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किसानों का हमसफर
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Land Resource and Hydrological Inventory of Kodlur Sub-watershed for Watershed Planning and Development Yadgir Taluk, Yadgir District, Karnataka (AESR 6.2)

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

ICAR - NBSS & LUP

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

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

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

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

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

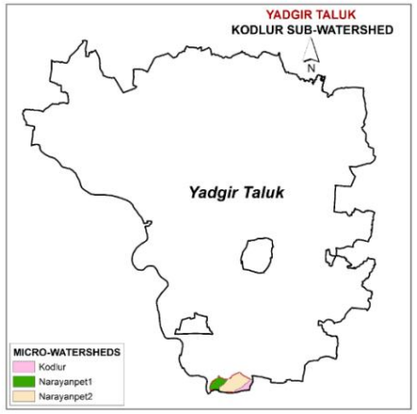
For easy map reading and understanding the information contain in different maps, the physical, cultural and scientific symbols used in the maps are illustrated in the form of colors, graphics and tables.

Physical, Cultural and Scientific symbols used in the Atlas

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

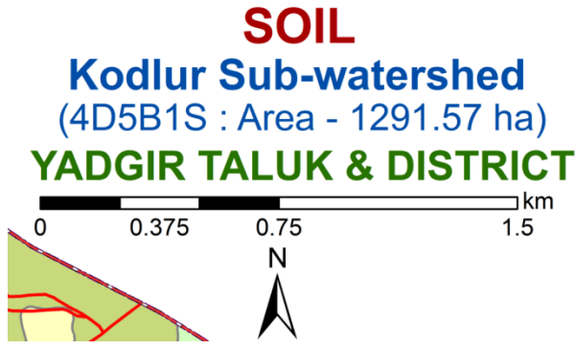
Inset map

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



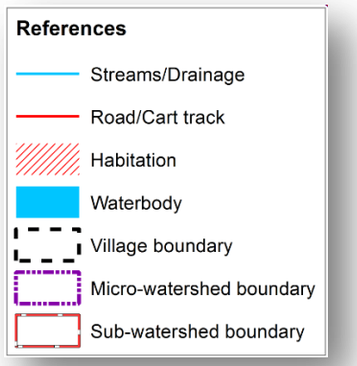
Map title

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



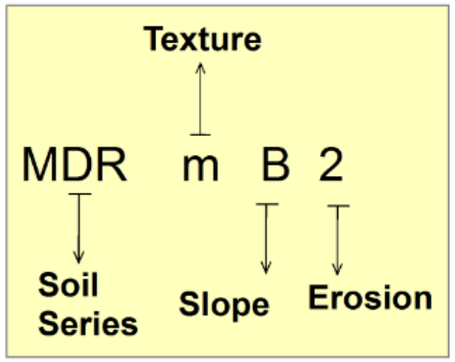
Legends and symbols

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



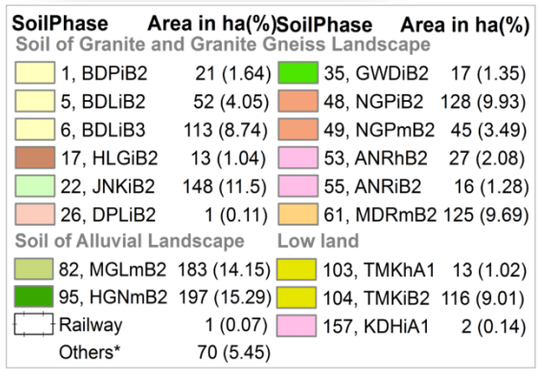
Soil Units

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



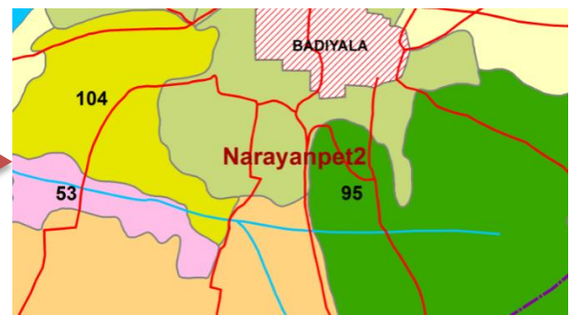
Map colours

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



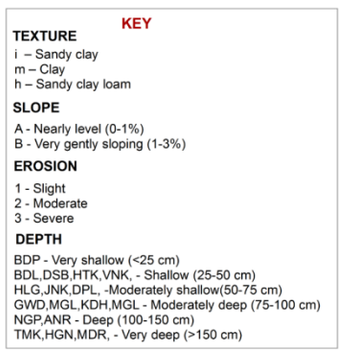
Soil and plot boundaries

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



Map key

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



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

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

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 Kodlur Sub-watershed covering an area of 1291.57 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.

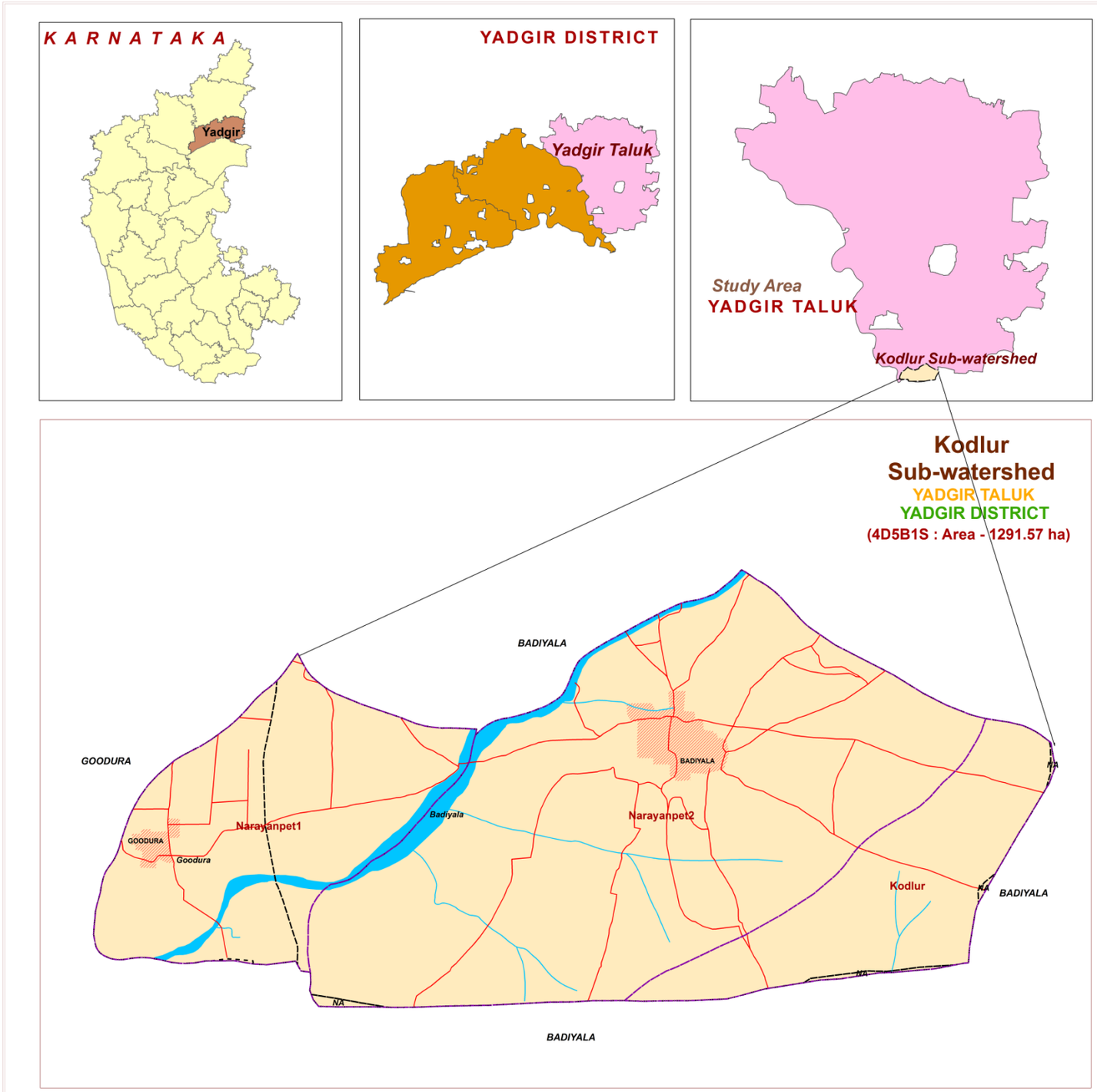
2. General Description of Sub-watershed

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 Kodlur Sub-watershed in Yadgir taluk, Yadgir district. It was selected for data base generation under Sujala III project. Kodlur Sub-watershed (code– 4D5B1S is covering an area of 1291.57 ha and spread across badiyala and Goodur villages.

2.1. Location and Extent

LOCATION MAP OF KODLUR SUB-WATERSHED

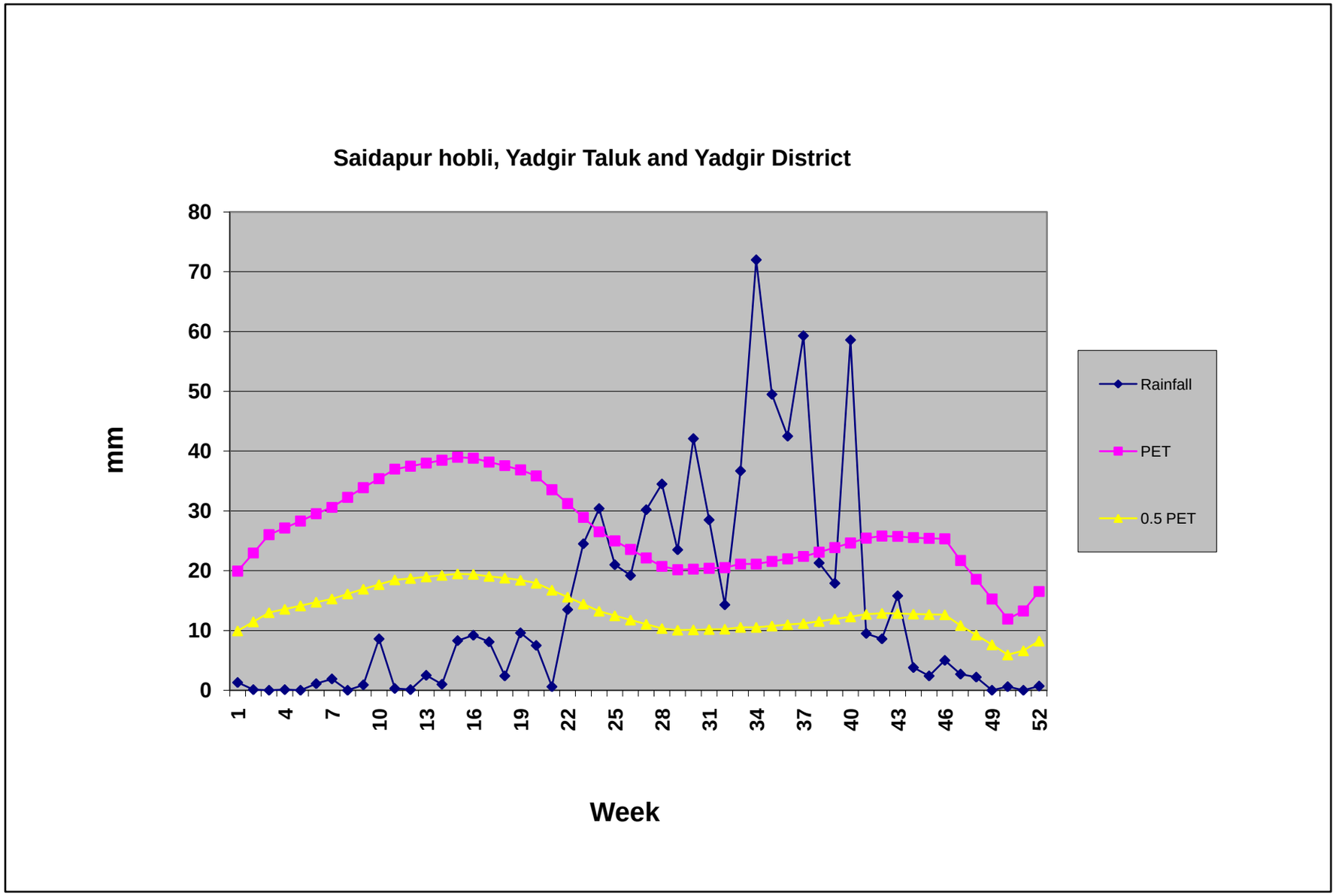


The Kodlur Sub-watershed (Yadgir taluk, Yadgir district) is located in between $16^0$28’ – $16^0$30’ North latitudes and $77^0$14’ – $77^0$17’ East longitudes, covering an area of about 1291.57 ha and spread across Badiyala and Goodura villages.

