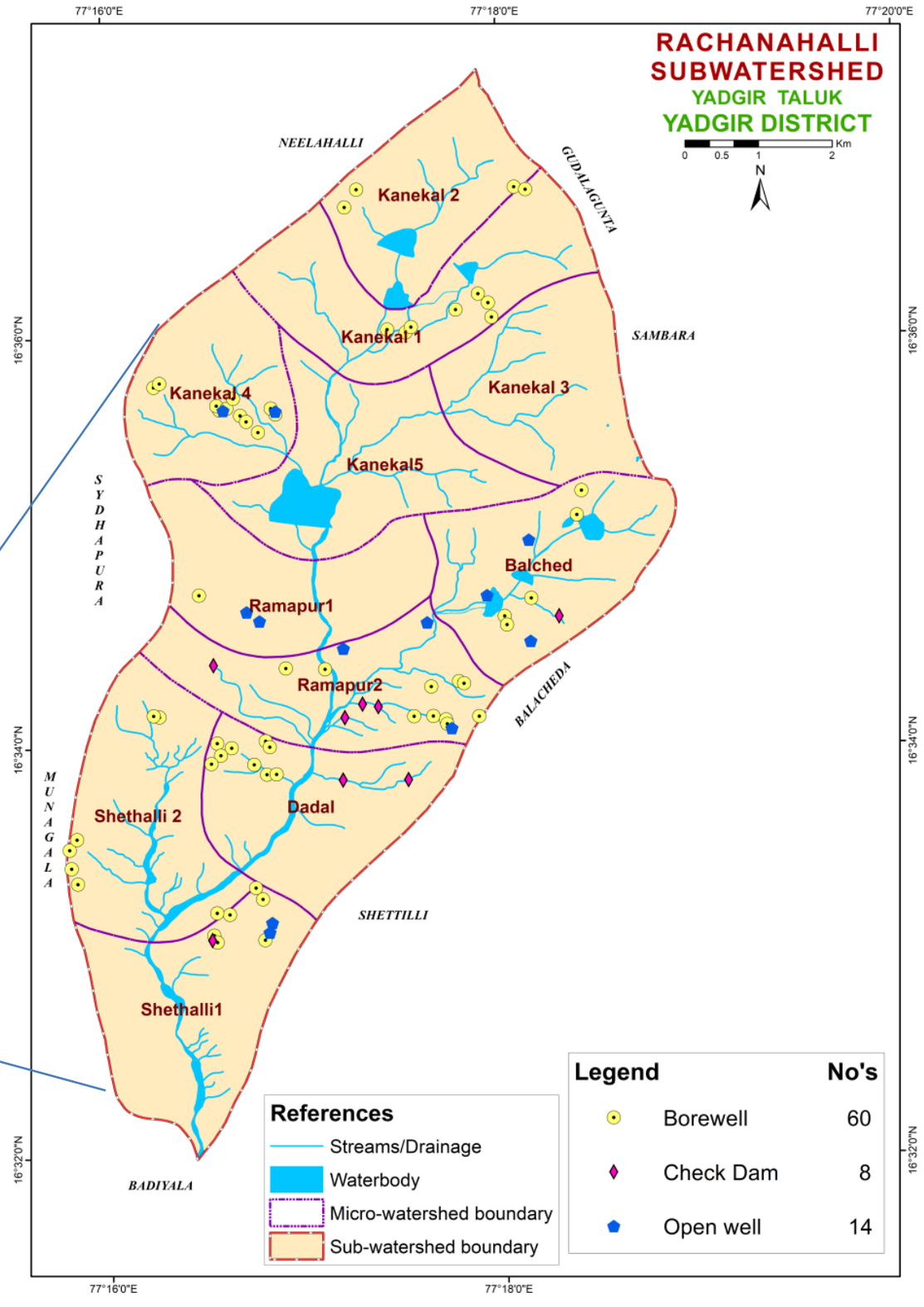
INTRODUCTION

- The inventory and documentation of spatial and temporal changes in hydrological components of Rachanahalli sub-watershed (4D5B1P) in Yadgir taluk, Yadgir district, has been undertaken for integrated planning, development and management at the level of soil mapping units.
- Rachanahalli sub-watershed (Yadgir taluk, Yadgir district) is located between $16^0$30’2’’–$16^0$37’39’’ North latitudes and $77^0$14’30’’–$77^0$21’45’’ East longitudes, covering an area of about 6359 ha.
- This sub-watershed encompasses of 11 MWs namely, Balched (4D5B1P2b), Dadal (4D5B1P2d), Kanekal-1 (4D5B1P1b), Kanekal-2 (4D5B1P1a), Kanekal-3 (4D5B1P1c), Kanekal-4 (4D5B1P1d), Kanekal-5 (4D5B1P1e), Ramapur-1 (4D5B1P2a), Ramapur-2 (4D5B1P2c), Shethalli-2 (4D5B1P2e) and Shethalli-1 (4D5B1P2f) micro watersheds. Land Resource Inventory (LRI) was generated for all the eleven 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, Sunflower, Redgram, Groundnut, Cotton, Chilly, Soybean , Paddy and major *rabi* crops are Sorghum, Bengal gram and 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 RACHANAHALLI SUB-WATERSHED