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

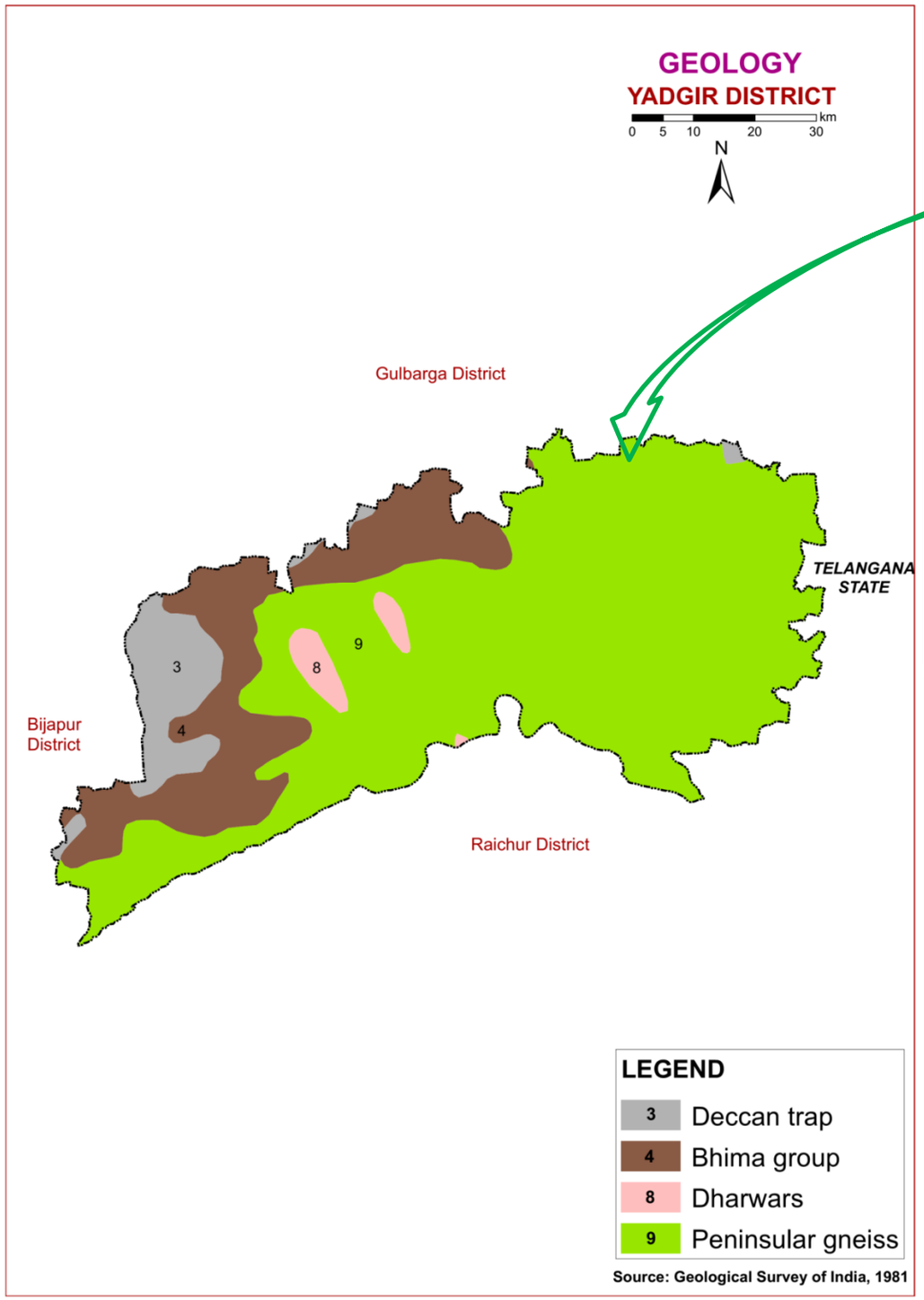


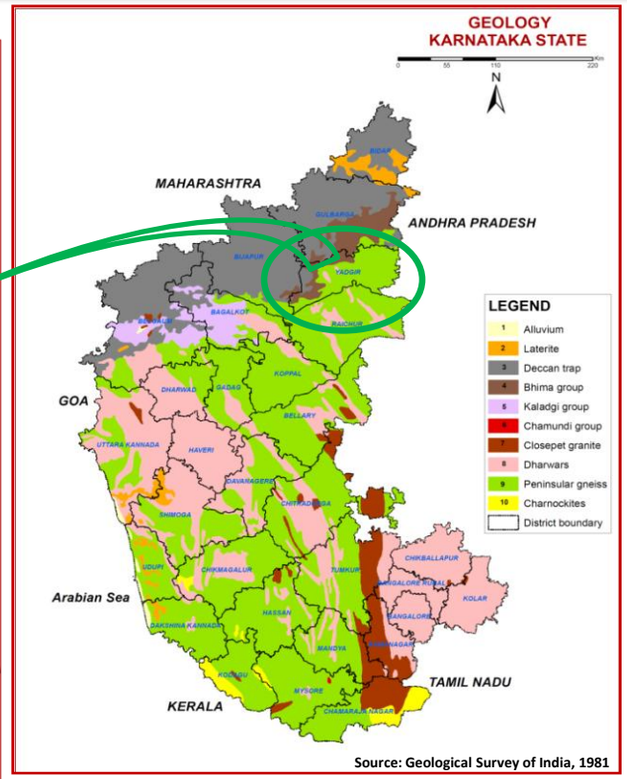
Length of Growing Period (LGP) is varying from June 1st week to 4th week of October (120 - 150 days)

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.

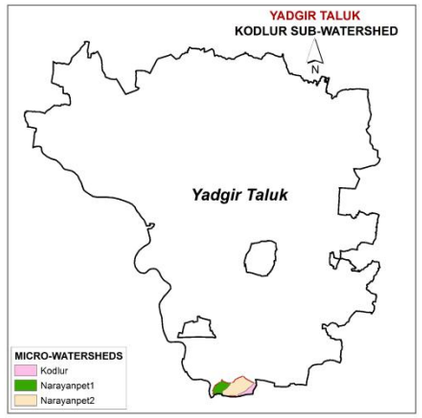
3. Survey Methodology

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



Kodlur Sub-watershed
(4D5B1S : Area - 1291.57 ha)
YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

Badiyala

Narayanpet1

Goodura

Narayanpet2

BADIYALA

Kodlur

NA

BADIYALA

NA

NA

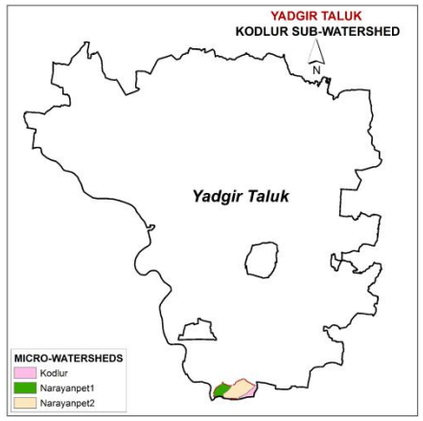
BADIYALA

References

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 220 Land parcel with No's
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

3.2. Database Used - Satellite Image



SATELLITE IMAGE

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

BADIYALA

BADIYALA

GOODURA

Narayanpet1

Goodura

Bediyala

Narayanpet2

Kodlur

NA

NA

NA

NA

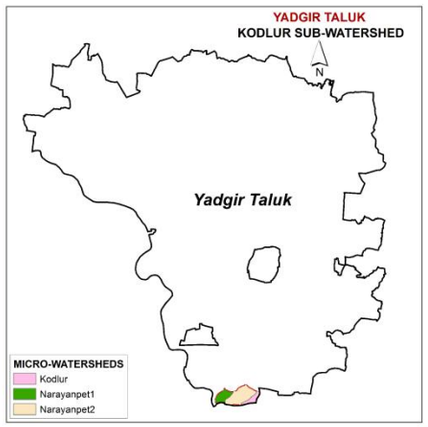
BADIYALA

References

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

Source: Cartosat 1 Imagery, 2011

4. The Soils



SOIL
Kodlur Sub-watershed
(4D5B1S : Area - 1291.57 ha)
YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5

N

BADIYALA
GOODURA
Badiyala
Goodura
Narayanpet1
Narayanpet2
Kodlur
NA
82
35
5
48
104
53
95
103
1
17
6
61
55
22
49
157
26

SoilPhase	Area in ha(%)	SoilPhase	Area in ha(%)
Soil of Granite and Granite Gneiss Landscape			
1, BDPiB2	21 (1.64)	35, GWDiB2	17 (1.35)
5, BDLiB2	52 (4.05)	48, NGPiB2	128 (9.93)
6, BDLiB3	113 (8.74)	49, NGPmB2	45 (3.49)
17, HLGiB2	13 (1.04)	53, ANRhB2	27 (2.08)
22, JNKiB2	148 (11.5)	55, ANRiB2	16 (1.28)
26, DPLiB2	1 (0.11)	61, MDRmB2	125 (9.69)
Soil of Alluvial Landscape		**Low land**	
82, MGLmB2	183 (14.15)	103, TMKhA1	13 (1.02)
95, HGNmB2	197 (15.29)	104, TMKiB2	116 (9.01)
Railway	1 (0.07)	157, KDHiA1	2 (0.14)
Others*	70 (5.45)		

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

KEY

TEXTURE
i – Sandy clay
m – Clay
h – Sandy clay loam

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

EROSION
1 - Slight
2 - Moderate
3 - Severe

DEPTH
BDP - Very shallow (<25 cm)
BDL,DSB,HTK,VNK, - Shallow (25-50 cm)
HLG,JNK,DPL, -Moderately shallow(50-75 cm)
GWD,MGL,KDH,MGL - Moderately deep (75-100 cm)
NGP,ANR - Deep (100-150 cm)
TMK,HGN,MDR, - Very deep (>150 cm)

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

Texture
MDR m B 2
Soil Series | Slope | Erosion

4.1 Mapping unit description of Kodlur (4D5B1S) 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				
	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		**125 (9.69)**
61		MDRmB2	Clay surface, slope 1-3%, moderate erosion	125 (9.69)
	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		**173 (13.42)**
48		NGPiB2	Sandy clay surface, slope 1-3%, moderate erosion	128 (9.93)
49		NGPmB2	Clay surface, slope 1-3%, moderate erosion	45 (3.49)
	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		**43 (3.36)**
53		ANRhB2	Sandy clay loam surface, slope 1-3%, moderate erosion	27 (2.08)
55		ANRiB2	Sandy clay surface, slope 1-3%, moderate erosion	16 (1.28)
	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		**17 (1.35)**
35		GWDiB2	Sandy clay surface, slope 1-3%, moderate erosion	17 (1.35)
	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.		**13 (1.04)**
17		HLGiB2	Sandy clay surface, slope 1-3%, moderate erosion	13 (1.04)
	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		**148 (11.5)**
22		JNKiB2	Sandy clay surface, slope 1-3%, moderate erosion	148 (11.5)
	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		**1 (0.11)**
26		DPLiB2	Sandy clay surface, slope 1-3%, moderate erosion	1 (0.11)

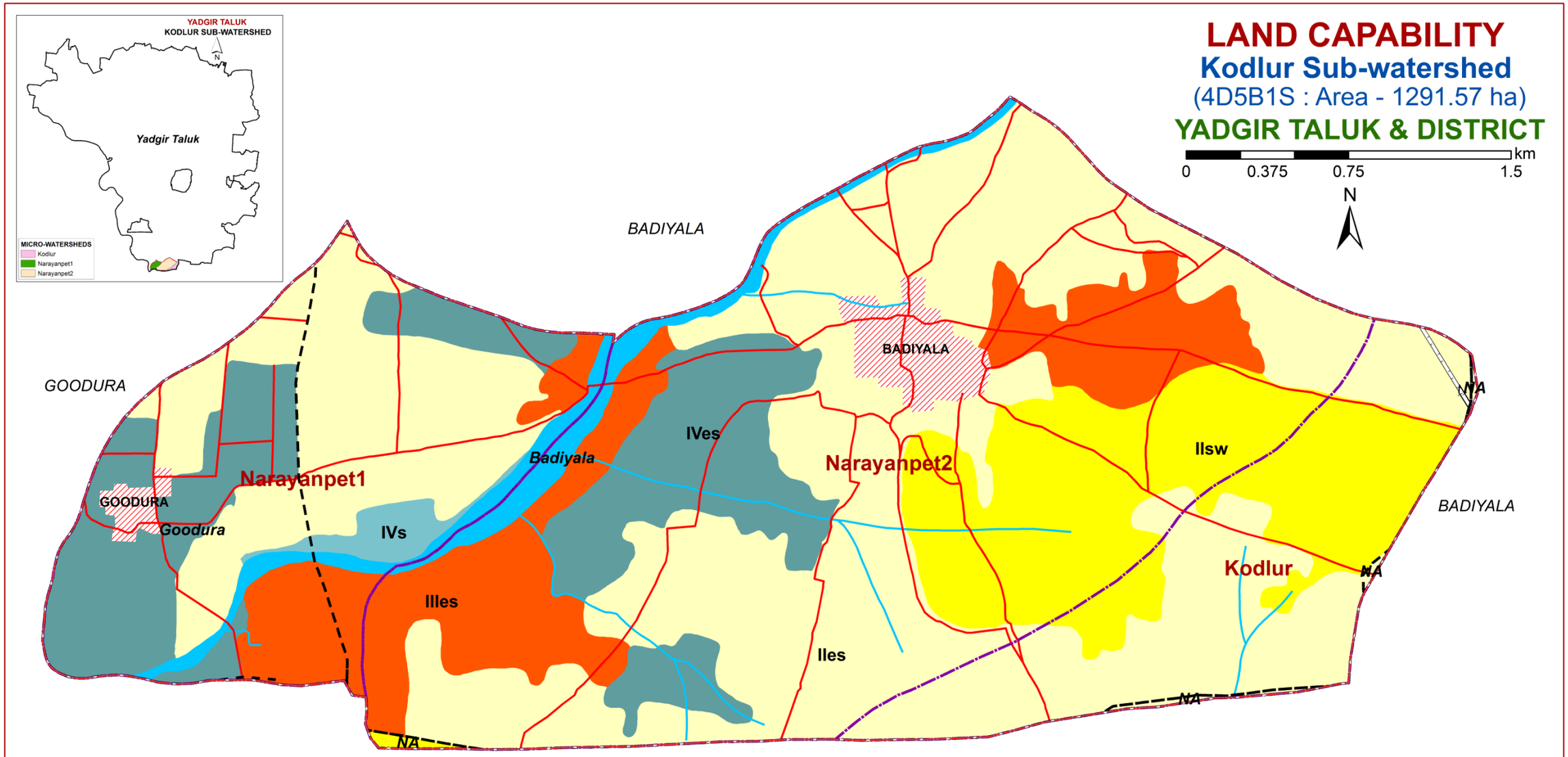
To be continued….

Soil map unit No*	Soil Series	Soil Phase Symbol	Mapping Unit Description	Area in ha (%)
Soils of Granite and Granite gneiss Landscape				
	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		**165 (12.79)**
5		BDLiB2	Sandy clay surface, slope 1-3%, moderate erosion	52 (4.05)
6		BDLiB3	Sandy clay surface, slope 1-3%, severe erosion	113 (8.74)
	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		**21 (1.64)**
1		BDPiB2	Sandy clay surface, slope 1-3%, moderate erosion	21 (1.64)
	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		**142 (11.05)**
103		TMKhA1	Sandy clay loam surface, slope 0-1%, slight erosion	13 (1.02)
104		TMKiB2	Sandy clay surface, slope 1-3%, moderate erosion	116 (9.01)
103		TMKhA1	Sandy clay loam surface, slope 0-1%, slight erosion	13 (1.02)
	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		**2 (0.14)**
157		KDHiA1	Sandy clay surface, slope 0-1%, slight erosion	2 (0.14)
Soils of Alluvial Landscape				
	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		**197 (15.29)**
95		HGNmB2	Clay surface, slope 1-3%, moderate erosion	197 (15.29)
	MGL	Mungala soils are moderately deep (75-100 cm), moderately well drained, very dark gray to dark gray, slightly calcareous cracking clay soils occurring on very gently sloping plains under cultivation		**183 (14.15)**
82		MGLmB2	Clay surface, slope 1-3%, moderate erosion	183 (14.15)
992		Railway	Railway line	1 (0.07)
1000		Others	Habitation and Waterbodies	70 (5.45)

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

5. Soil Survey Interpretations

5.1. Land Capability Classification



Capability subclass	Area in ha (%)
IIes	645 (49.91)
IIsw	199 (15.43)
IIIes	165 (12.79)
IVs	13 (1.02)
IVes	198 (15.35)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

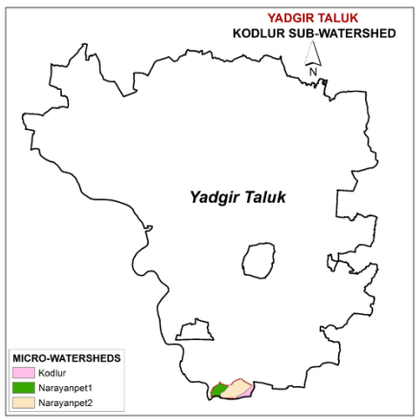
Key
II - Good cultivable land
III - Moderately good cultivable lands
IV - Fairly good cultivable lands

Limitations
e - erosion limitation
s - soil limitation
(depth, gravelliness, texture, salinity/alkalinity)
w – excess water
(wetness, high water table, drainage) limitation

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

Source: ICAR-NBSS&LUP, Bengaluru

5.2. Soil Depth



SOIL DEPTH

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

Depth Class	Area in ha (%)
Very shallow (<25 cm)	21 (1.64)
Shallow (25-50 cm)	165 (12.79)
Moderately shallow (50-75 cm)	163 (12.65)
Moderately deep (75-100 cm)	202 (15.64)
Deep (100-150 cm)	217 (16.77)
Very deep (>150 cm)	452 (34.99)
Railway	1 (0.07)
Others*	70 (5.45)

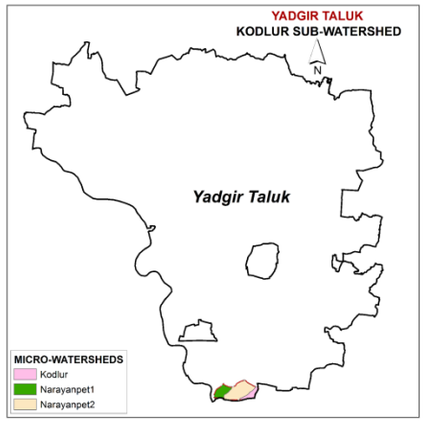
* - Habitation & Waterbody

References

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

Source: ICAR-NBSS&LUP, Bengaluru

5.3. Surface Soil Texture



SURFACE SOIL TEXTURE

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

BADIYALA

NA

Badiyala

Narayanpet1

Narayanpet2

GOODURA

Goodura

BADIYALA

Kodlur

NA

NA

NA

BADIYALA

Texture Class	Area in ha(%)
Sandy clay loam	40 (3.09)
Sandy clay	630 (48.78)
Clay	550 (42.61)
Railway	1 (0.07)
Others*	70 (5.45)

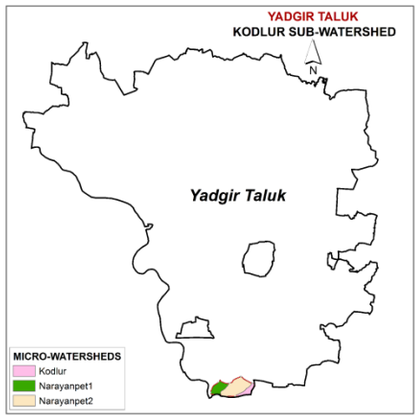
* - Habitation & Waterbody

References

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

Source: ICAR-NBSS&LUP, Bengaluru

5.4. Surface Soil Gravelliness



SOIL GRAVELLINESS
Kodlur Sub-watershed
(4D5B1S : Area - 1291.57 ha)
YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

BADIYALA

NA

BADIYALA

Narayanpet1

Badiyala

Narayanpet2

GOODURA

Goodura

Kodlur

NA

NA

NA

BADIYALA

Gravelly Class	Area in ha (%)
Non gravelly (<15%)	1220 (94.49)
Railway	1 (0.07)
Others*	70 (5.45)

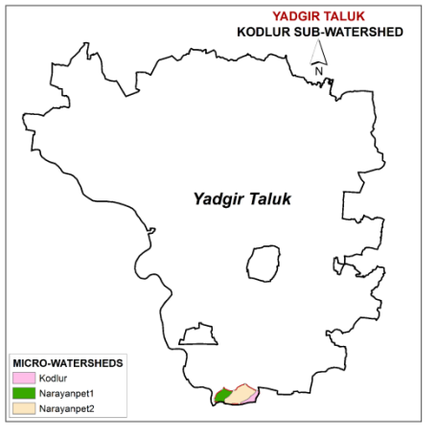
* - Habitation & Waterbody

References

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

Source: ICAR-NBSS&LUP, Bengaluru

5.5. Available Water Capacity



AVAILABLE WATER CAPACITY

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

Narayanpet1

Badiyala

Narayanpet2

BADIYALA

NA

GOODURA

Goodura

BADIYALA

Kodlur

NA

NA

NA

BADIYALA

Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	186 (14.43)
Low (51-100 mm/m)	163 (12.65)
Medium (101-150 mm/m)	202 (15.64)
Very high (>200 mm/m)	669 (51.77)
Railway	1 (0.07)
Others*	70 (5.45)

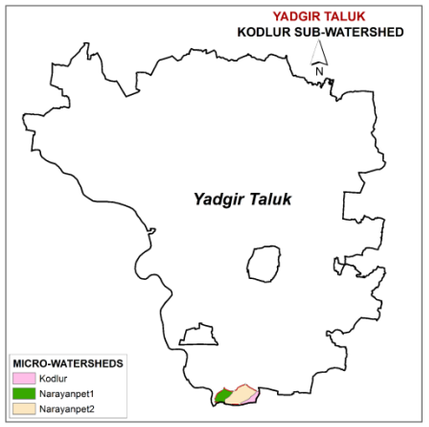
* - Habitation & Waterbody

References

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

Source: ICAR-NBSS&LUP, Bengaluru

5.6.Slope



SLOPE
Kodlur Sub-watershed
(4D5B1S : Area - 1291.57 ha)
YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5

N

BADIYALA
GOODURA
BADIYALA
NA
Badiyala
Narayanpet1
Narayanpet2
GOODURA
Goodura
BADIYALA
Kodlur
NA
NA
NA
BADIYALA

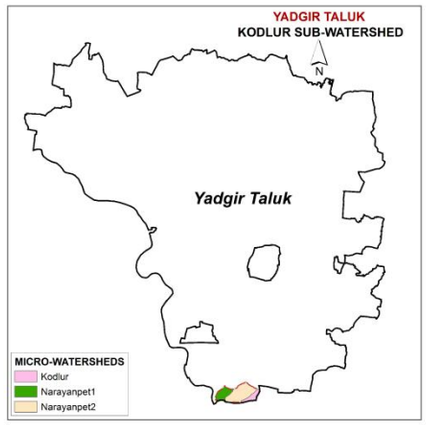
Slope Class	Area in ha (%)
Nearly level (0-1%)	15 (1.16)
Very gently sloping (1-3%)	1205 (93.33)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

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

Source: ICAR-NBSS&LUP, Bengaluru

5.7.Soil Erosion



SOIL EROSION

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

Narayanpet1

GOODURA

Goodura

Badiyala

BADIYALA

Narayanpet2

BADIYALA

NA

Kodlur

BADIYALA

NA

NA

BADIYALA

Erosion Class	Area in ha(%)
Slight	15 (1.16)
Moderate	1093 (84.59)
Severe	113 (8.74)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

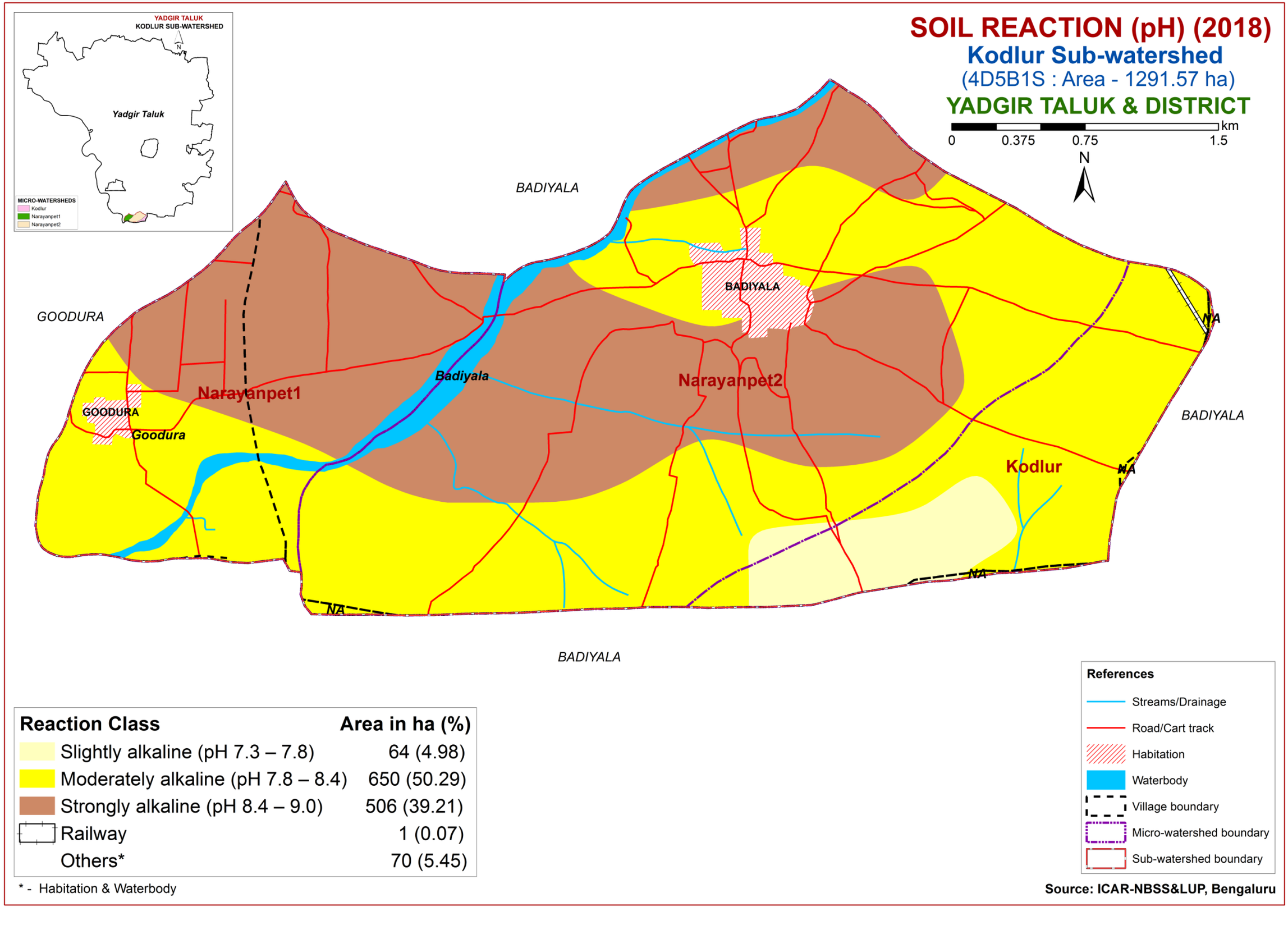
References

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

Source: ICAR-NBSS&LUP, Bengaluru

6. Soil Fertility Status

6.1. Soil Reaction (pH)



Reaction Class	Area in ha (%)
Slightly alkaline (pH 7.3 – 7.8)	64 (4.98)
Moderately alkaline (pH 7.8 – 8.4)	650 (50.29)
Strongly alkaline (pH 8.4 – 9.0)	506 (39.21)
Railway	1 (0.07)
Others*	70 (5.45)

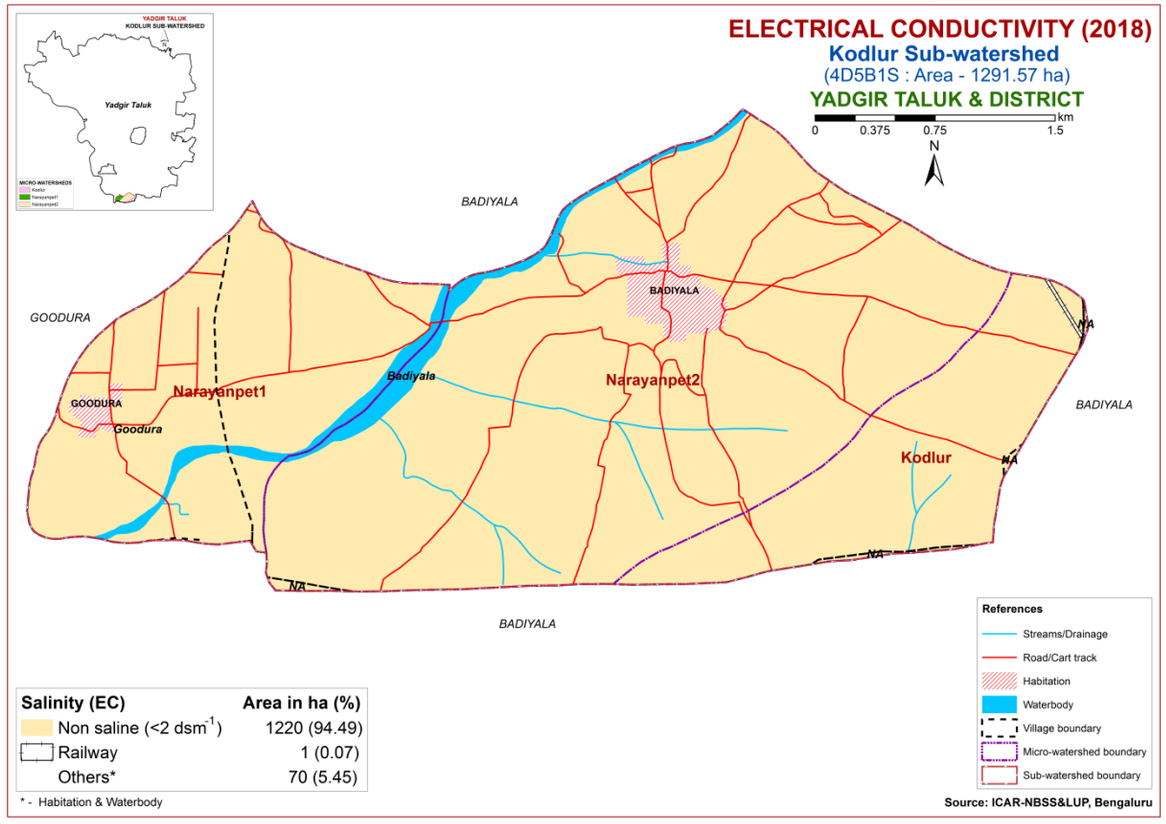
* - Habitation & Waterbody

References

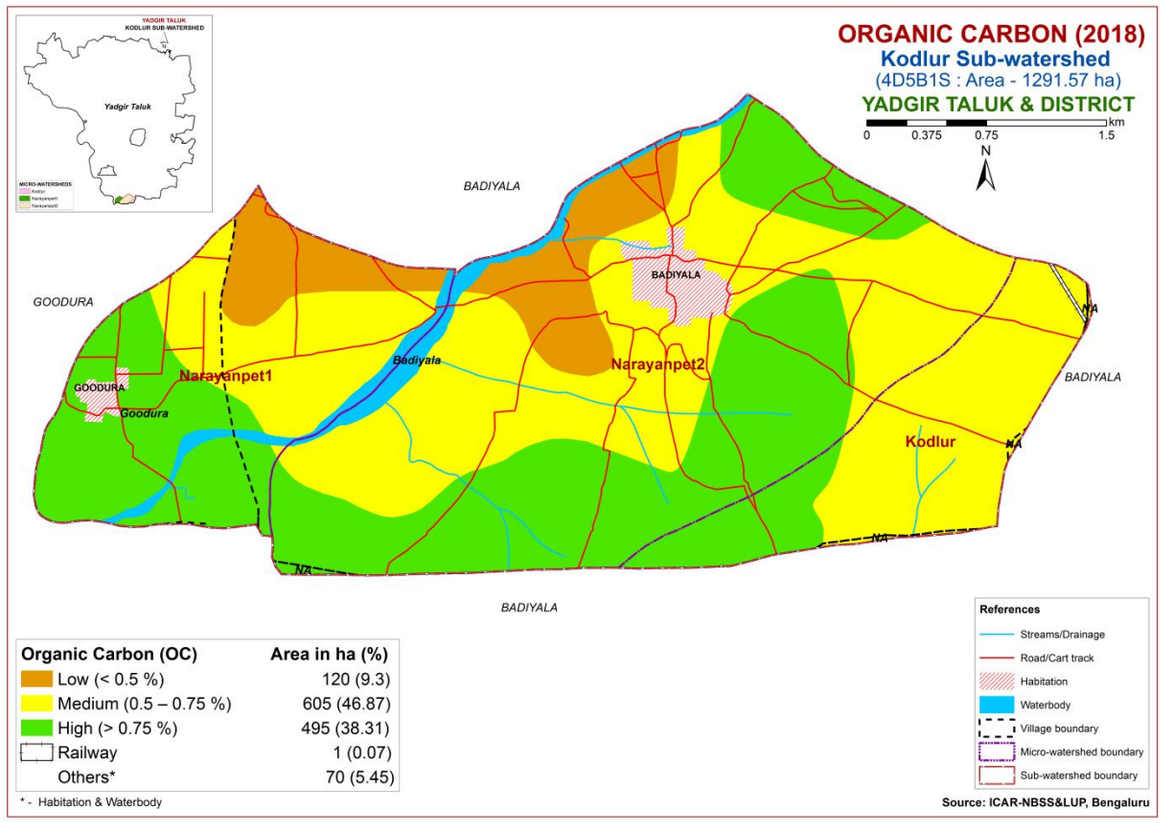
- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