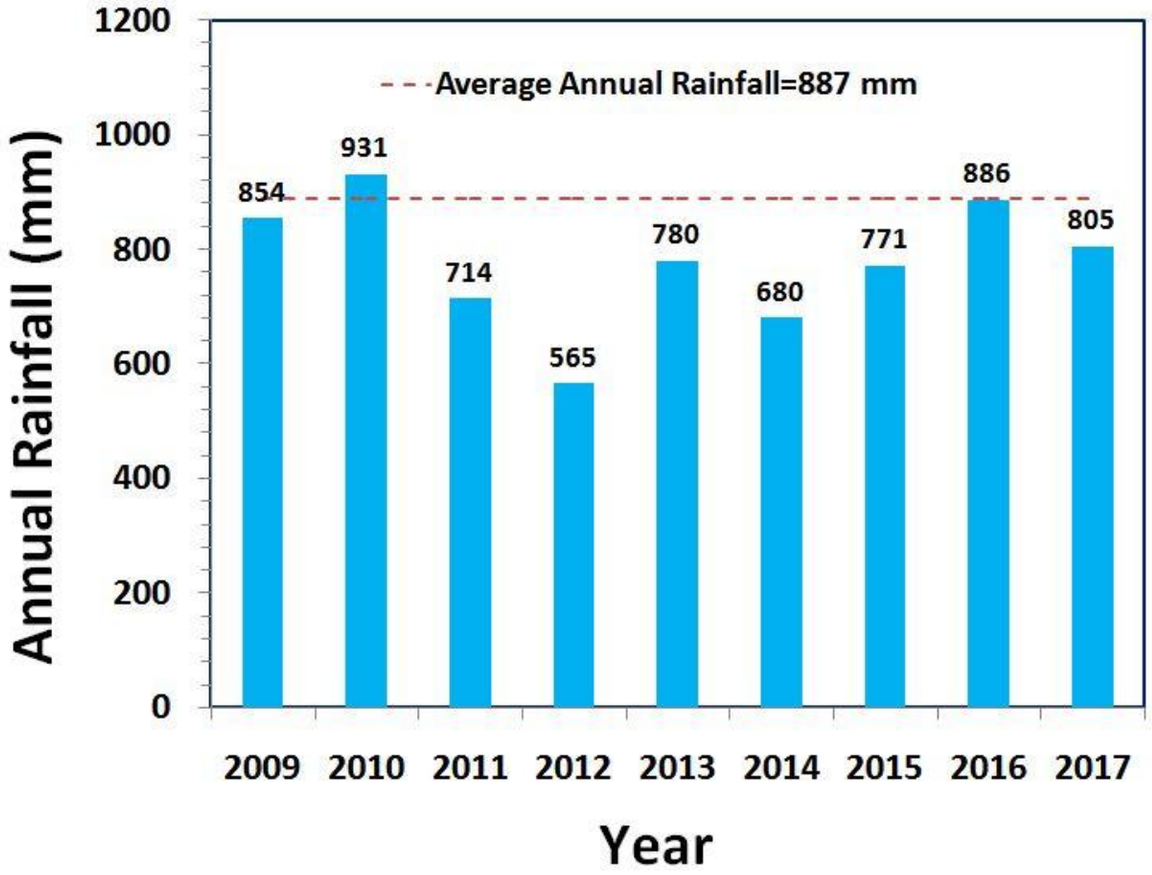






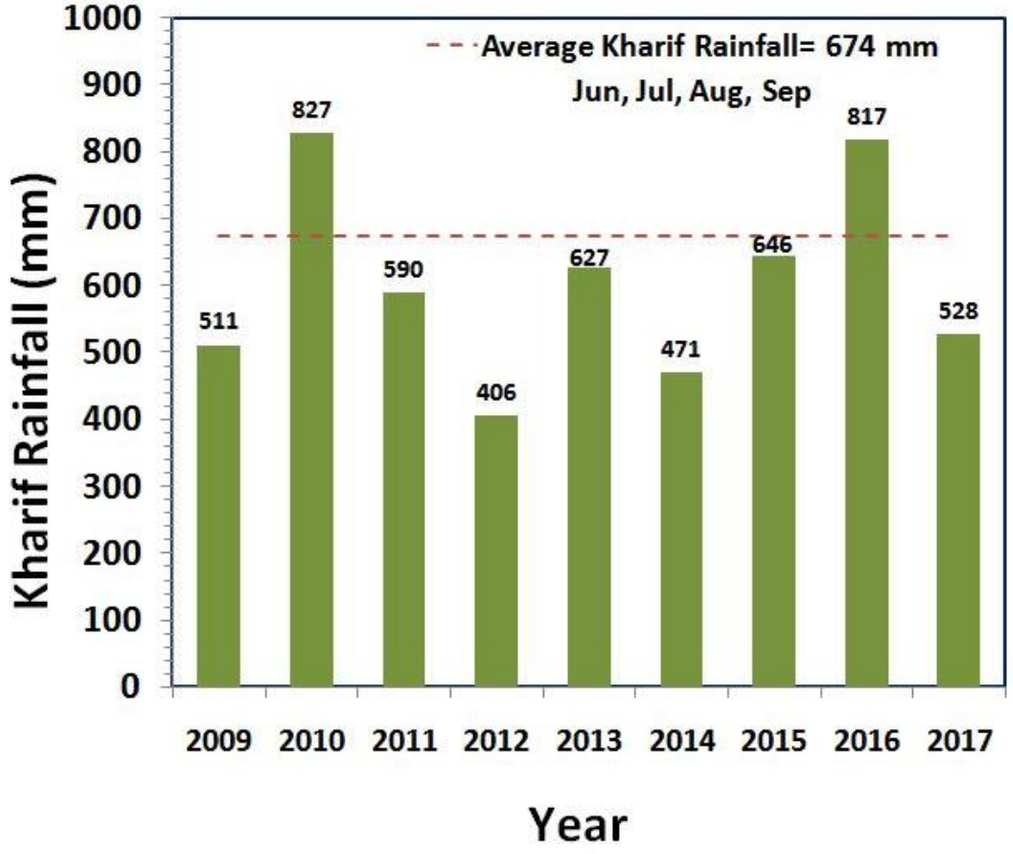
Soil & Water Conservation Structures in Rachanahalli Sub-watershed, Yadgir taluk, Yadgir district