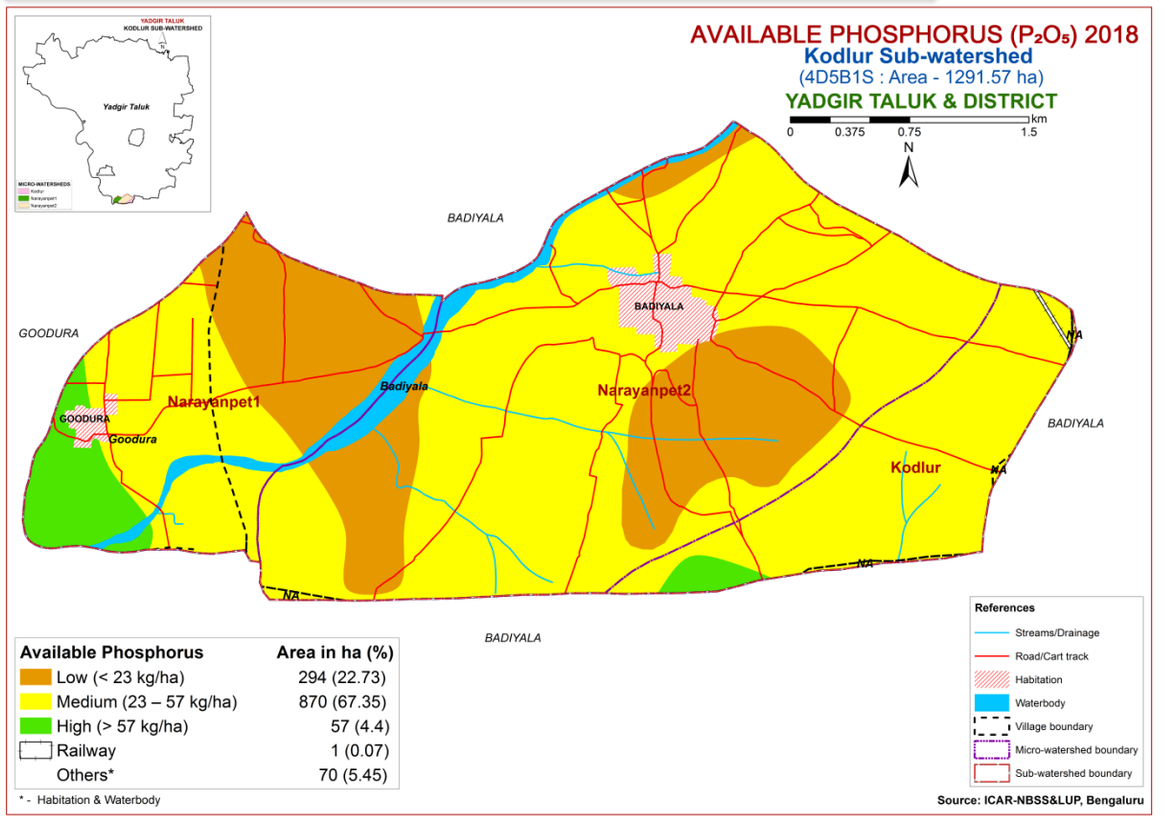
6.2. Electrical Conductivity (EC)



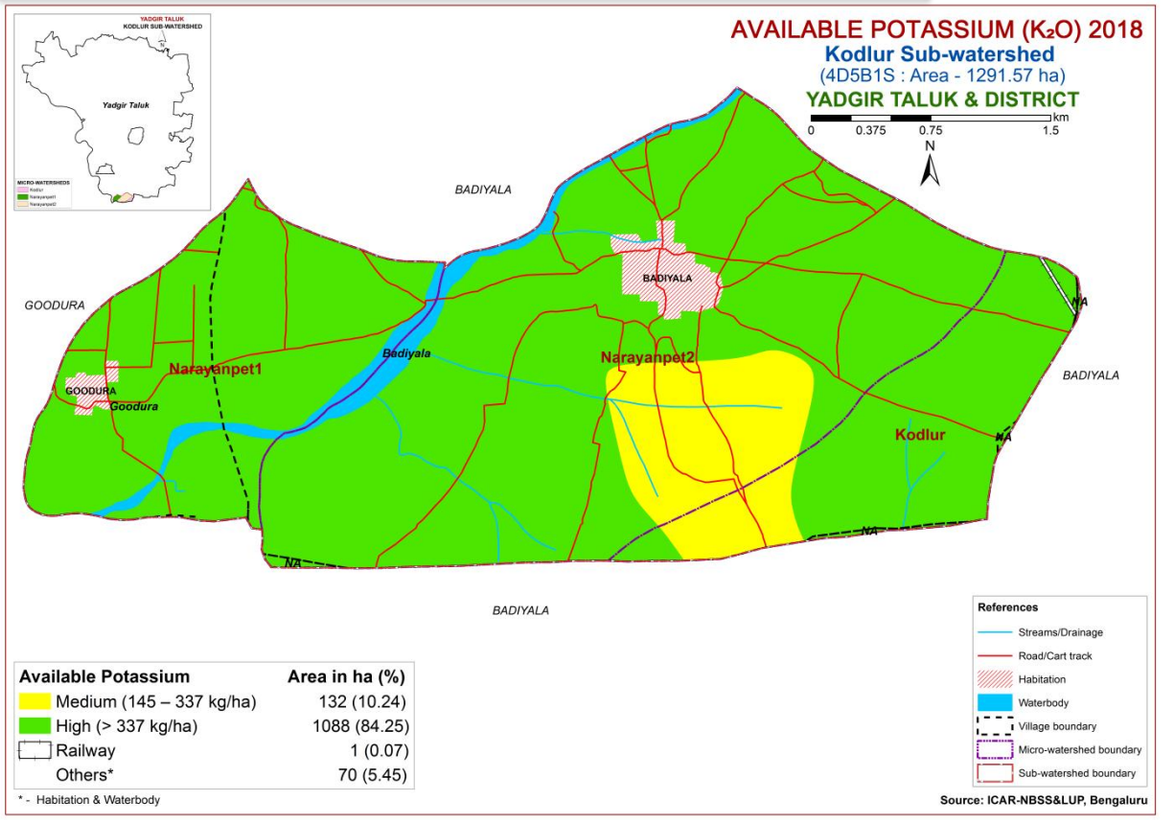
6.3. Organic Carbon



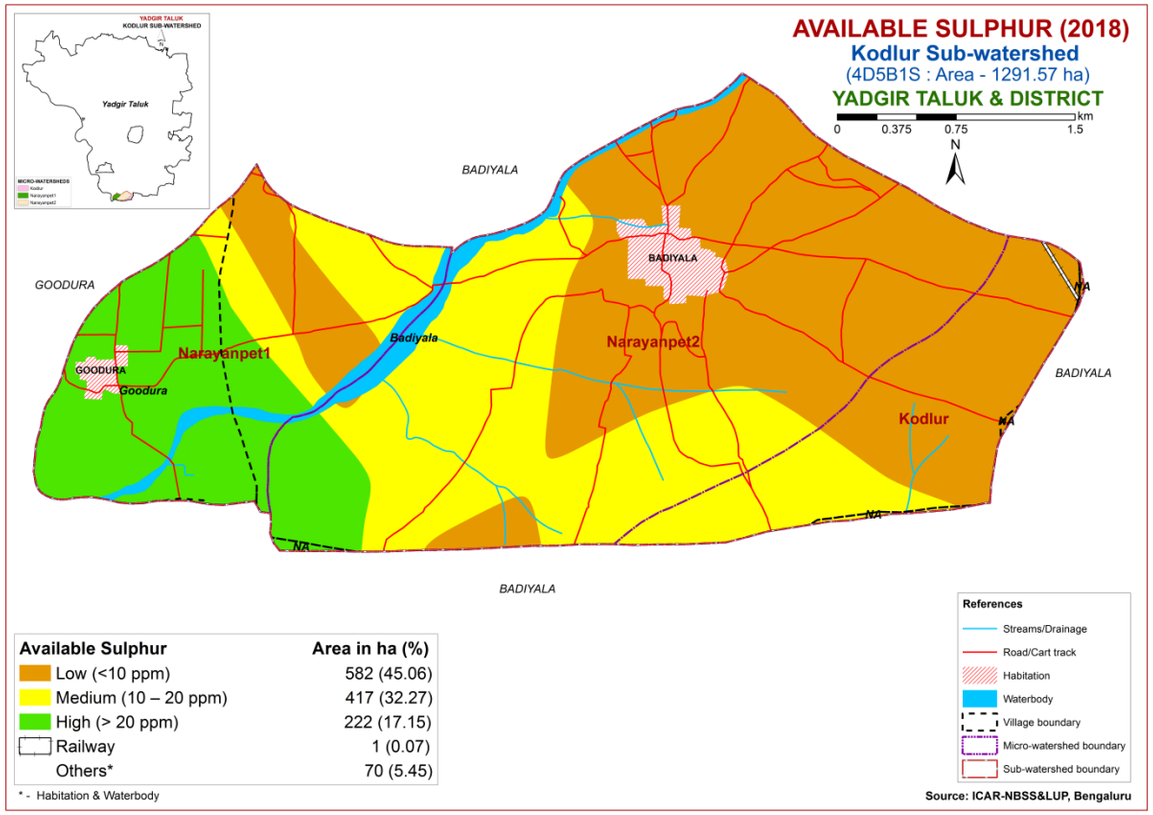
6.4. Available Phosphorus (P_2O_5)



6.5. Available Potassium (K_2O)



6.6. Available Sulphur

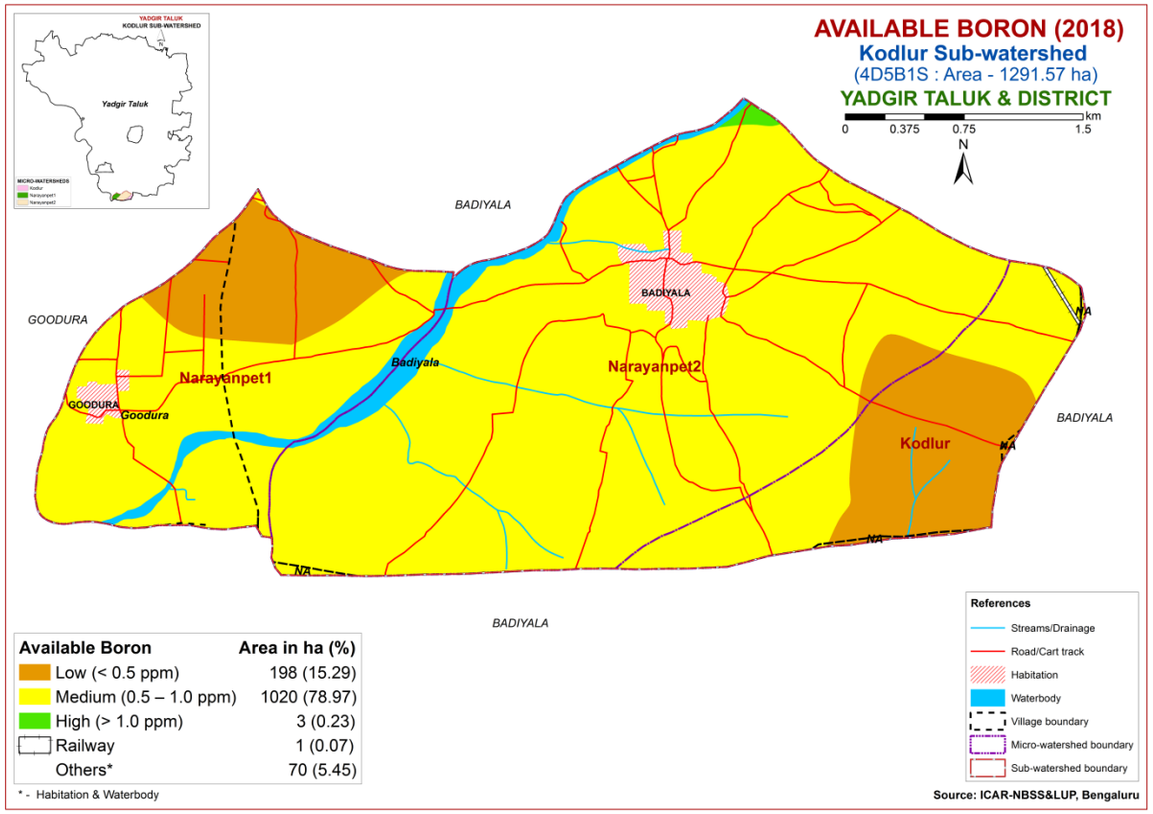


Available Sulphur	Area in ha (%)
Low (<10 ppm)	582 (45.06)
Medium (10 – 20 ppm)	417 (32.27)
High (> 20 ppm)	222 (17.15)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

6.7. Available Boron

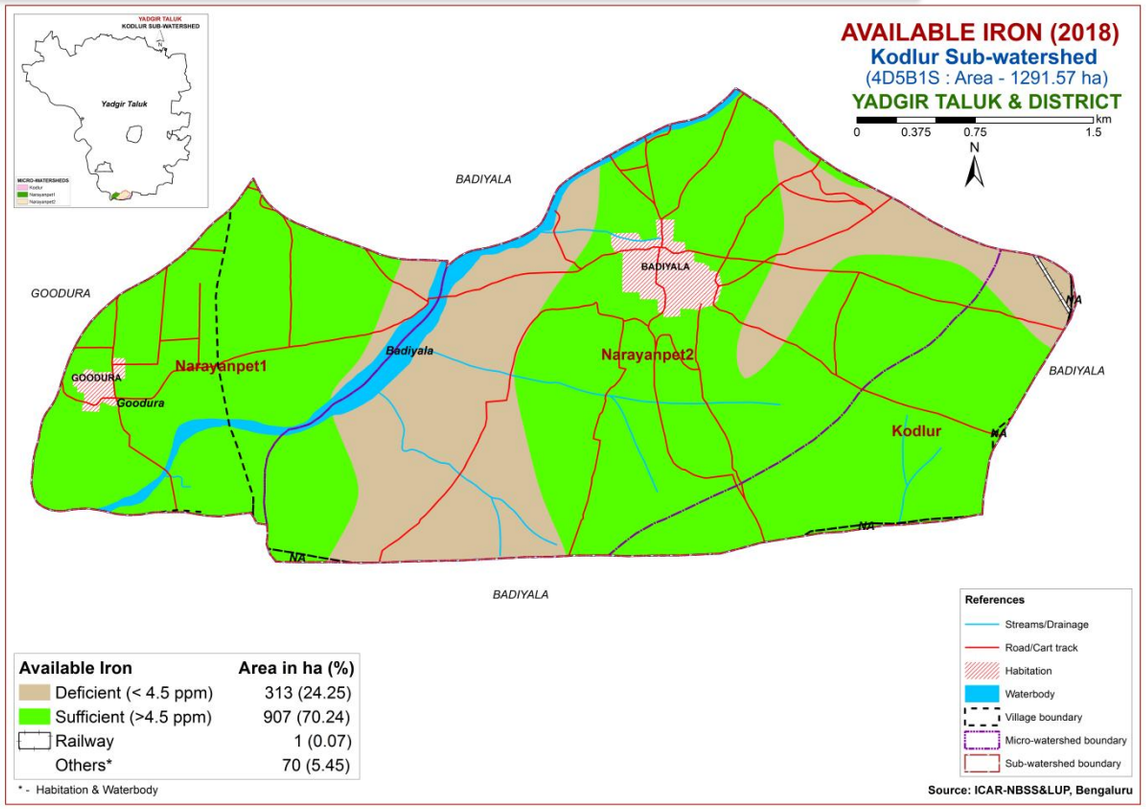


Available Boron	Area in ha (%)
Low (< 0.5 ppm)	198 (15.29)
Medium (0.5 – 1.0 ppm)	1020 (78.97)
High (> 1.0 ppm)	3 (0.23)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

6.8. Available Iron

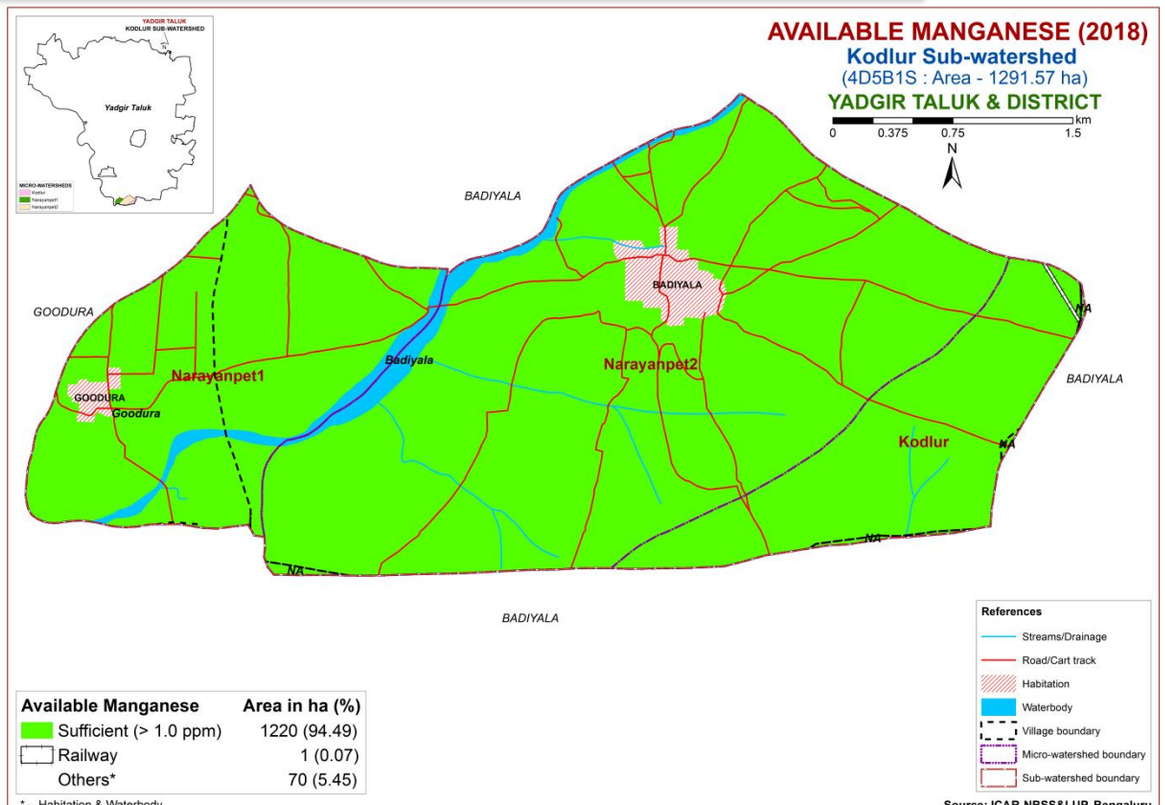


Available Iron	Area in ha (%)
Deficient (< 4.5 ppm)	313 (24.25)
Sufficient (>4.5 ppm)	907 (70.24)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

6.9. Available Manganese

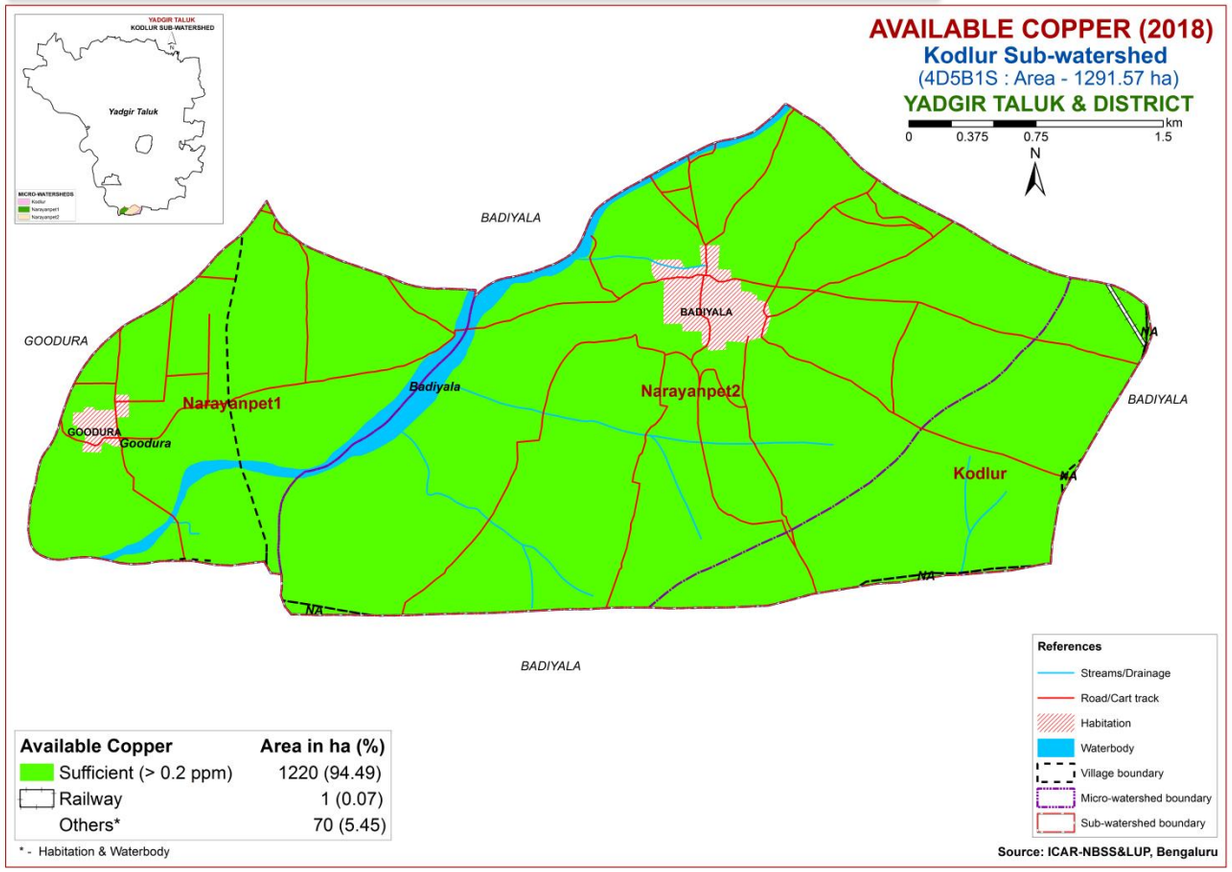


Available Manganese	Area in ha (%)
Sufficient (> 1.0 ppm)	1220 (94.49)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

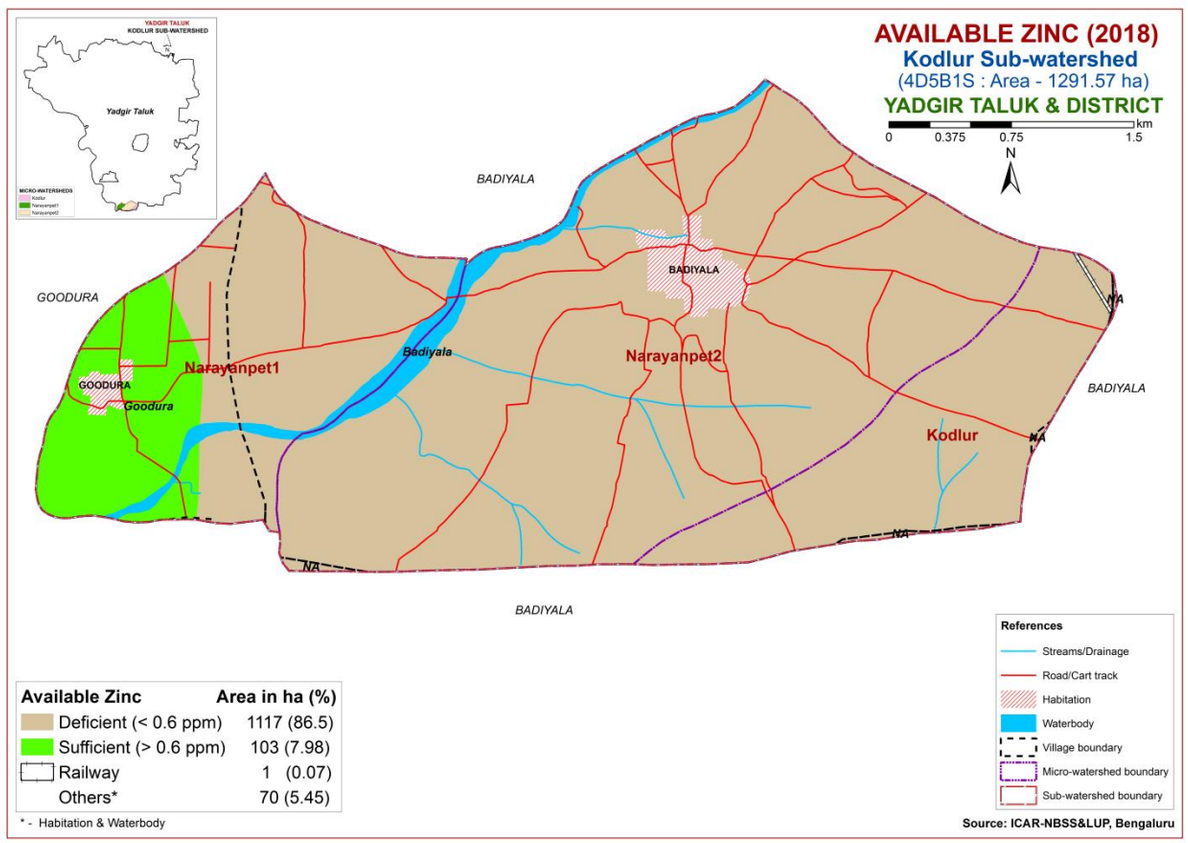
6.10. Available Copper



Available Copper	Area in ha (%)
Sufficient (> 0.2 ppm)	1220 (94.49)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

6.11. Available Zinc



Available Zinc	Area in ha (%)
Deficient (< 0.6 ppm)	1117 (86.5)
Sufficient (> 0.6 ppm)	103 (7.98)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

6.12. Correcting the Soil Nutrient Deficiencies

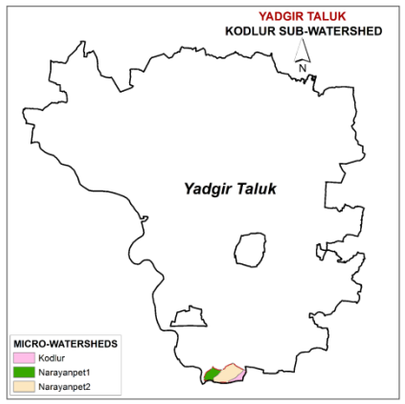
1. Reclamation of Salt affected soils
   a) When the soil is having neutral pH (6.5-7.5), no need of adding amendments (lime or gypsum)
   b) If the soil pH is <6.5, apply burnt lime to soil as per specifically recommended dosage and again after 2 years proper change has to be made based on soil test 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

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

Suitability subclass	Area in ha (%)		
S2r	1 (0.11)	S3n	173 (13.37)
S2w	185 (14.29)	S3nz	17 (1.35)
S2z	173 (13.42)	S3rt	165 (12.79)
S2nw	197 (15.29)	N1r	21 (1.64)
S2rt	148 (11.5)	Railway	1 (0.07)
S2rz	13 (1.04)	Others*	70 (5.45)
S2tn	125 (9.69)		

* - Habitation & Waterbody

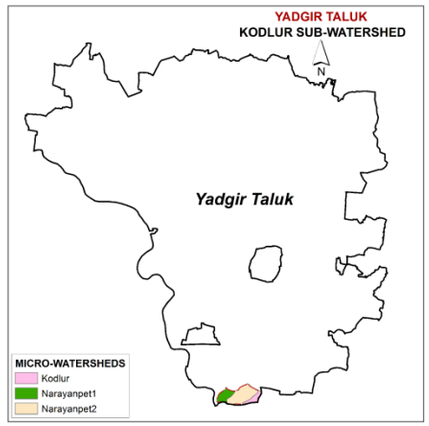
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.2. Land Suitability for Maize