RAINFALL INDEX

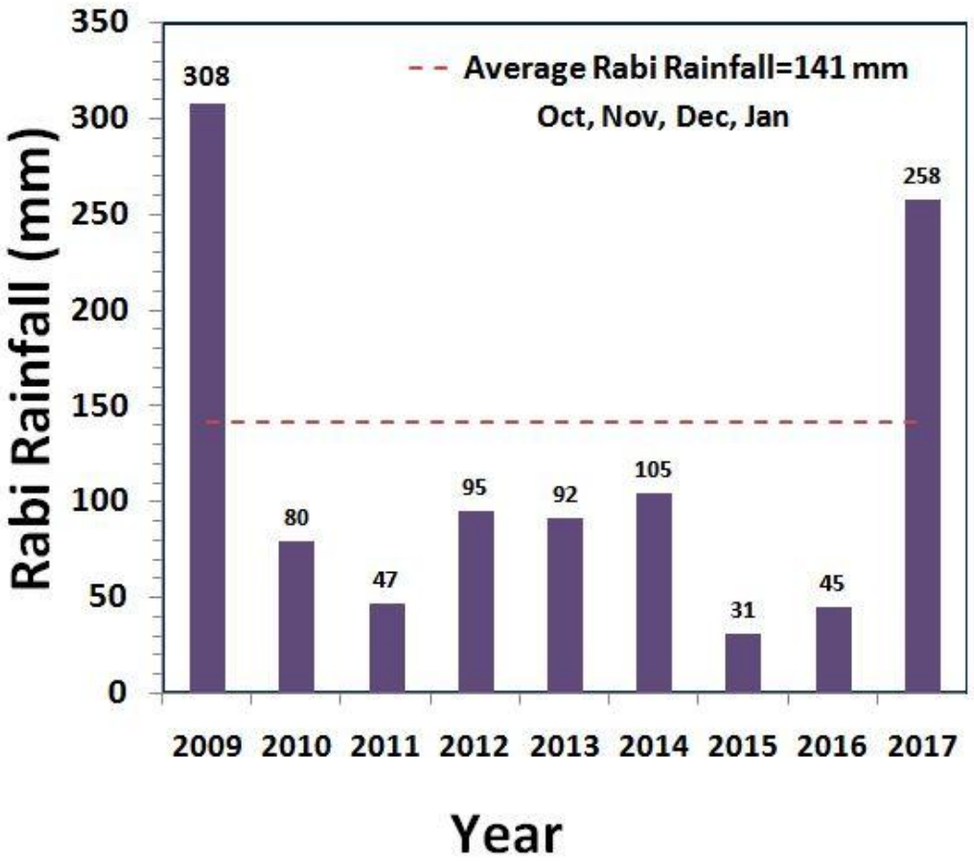


The average annual rainfall (1960-2014) recorded at the Yadgir station in Yadgir taluk of Yadgir district is 887 mm. The annual rainfall at Sydhapura station (Hobli H.Q.) is presented. During the years 2009, 2011, 2012, 2013, 2014, 2015 and 2017 the annual rainfall was deficient by 4%, 20%, 36%, 12%, 23%, 13% and 9% respectively.

The *kharif* rainfall (Jun–Sep) is an average about 77% of the annual rainfall and it typically follows the annual rainfall patterns. During the years 2009, 2011, 2012, 2013, 2014, 2015 and 2017 the *kharif* rainfall was deficient by 24%, 12%, 40%, 7%, 30%, 4% and 22% respectively.