LAND SUITABILITY FOR MAIZE

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S3nz

S2tz

Narayanpet1

GOODURA

Goodura

N1r

S2rz

Badiyala

S3rt

NA

S2w

S3n

BADIYALA

Narayanpet2

S2n

S2tw

NA

BADIYALA

Kodlur

NA

S2r

NA

BADIYALA

Suitability subclass	Area in ha (%)		
S2n	125 (9.69)	S3n	173 (13.37)
S2r	150 (11.61)	S3nz	17 (1.35)
S2w	2 (0.14)	S3rt	165 (12.79)
S2rz	13 (1.04)	N1r	21 (1.64)
S2tw	380 (29.44)	Railway	1 (0.07)
S2tz	173 (13.42)	Others*	70 (5.45)

* - Habitation & Waterbody

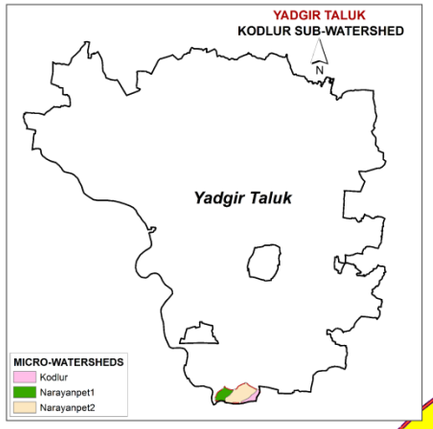
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.3. Land Suitability for Redgram



LAND SUITABILITY FOR REDGRAM

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S2rt

S3nz

GOODURA

S2tz

Badiyala

S3n

BADIYALA

NA

Narayanpet1

Narayanpet2

S2tw

GOODURA

Goodura

BADIYALA

Kodlur

NA

N1r

S3r

S2tn

NA

S2rw

BADIYALA

Suitability subclass	Area in ha (%)
S2rt	183 (14.15)
S2rw	2 (0.14)
S2tn	125 (9.69)
S2tw	197 (15.29)
S2tz	173 (13.42)
S3n	173 (13.37)
S3r	163 (12.65)
S3nz	17 (1.35)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

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

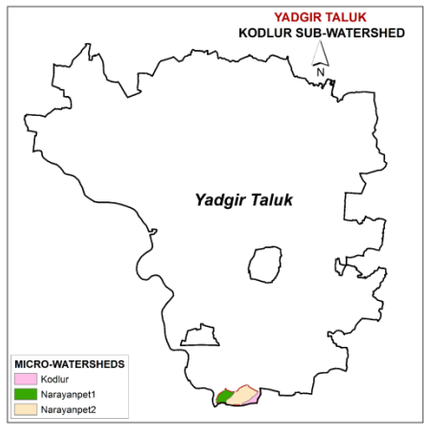
Limitations
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

References
- Streams/Drainage
- Road/Cart track
- 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

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S3nz

S2tz

Badiyala

Narayanpet1

GOODURA

Goodura

N1r

S2rz

S3r

NA

S2w

BADIYALA

S3n

Narayanpet2

S2n

BADIYALA

S2tw

NA

Kodlur

S2r

NA

BADIYALA

Suitability subclass	Area in ha (%)				
S2n	125 (9.69)		S3n	173 (13.37)	
S2r	150 (11.61)		S3r	165 (12.79)	
S2w	2 (0.14)		S3nz	17 (1.35)	
S2rz	13 (1.04)		N1r	21 (1.64)	
S2tw	380 (29.44)		Railway	1 (0.07)	
S2tz	173 (13.42)		Others*	70 (5.45)	

* - Habitation & Waterbody

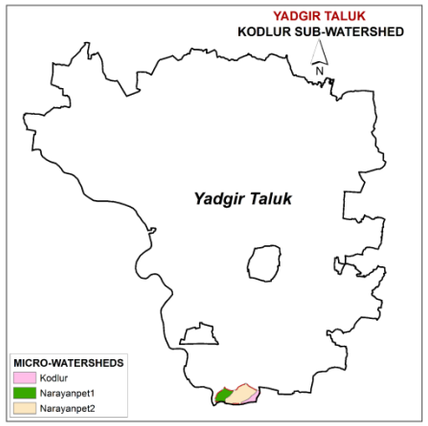
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.5. Land Suitability for Drumstick



LAND SUITABILITY FOR DRUMSTICK

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5

N

BADIYALA
S2rt
BADIYALA
GOODURA
S3z
Badiyala
Narayanpet1
Narayanpet2
N1n
NA
BADIYALA
GOODURA
Goodura
S3rz
N1r
Kodlur
S3r
NA
NA
NA
S2rw
BADIYALA

Suitability subclass	Area in ha (%)
S2rt	183 (14.15)
S2rw	2 (0.14)
S3r	150 (11.61)
S3z	173 (13.42)
S3rz	13 (1.04)
N1n	513 (39.7)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

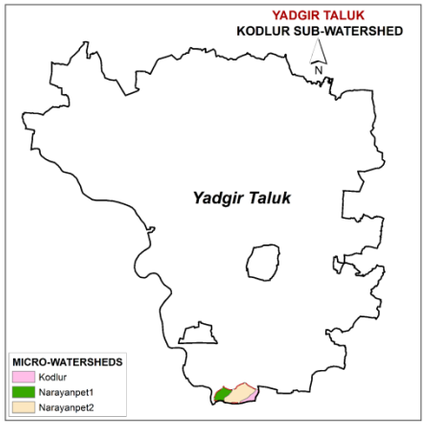
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.6. Land Suitability for Sunflower



LAND SUITABILITY FOR SUNFLOWER

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

Suitability subclass	Area in ha (%)
S2z	173 (13.42)
S2rw	185 (14.29)
S3n	323 (24.97)
S3r	163 (12.65)
N1n	190 (14.73)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

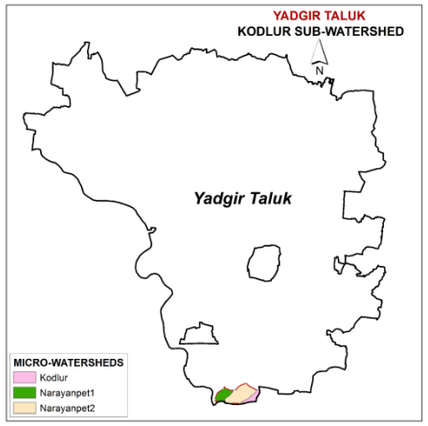
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.7. Land Suitability for Cotton



LAND SUITABILITY FOR COTTON

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S2r

GOODURA

S3nz

S2z

Badiyala

Narayanpet1

GOODURA

Goodura

N1r

N1t

BADIYALA

Narayanpet2

S3n

NA

BADIYALA

Kodlur

NA

S3t

S3tn

NA

BADIYALA

Suitability subclass	Area in ha (%)
S2r	186 (14.4)
S2z	173 (13.42)
S3n	370 (28.66)
S3t	162 (12.54)
S3nz	17 (1.35)
S3tn	125 (9.69)
N1r	21 (1.64)
N1t	165 (12.79)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

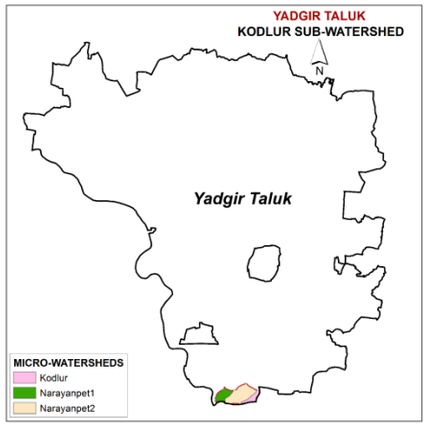
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.8. Land Suitability for Bengalgram



LAND SUITABILITY FOR BENGALGRAM

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5
N

BADIYALA
GOODURA
S1
S3nz
S2z
S3n
S2n
S3t
N1r
N1t
Narayanpet1
Narayanpet2
Kodlur
Badiyala
Goodura
NA

Suitability subclass	Area in ha (%)
S1	183 (14.15)
S2n	197 (15.29)
S2z	173 (13.42)
S3n	173 (13.37)
S3t	290 (22.48)
S3nz	17 (1.35)
N1r	21 (1.64)
N1t	165 (12.79)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

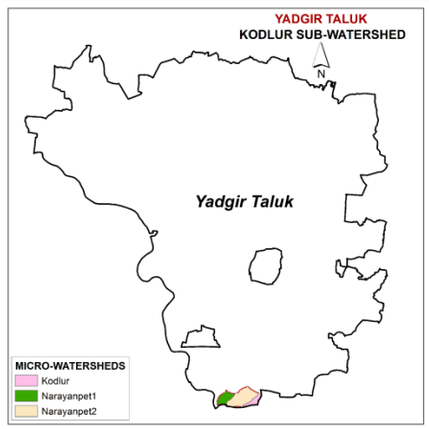
Key
S1- Highly Suitable
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.9. Land Suitability for Groundnut



LAND SUITABILITY FOR GROUNDNUT

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5

N

BADIYALA

GOODURA

S3t

Badiyala

N1n

BADIYALA

Narayanpet2

S3tn

NA

Narayanpet1

GOODURA

Goodura

N1r

S2rz

S3r

Kodlur

S2r

S3n

NA

S2tw

S2r NA

BADIYALA

Suitability subclass	Area in ha (%)		
S2r	148 (11.5)	S3t	356 (27.57)
S2rt	1 (0.11)	S3tn	197 (15.29)
S2rz	13 (1.04)	N1n	190 (14.73)
S2tw	2 (0.14)	N1r	21 (1.64)
S3n	125 (9.69)	Railway	1 (0.07)
S3r	165 (12.79)	Others*	70 (5.45)

* - Habitation & Waterbody

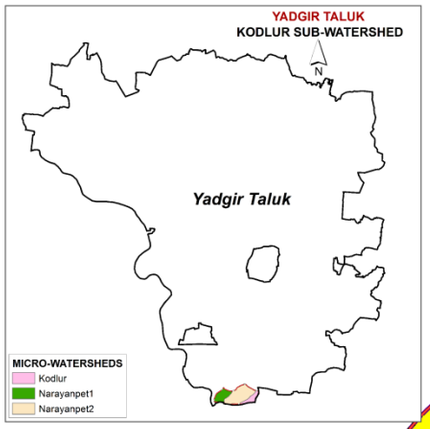
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.10. Land Suitability for Chilli



LAND SUITABILITY FOR CHILLI

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S2tz

Narayanpet1

Badiyala

N1n

S2tw

BADIYALA

Narayanpet2

S3n

NA

BADIYALA

GOODURA

Goodura

N1r

S2rz

S3r

Kodlur

NA

S2r

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	2 (0.14)
S2rz	13 (1.04)
S2tw	183 (14.15)
S2tz	173 (13.42)
S3n	323 (24.97)
S3r	165 (12.79)
N1n	190 (14.73)
N1r	21 (1.64)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

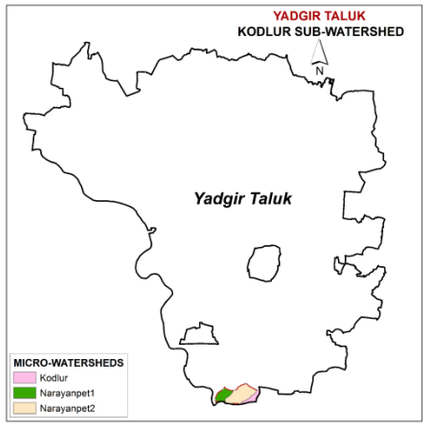
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.11. Land Suitability for Pomegranate



LAND SUITABILITY FOR POMEGRANATE

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA
GOODURA
S2rt
S2tz
N1n
S3n
Narayanpet1
Narayanpet2
Badiyala
Goodura
Kodlur
N1r
S3r
NA
S2rw

Suitability subclass	Area in ha (%)
S2rt	183 (14.15)
S2rw	2 (0.14)
S2tz	173 (13.42)
S3n	323 (24.97)
S3r	163 (12.65)
N1n	190 (14.73)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

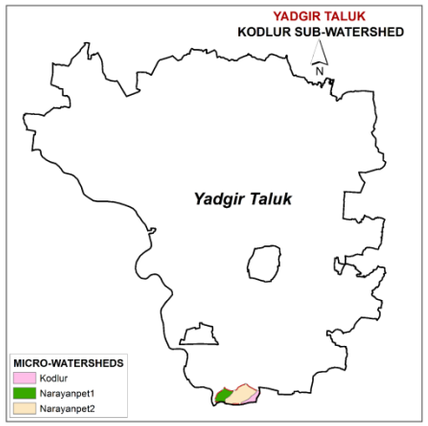
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.12. Land Suitability for Tomato



LAND SUITABILITY FOR TOMATO

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

BADIYALA

NA

S3t

N1n

Badiyala

Narayanpet2

S3tn

Narayanpet1

GOODURA

Goodura

N1r

S2rz

S3r

S3n

Kodlur

S2r

NA

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)		
S2r	150 (11.61)	S3tn	197 (15.29)
S2w	2 (0.14)	N1n	190 (14.73)
S2rz	13 (1.04)	N1r	21 (1.64)
S3n	125 (9.69)	Railway	1 (0.07)
S3r	165 (12.79)	Others*	70 (5.45)
S3t	356 (27.57)		

* - Habitation & Waterbody

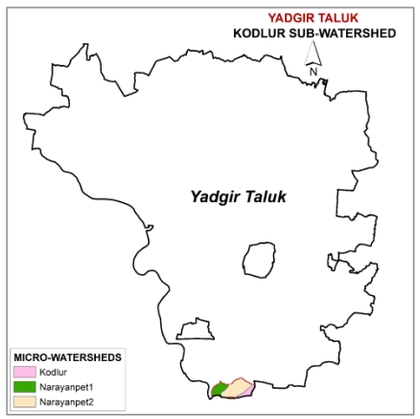
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.13. Land Suitability for Mulberry



LAND SUITABILITY FOR MULBERRY

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5

N

BADIYALA
GOODURA
BADIYALA
BADIYALA
BADIYALA
BADIYALA
NA
NA
NA
NA
Goodura
Badiyala
Kodlur
S3t
S3tz
S3rz
N1r
N1n
S3r
S2rw
Narayanpet1
Narayanpet2

Suitability subclass	Area in ha (%)
S2rw	2 (0.14)
S3r	150 (11.61)
S3t	183 (14.15)
S3rz	13 (1.04)
S3tz	173 (13.42)
N1n	513 (39.7)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