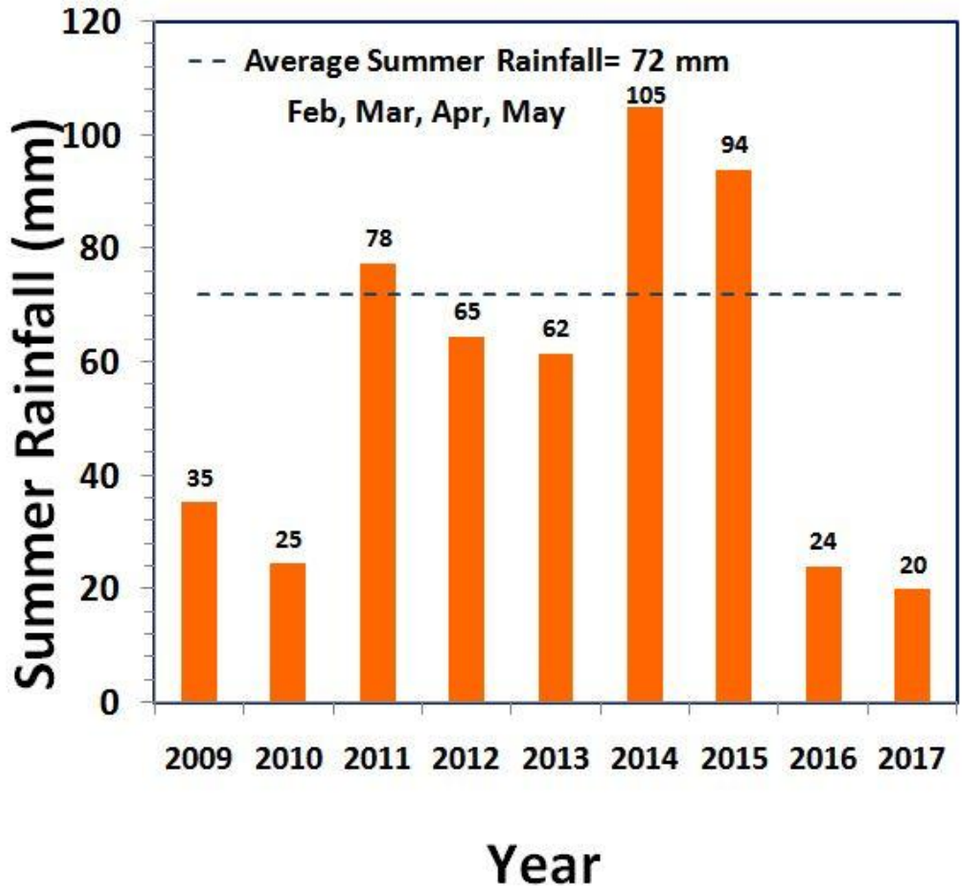


RAINFALL INDEX

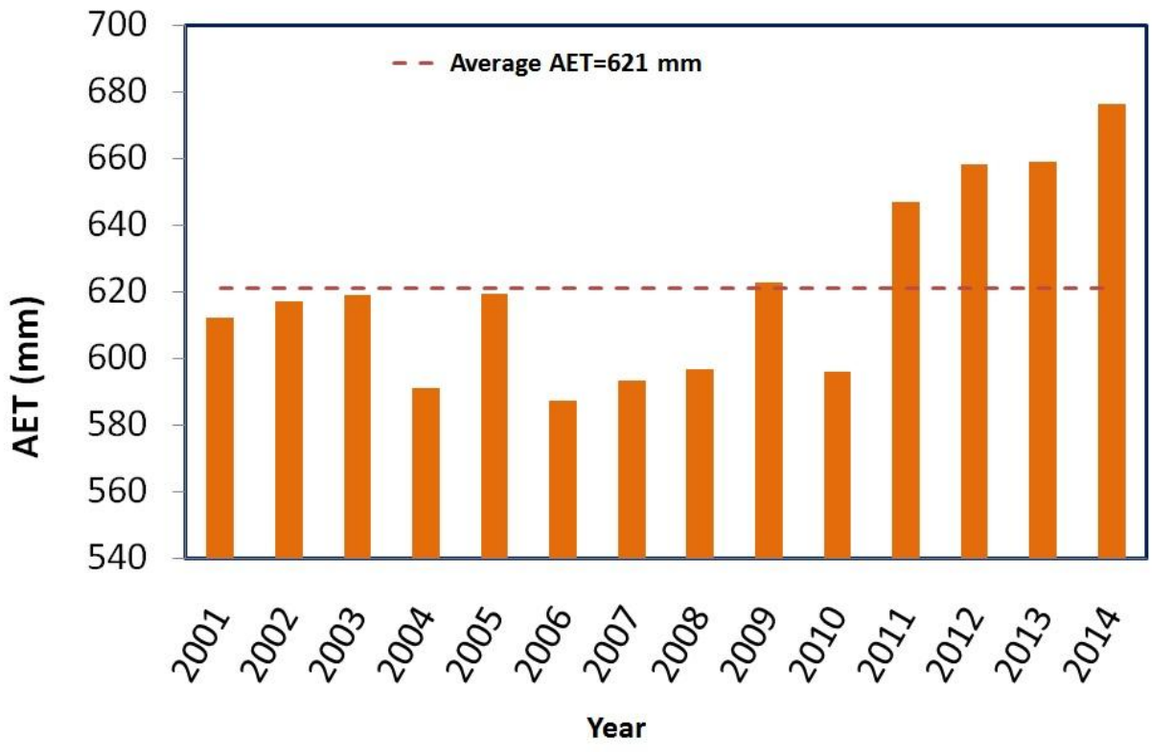


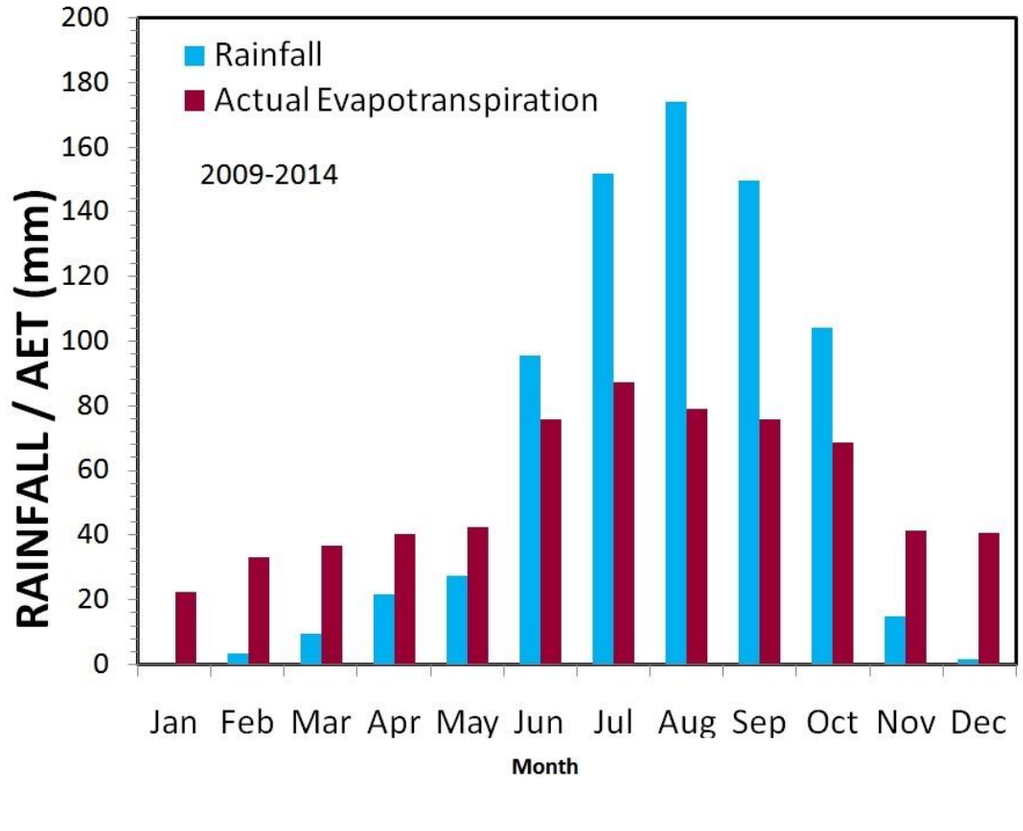
The average *rabi* rainfall (Oct-Jan) is about 15% of the average annual rainfall. During the years 2009 and 2017 high *rabi* rainfall was received, where as other years showed deficient rainfall.

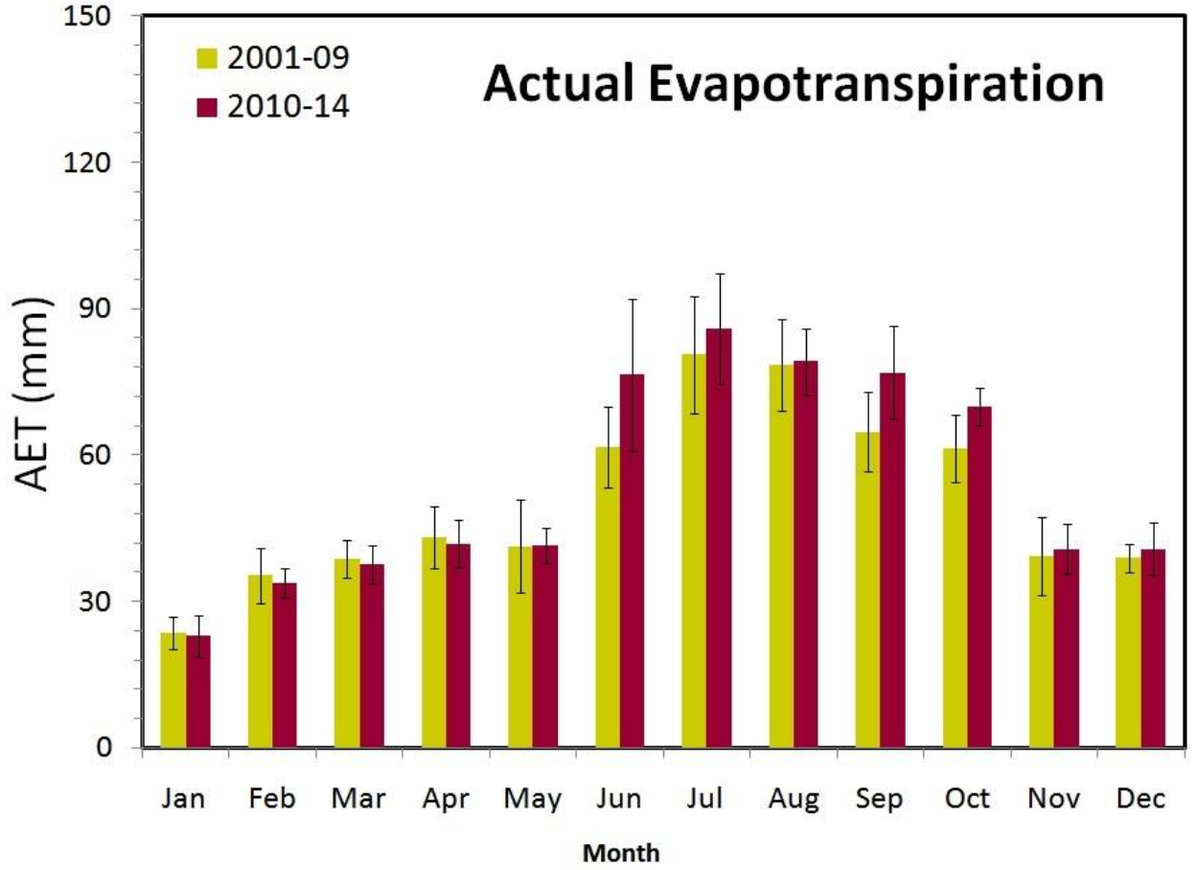
The average summer rainfall (Feb-May) is about 8% of the average annual rainfall.