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

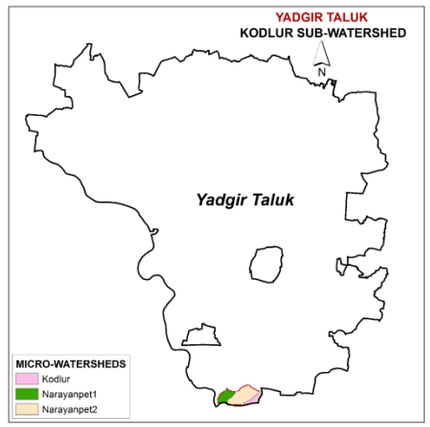
Limitations
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

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

Source: ICAR-NBSS&LUP, Bengaluru

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

7.14. Land Suitability for Bhendi



LAND SUITABILITY FOR BHENDI

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S2tw

GOODURA

S2tz

Narayanpet1

Badiyala

N1n

BADIYALA

Narayanpet2

S3n

NA

BADIYALA

GOODURA

Goodura

N1r

S2rz

S3r

Kodlur

NA

S2r

NA

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	2 (0.14)
S2rz	13 (1.04)
S2tw	183 (14.15)
S2tz	173 (13.42)
S3n	323 (24.97)
S3r	165 (12.79)
N1n	190 (14.73)
N1r	21 (1.64)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

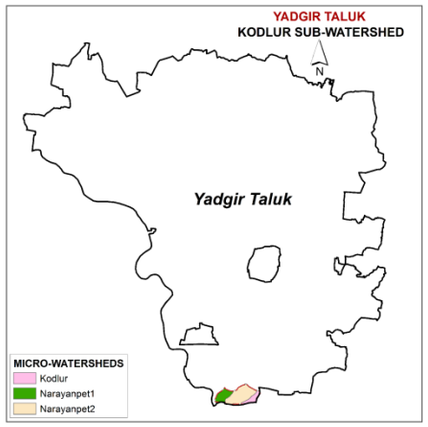
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

References
- Streams/Drainage
- Road/Cart track
- 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

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S3t

S3tz

Badiyala

Narayanpet1

Narayanpet2

BADIYALA

NA

N1n

GOODURA

Goodura

S3rz

N1r

Kodlur

S3r

BADIYALA

NA

NA

S2rw

BADIYALA

Suitability subclass	Area in ha (%)
S2rw	2 (0.14)
S3r	150 (11.61)
S3t	183 (14.15)
S3rz	13 (1.04)
S3tz	173 (13.42)
N1n	513 (39.7)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

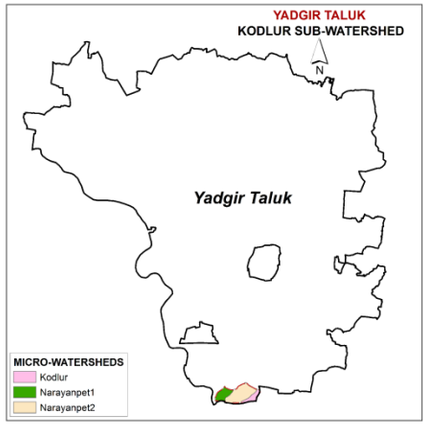
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.16. Land Suitability for Mango



LAND SUITABILITY FOR MANGO

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S3rt

BADIYALA

GOODURA

S3t

N1n

Badiyala

Narayanpet1

Narayanpet2

S3tn

NA

GOODURA

Goodura

BADIYALA

Kodlur

NA

N1r

S3n

NA

NA

S3r

BADIYALA

Suitability subclass	Area in ha (%)
S3n	125 (9.69)
S3r	2 (0.14)
S3t	173 (13.42)
S3rt	183 (14.15)
S3tn	197 (15.29)
N1n	190 (14.73)
N1r	350 (27.08)
Railway	1 (0.07)
Others*	70 (5.45)

Key
S3- Marginally Suitable
N1- Currently Not Suitable

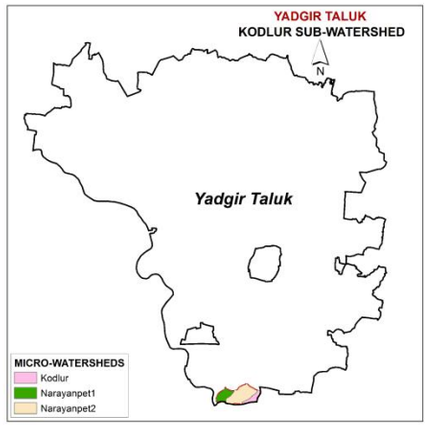
Limitations
n- nutrient availability
r- rooting condition
t- texture

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

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

7.17. Land Suitability for Sapota



LAND SUITABILITY FOR SAPOTA

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

BADIYALA

S3t

N1n

Badiyala

Narayanpet2

S3tn

BADIYALA

GOODURA

Narayanpet1

Goodura

Kodlur

NA

N1r

S3r

S3n

NA

NA

S2rw

BADIYALA

Suitability subclass	Area in ha (%)
S2rw	2 (0.14)
S3n	125 (9.69)
S3r	163 (12.65)
S3t	356 (27.57)
S3tn	197 (15.29)
N1n	190 (14.73)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

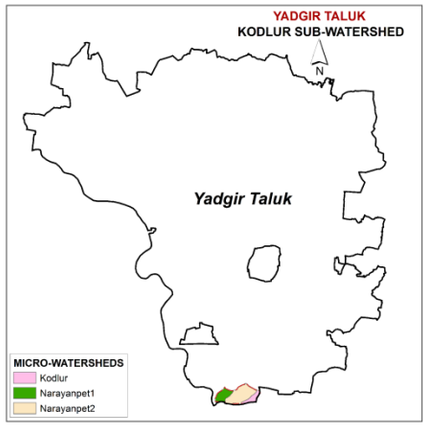
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.18. Land Suitability for Jackfruit



LAND SUITABILITY FOR JACKFRUIT

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S3t

BADIYALA

GOODURA

S3tz

Badiyala

Narayanpet1

Narayanpet2

N1n

NA

BADIYALA

GOODURA

Goodura

S3rz

N1r

Kodlur

S3r

NA

NA

NA

S2rw

BADIYALA

Suitability subclass	Area in ha (%)
S2rw	2 (0.14)
S3r	150 (11.61)
S3t	183 (14.15)
S3rz	13 (1.04)
S3tz	173 (13.42)
N1n	513 (39.7)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

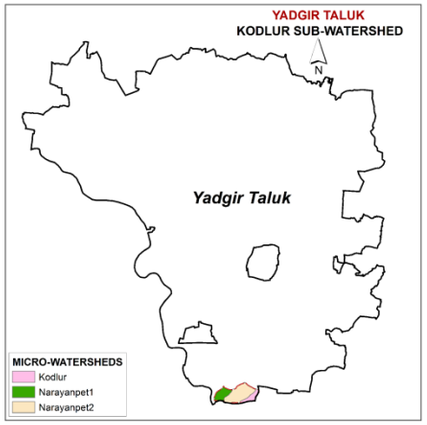
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.19. Land Suitability for Jamun



LAND SUITABILITY FOR JAMUN

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S3rt

BADIYALA

GOODURA

S3z

Badiyala

Narayanpet1

Narayanpet2

N1n

NA

BADIYALA

GOODURA

Goodura

S3rz

N1r

Kodlur

NA

S3r

NA

NA

BADIYALA

Suitability subclass	Area in ha (%)
S3r	152 (11.75)
S3z	173 (13.42)
S3rt	183 (14.15)
S3rz	13 (1.04)
N1n	513 (39.7)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Key
S3- Marginally Suitable
N1- Currently Not Suitable

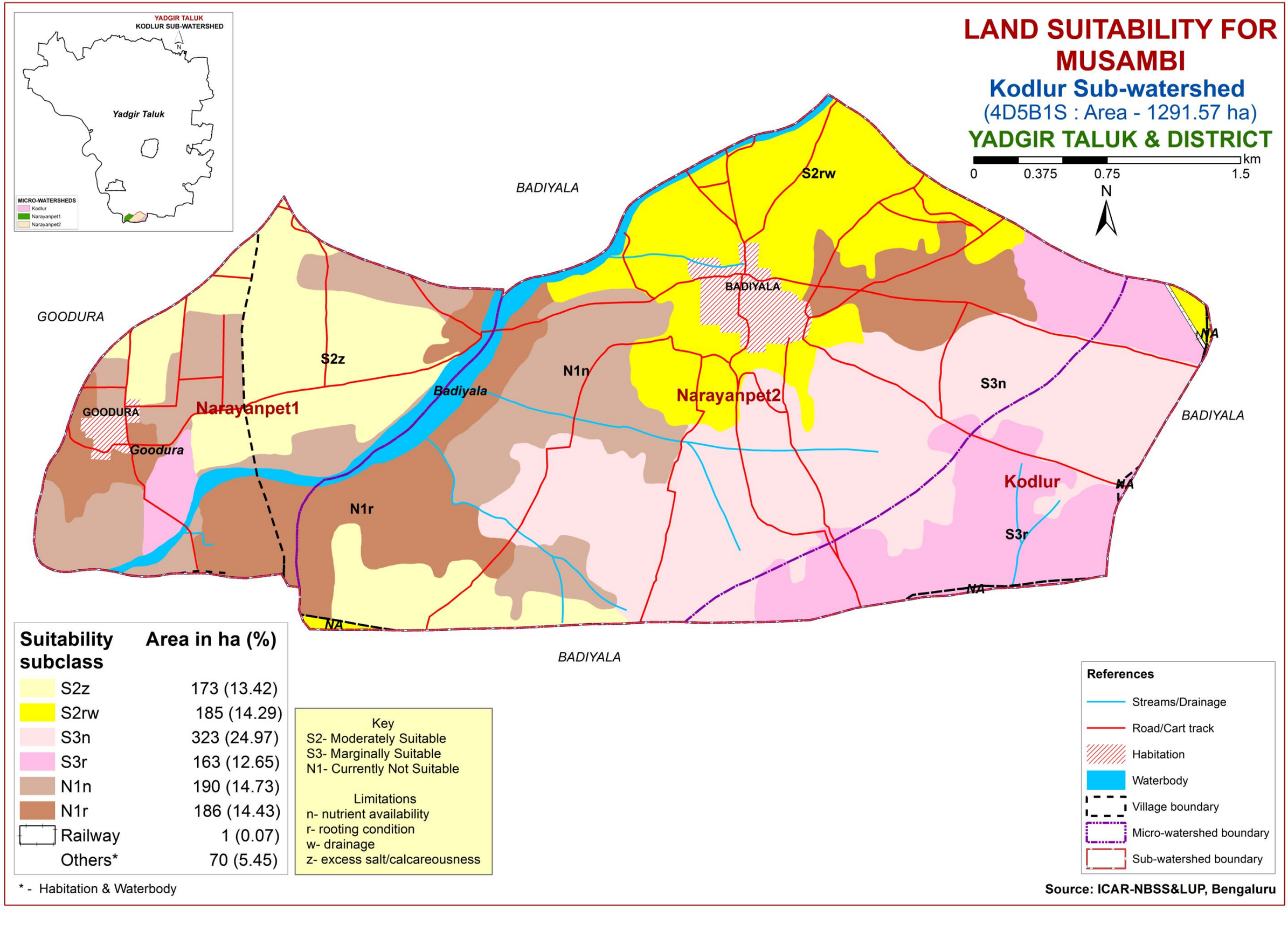
Limitations
n- nutrient availability
r- rooting condition
t- texture
z- excess salt/calcareousness

References

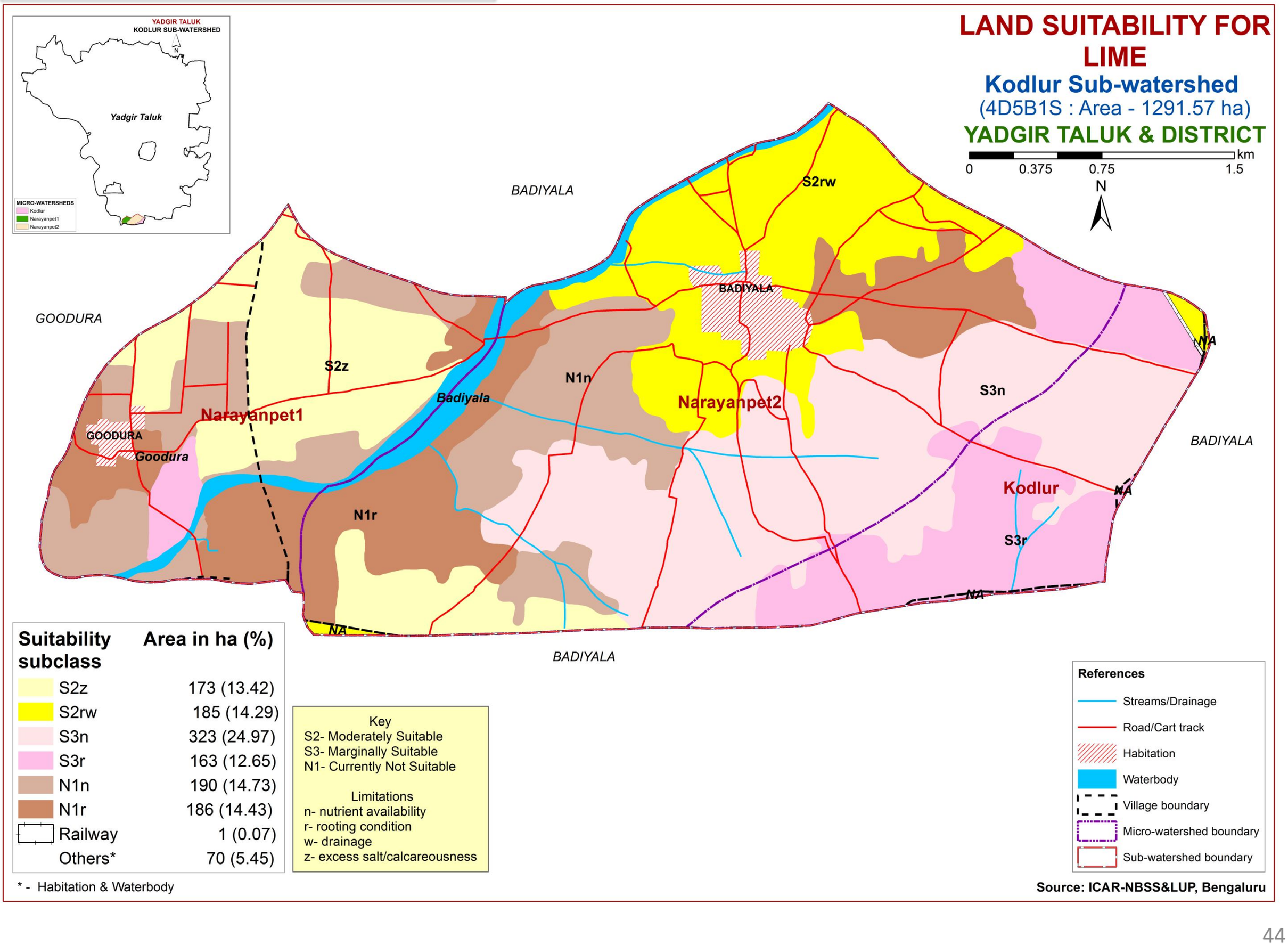
- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Village boundary
- Micro-watershed boundary
- Sub-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