EVAPOTRANSPIRATION

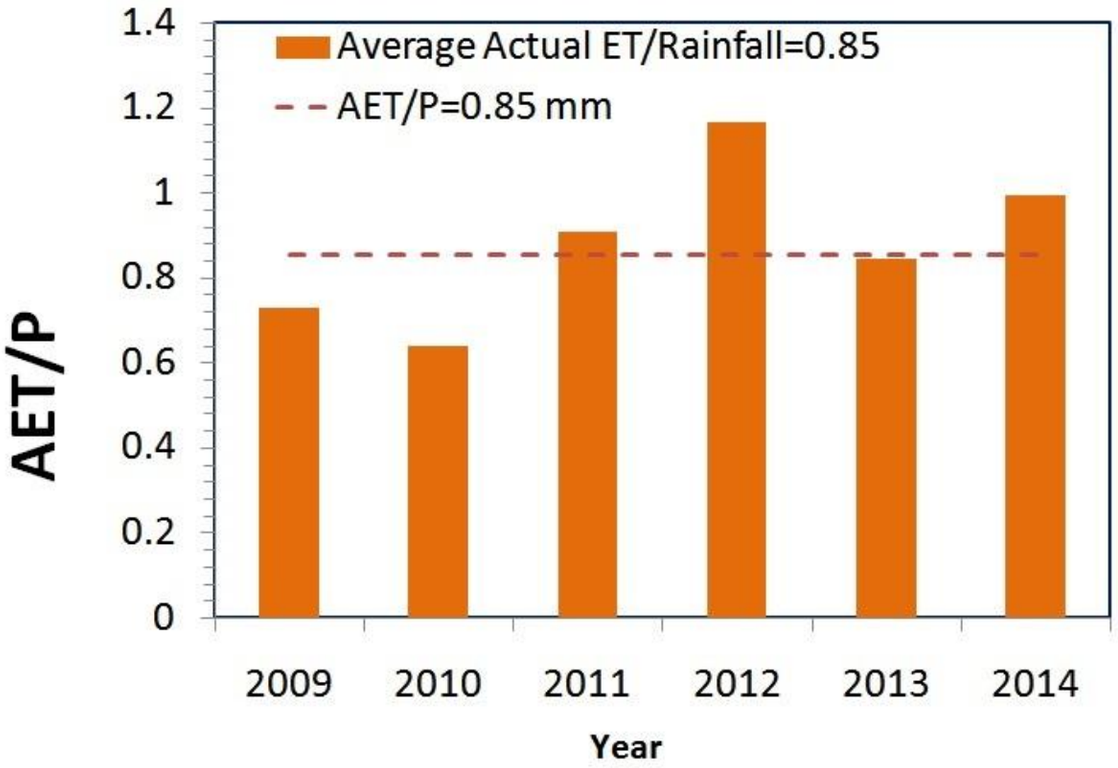


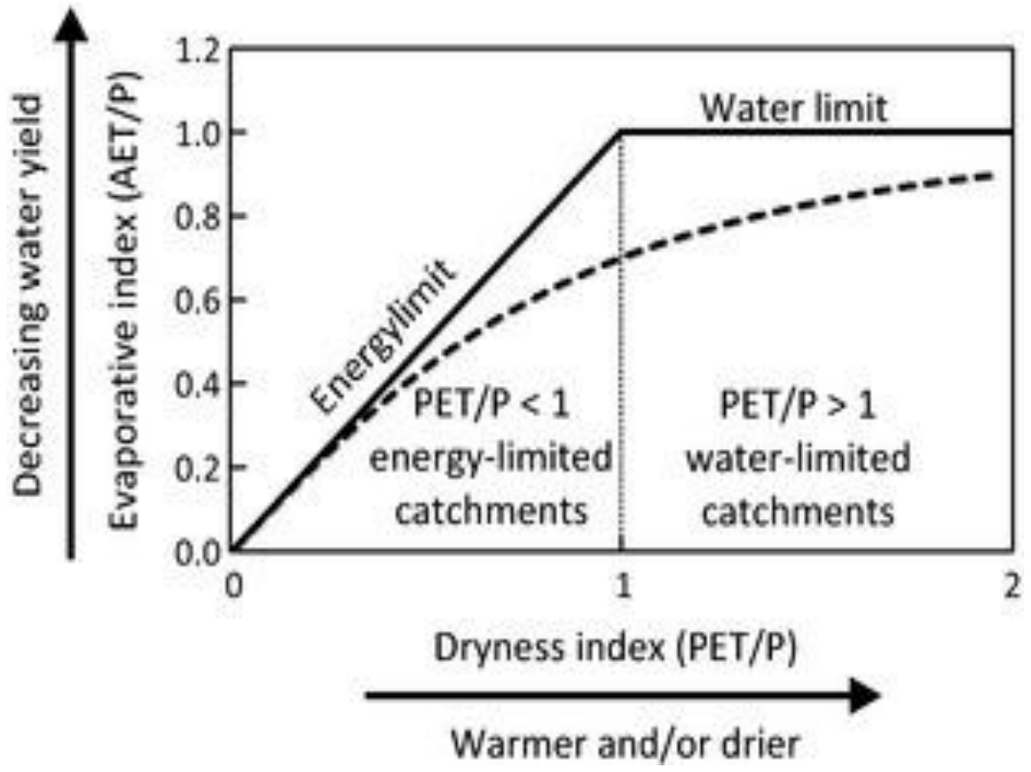




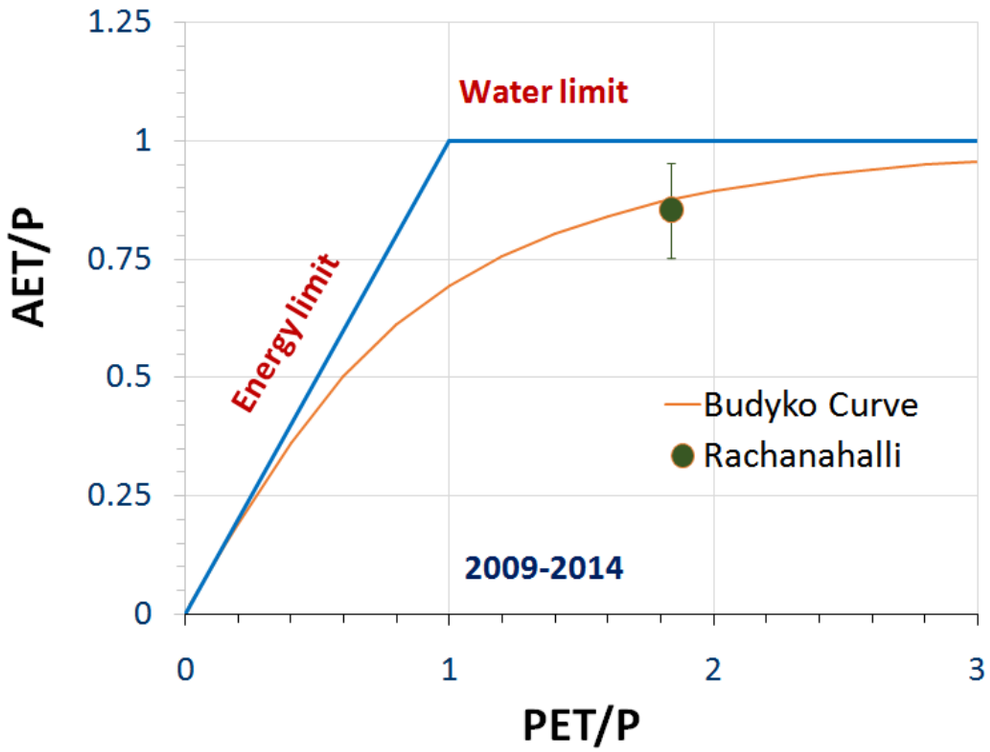
The average annual actual ET is lower than the average rainfall. During *kharif* average rainfall and ET was found to be 674 mm and 318 mm respectively, whereas in *rabi* it was about 141 mm and 173 mm. In comparison to the 2001-2009, the annual ET increased by 6% during 2010-2014.

EVAPOTRANSPIRATION INDEX

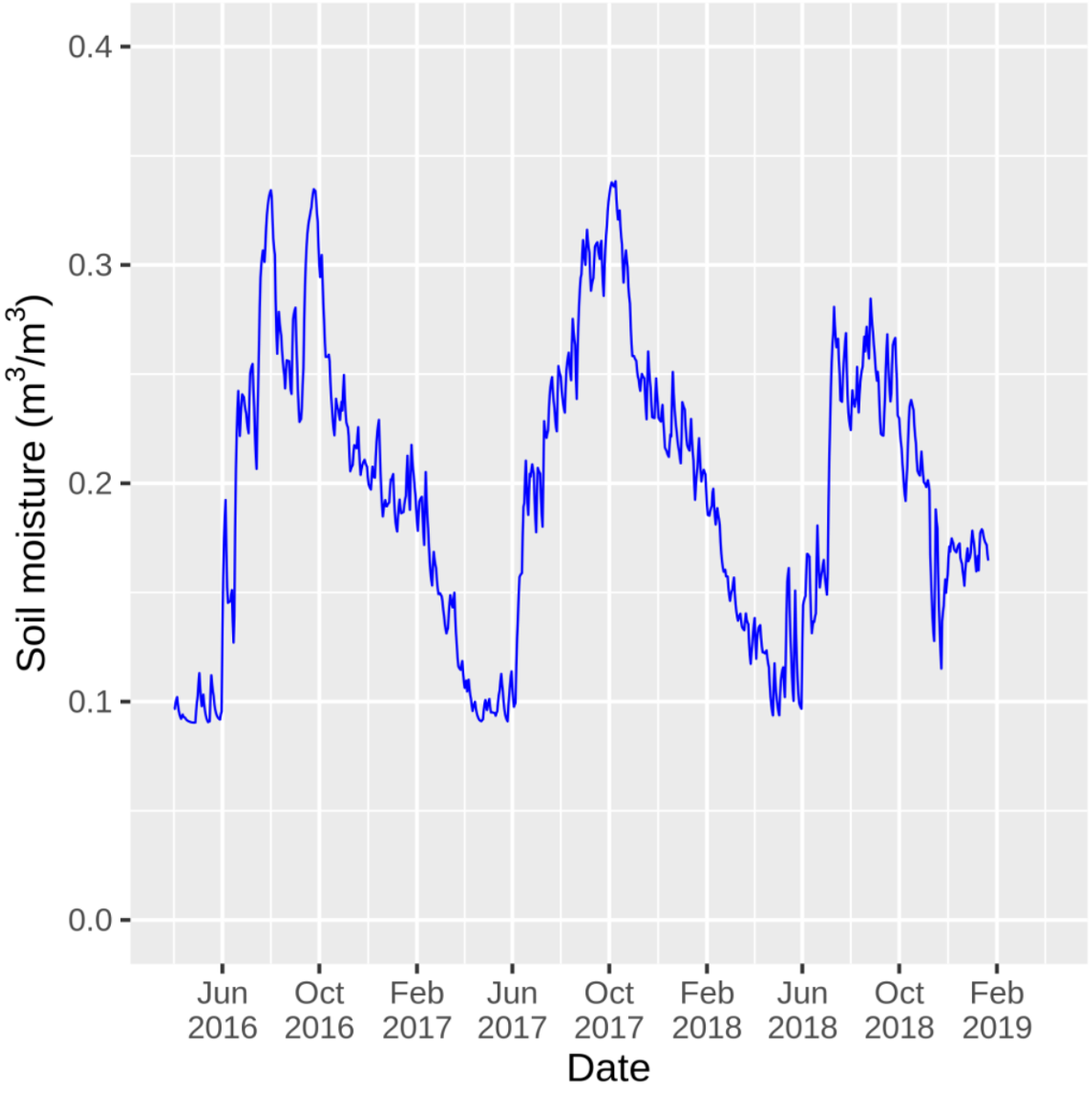


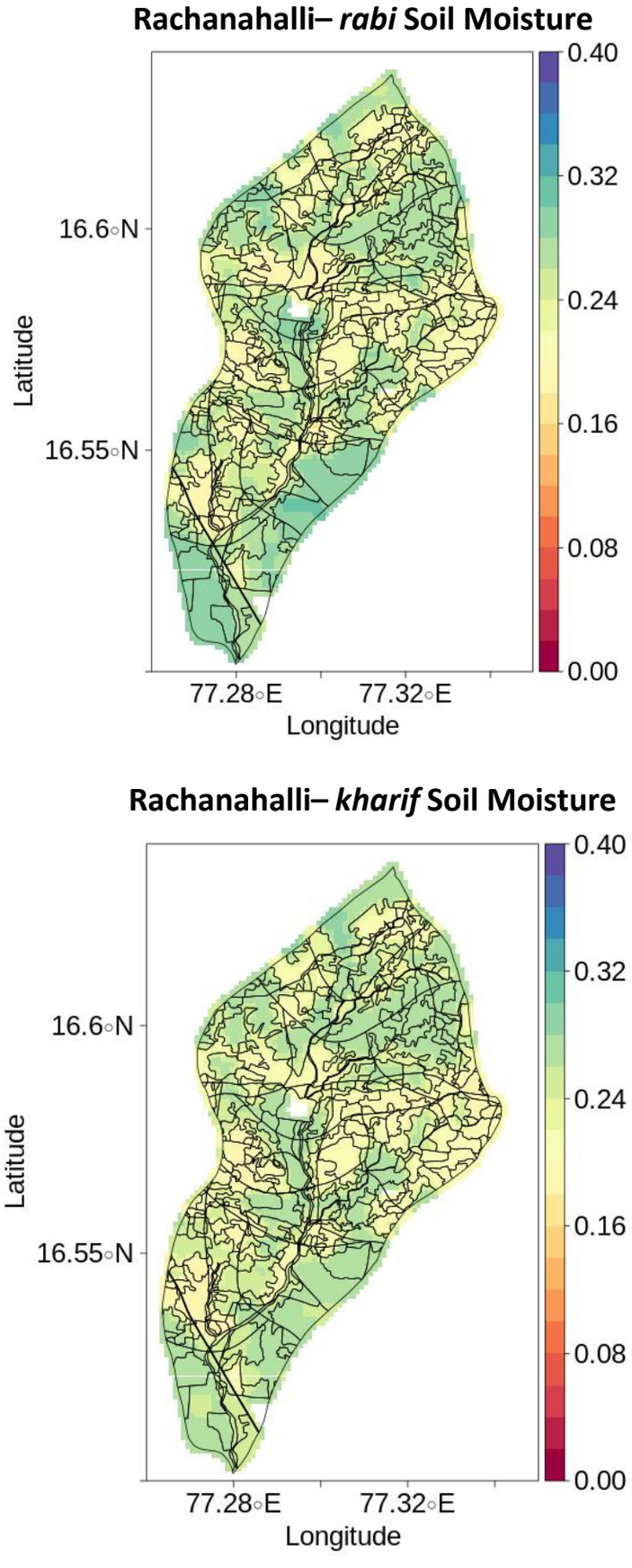


The average AET/P ratio was about 85%, which is slightly higher than the sustainable limit of about 80%. Even during extremely lower rainfall year of 2012, AET was 620 mm. This suggests the presence of water storage and utilization from other sources such as groundwater, which buffered the lower rainfall.



SATELLITE RETRIEVED SOIL MOISTURE



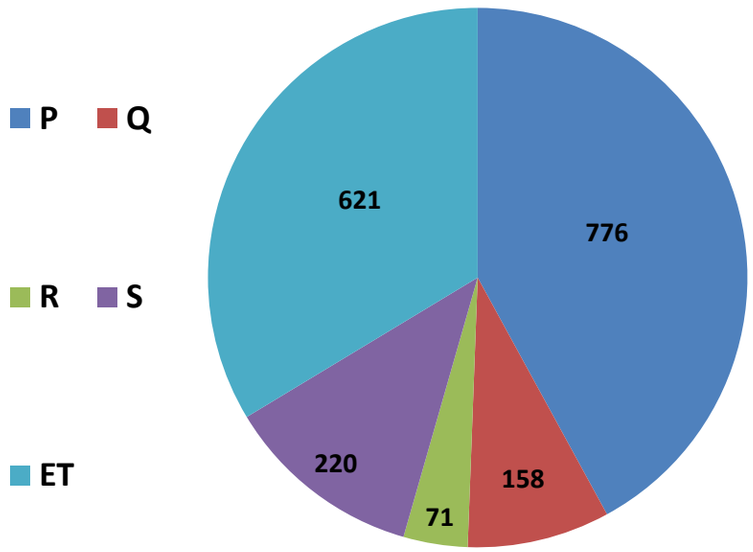


The method developed for retrieving soil moisture from multi-satellite observations allowed to map surface soil moisture behavior in the micro-watershed. The available surface moisture was varied in the range of 9-24% in *kharif* and 21-33 % in *rabi* seasons of 2016, 10-32% in *kharif* and 24-33% in *rabi* seasons of 2017 and 10-27% in *kharif* and 16-20% in *rabi* seasons of 2018.

WATER BALANCE

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

- Q = Runoff
- P = Precipitation
- E = Evapotranspiration
- R = Groundwater recharge
- S = Storage change in the watershed

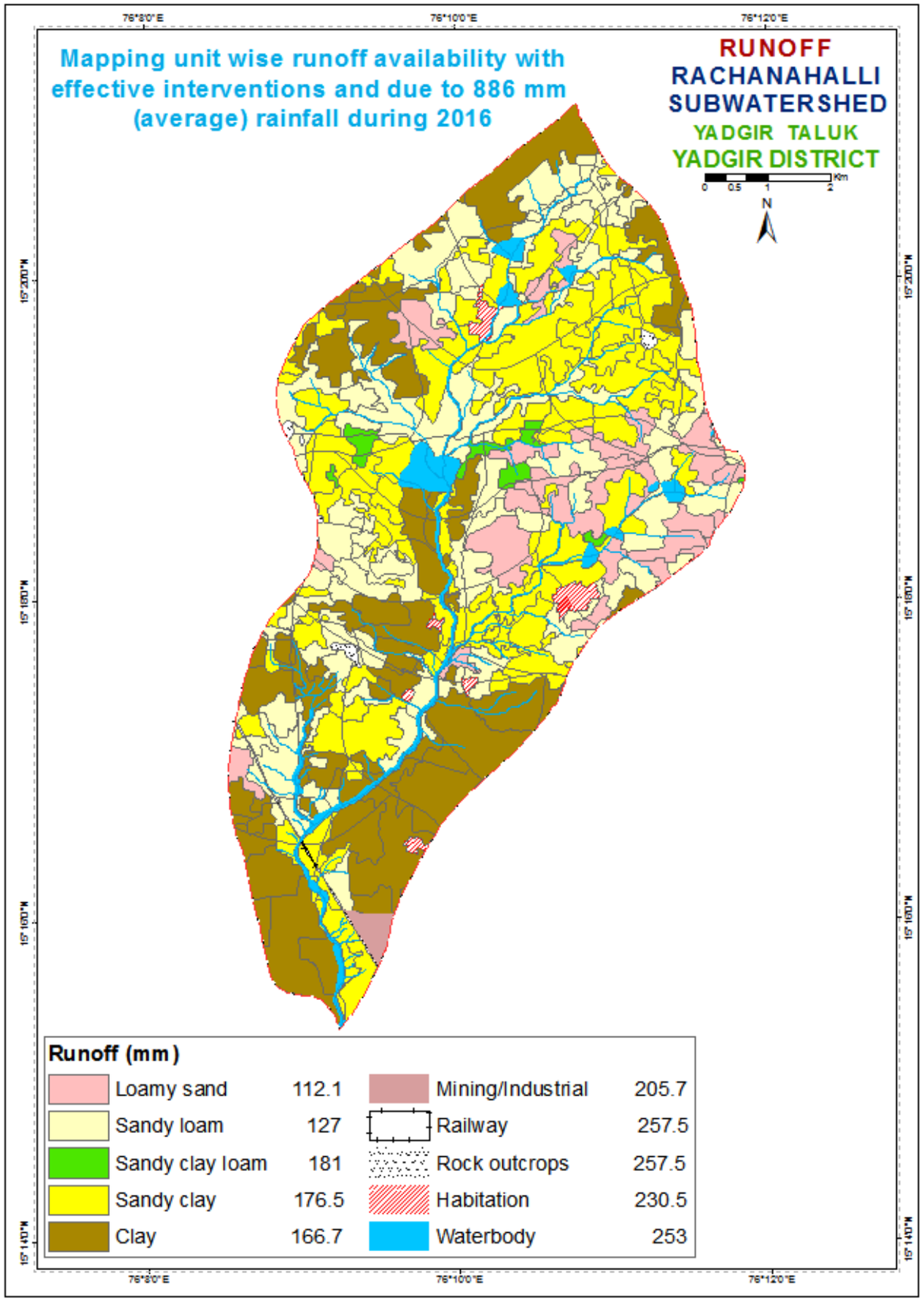


During June-October months, Precipitation is higher than Evapotranspiration, hence Runoff can occur in the watershed.

P = 776 mm (average of 2009-2017) ET = 621 mm R = 71 mm S = 220 mm Q = 126 mm

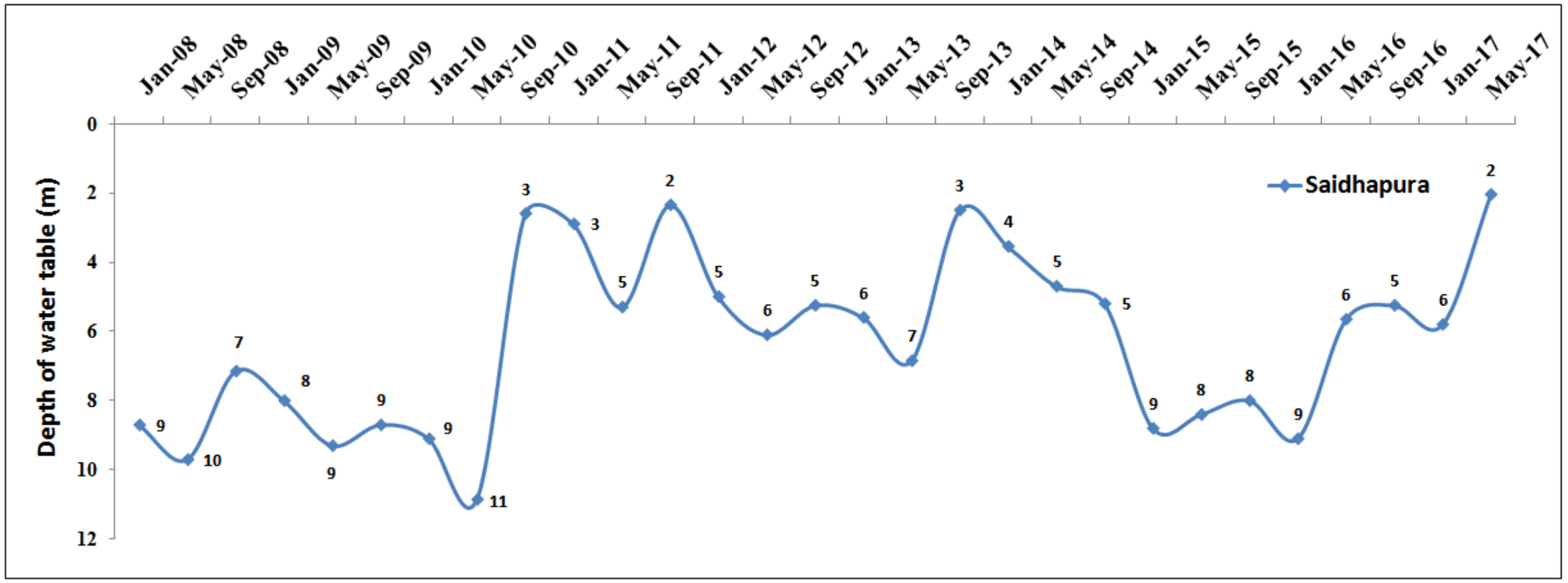
Sl. No.	Parameters	Average_ 2016 (mm)
1.	Rainfall	886
2.	Runoff availability with existing conditions	185.05
3.	Runoff availability with effective interventions	157.85
4.	Runoff allowed as environmental flow at the outlet	31.57
5.	Runoff excess for harvesting by construction of structures	126.28

RUNOFF


Mapping unit wise runoff availability with effective interventions and due to 886 mm (average) rainfall during 2016
RUNOFF
RACHANAHALLI SUBWATERSHED
YADGIR TALUK
YADGIR DISTRICT
0 0.5 1 2 Km
N
76°80'E
76°100'E
76°120'E
15°20'N
15°10'N
15°00'N
14°50'N
Runoff (mm)
Loamy sand 112.1
Sandy loam 127
Sandy clay loam 181
Sandy clay 176.5
Clay 166.7
Mining/Industrial 205.7
Railway 257.5
Rock outcrops 257.5
Habitation 230.5
Waterbody 253

GROUND WATER STATUS

SAIDHAPURA STATION



The total number of wells present in Rachanahalli Sub-watershed as per LRI data is 74 (60- Borewells & 14- Open wells). Groundwater levels was found from the data obtained from KSNDMC for the nearest station of Saidhapur. The above graph depicts the groundwater levels during the years Jan 2008-May 2010 was constant whereas groundwater levels from Sep-2010 increased suddenly, remained constant from jan 2011- Jan 2015 and decreased in May-2015, remained constant from (Sep 2015- Jan 2016 and May 2016- jan 2017) and decreased in May 2017 .Deepest levels were found in 2010.

x

SUMMARY

➢The average annual rainfall of 887 mm in the Rachanahalli sub-watershed as recorded from the Sydhapura station data by KSNDMC.

➢77 percent, 15 percent and 8 percent 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 126 mm for an annual rainfall of 776 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 (220 mm) and utilizable runoff plus recharge is 395.7 (=126+220+49.7) i.e. approximately 396 mm.

➢The average actual evapotranspiration estimated in the watershed based on the current land use and irrigation practices for the Kharif and Rabi seasons is 490 mm. Hence the amount of water use for Kharif and Rabi seasons may be estimated as 612.5 mm (i.e 125% of AET). This demand for the two seasons is marginally higher by 217 mm, i.e. (612.5-396). The AET in June-Sept months is 55% of rainfall. Hence, there is good opportunity to harvest the excess water through watershed management practices for utilizing during rabi season.

➢The total number of wells present in Rachanahalli Sub-watershed as per LRI data is 74 (60-Borewells & 14-Open wells). Groundwater levels was found from the data obtained from KSNDMC for the nearest station of saidhapur. Deepest levels were found in 2010.