7.20. Land Suitability for Musambi



7.21. Land Suitability for Lime



Suitability subclass	Area in ha (%)
S2z	173 (13.42)
S2rw	185 (14.29)
S3n	323 (24.97)
S3r	163 (12.65)
N1n	190 (14.73)
N1r	186 (14.43)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

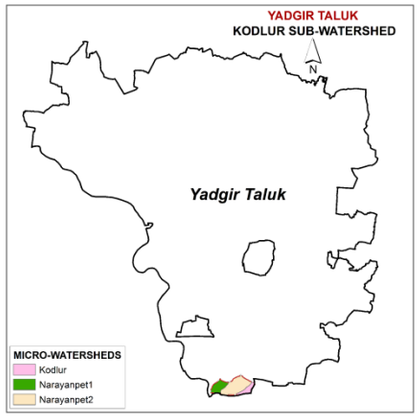
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.22. Land Suitability for Cashew



LAND SUITABILITY FOR CASHEW

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

N1t

Narayanpet1

Badiyala

BADIYALA

Narayanpet2

N1tn

NA

BADIYALA

GOODURA

Goodura

N1r

N1zn

Kodlur

NA

N1n

S3r NA

NA

BADIYALA

Suitability subclass	Area in ha (%)
S3r	1 (0.11)
N1n	458 (35.47)
N1r	21 (1.64)
N1t	173 (13.42)
N1tn	553 (42.81)
N1zn	13 (1.04)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

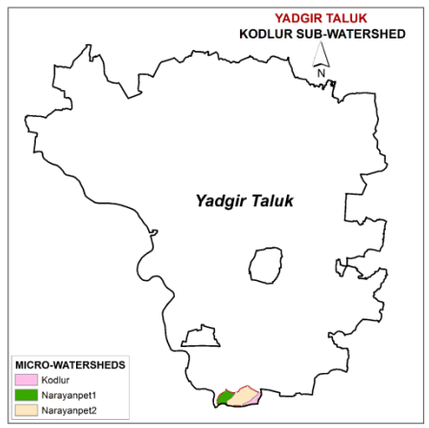
Key
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.23. Land Suitability for Custard Apple



LAND SUITABILITY FOR CUSTARD APPLE

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	185 (14.29)
S2z	173 (13.42)
S2rz	13 (1.04)
S3n	323 (24.97)
S3rt	165 (12.79)
N1n	190 (14.73)
N1r	21 (1.64)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

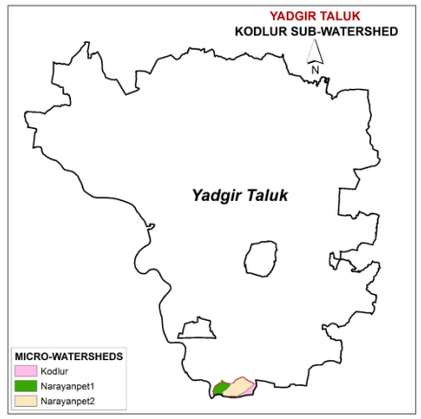
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.24. Land Suitability for Amla



LAND SUITABILITY FOR AMLA

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

km
0 0.375 0.75 1.5
N

BADIYALA
GOODURA
S2tw
S3z
Badiyala
Narayanpet1
Narayanpet2
N1n
NA
GOODURA
Goodura
N1r
S2rz
S3rt
Kodlur
S2r
NA
NA
S2w
BADIYALA
BADIYALA

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	2 (0.14)
S2rz	13 (1.04)
S2tw	183 (14.15)
S3z	173 (13.42)
S3rt	165 (12.79)
N1n	513 (39.7)
N1r	21 (1.64)
Railway	1 (0.07)
Others	70 (5.45)

* - Habitation & Waterbody

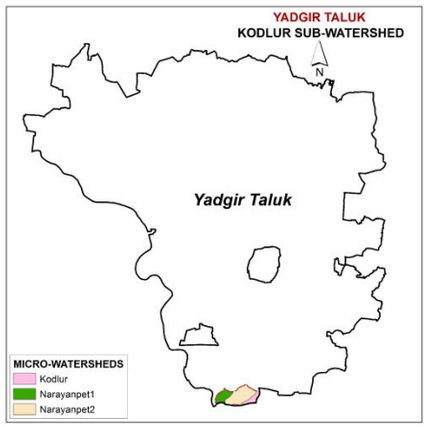
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.25. Land Suitability for Tamarind



LAND SUITABILITY FOR TAMARIND

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

S3r

BADIYALA

GOODURA

S3z

Badiyala

Narayanpet1

Narayanpet2

N1n

BADIYALA

NA

GOODURA

Goodura

Kodlur

NA

N1r

NA

NA

BADIYALA

Suitability subclass	Area in ha (%)
S3r	185 (14.29)
S3z	173 (13.42)
N1n	513 (39.7)
N1r	350 (27.08)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

Key
S3- Marginally Suitable
N1- Currently Not Suitable

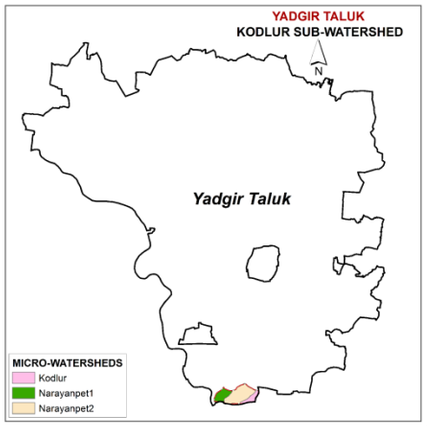
Limitations
n- nutrient availability
r- rooting condition
z- excess salt/calcareousness

References

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

Source: ICAR-NBSS&LUP, Bengaluru

7.26. Land Suitability for Brinjal



LAND SUITABILITY FOR BRINJAL

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S3t

N1n

Badiyala

Narayanpet1

Narayanpet2

BADIYALA

S3tn

NA

BADIYALA

GOODURA

Goodura

N1r

S2rz

S3r

S3n

Kodlur

S2r

NA

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)		
S2r	150 (11.61)	S3tn	197 (15.29)
S2w	2 (0.14)	N1n	190 (14.73)
S2rz	13 (1.04)	N1r	21 (1.64)
S3n	125 (9.69)	Railway	1 (0.07)
S3r	165 (12.79)	Others*	70 (5.45)
S3t	356 (27.57)		

* - Habitation & Waterbody

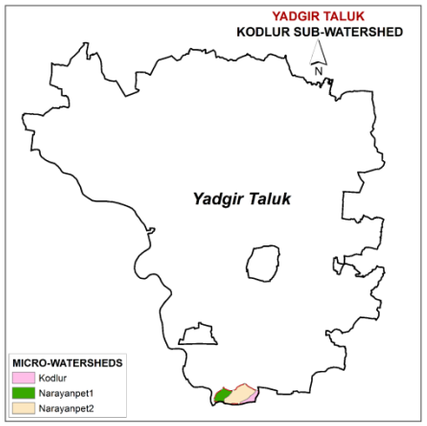
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.27. Land Suitability for Onion



LAND SUITABILITY FOR ONION

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S3t

S3tz

Badiyala

Narayanpet1

Narayanpet2

BADIYALA

N1n

NA

BADIYALA

GOODURA

Goodura

N1r

S2rz

S3r

Kodlur

S2r

NA

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	2 (0.14)
S2rz	13 (1.04)
S3r	165 (12.79)
S3t	183 (14.15)
S3tz	173 (13.42)
N1n	513 (39.7)
N1r	21 (1.64)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

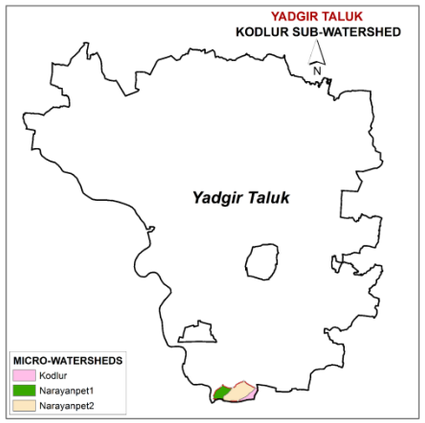
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.28. Land Suitability for Marigold



LAND SUITABILITY FOR MARIGOLD

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA
S2tw
BADIYALA
NA
GOODURA
S2tz
N1n
Badiyala
Narayanpet1
Narayanpet2
S3n
BADIYALA
GOODURA
Goodura
N1r
S2rz
S3r
Kodlur
NA
S2r
NA
NA
S2w
BADIYALA

Suitability subclass	Area in ha (%)		
S2r	150 (11.61)	S3r	165 (12.79)
S2w	2 (0.14)	N1n	190 (14.73)
S2rz	13 (1.04)	N1r	21 (1.64)
S2tw	183 (14.15)	Railway	1 (0.07)
S2tz	173 (13.42)	Others*	70 (5.45)
S3n	323 (24.97)		

* - Habitation & Waterbody

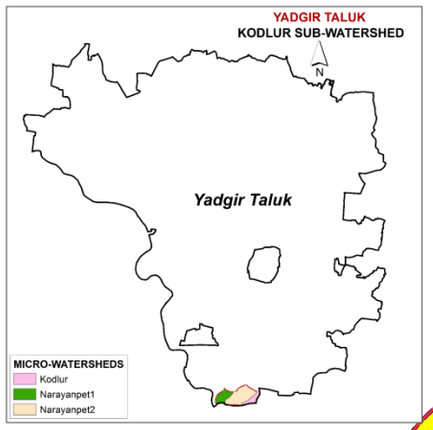
Key
S2- Moderately Suitable
S3- Marginally Suitable
N1- Currently Not Suitable

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

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

Source: ICAR-NBSS&LUP, Bengaluru

7.29. Land Suitability for Chrysanthemum



LAND SUITABILITY FOR CHRYSANTHEMUM

Kodlur Sub-watershed

(4D5B1S : Area - 1291.57 ha)

YADGIR TALUK & DISTRICT

0 0.375 0.75 1.5 km

N

BADIYALA

GOODURA

S2tz

Narayanpet1

Badiyala

N1n

S2tw

BADIYALA

Narayanpet2

S3n

NA

BADIYALA

GOODURA

Goodura

N1r

S2rz

S3r

Kodlur

NA

S2r

NA

NA

S2w

BADIYALA

Suitability subclass	Area in ha (%)
S2r	150 (11.61)
S2w	2 (0.14)
S2rz	13 (1.04)
S2tw	183 (14.15)
S2tz	173 (13.42)
S3n	323 (24.97)
S3r	165 (12.79)
N1n	190 (14.73)
N1r	21 (1.64)
Railway	1 (0.07)
Others*	70 (5.45)

* - Habitation & Waterbody

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

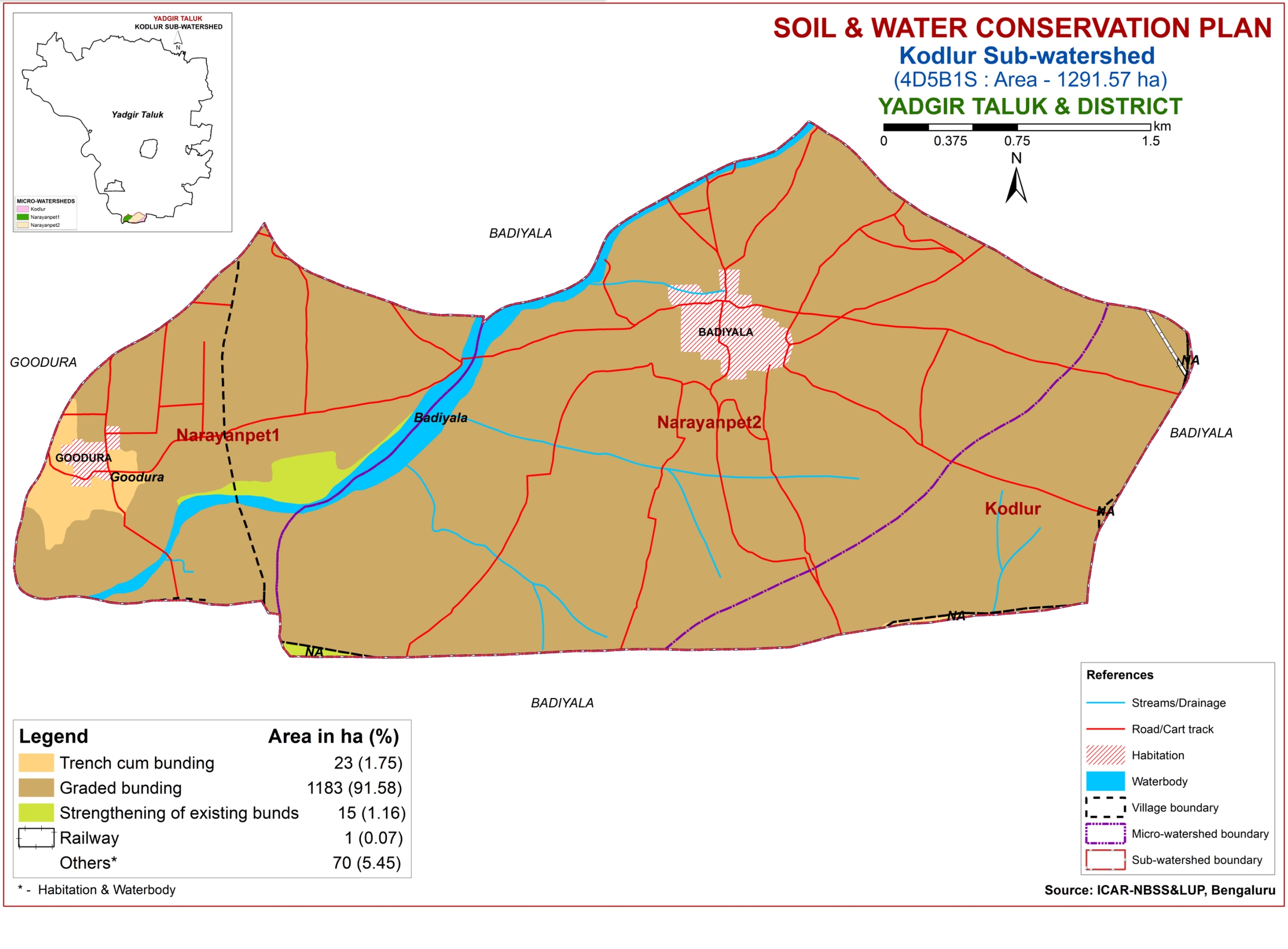
Limitations
n- nutrient availability
r- rooting condition
t- texture
w- drainage
z- excess salt/calcareousness

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

Source: ICAR-NBSS&LUP, Bengaluru

8. Soil and Water Conservation Measures

8.1. Soil & Water Conservation Plan



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

LMU. No	Soil Map Units	Field Crops/ Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
1	61.MDRmB2, 95.HGNmB2 (Very deep, strongly alkaline soils)	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
2	157.KDHiA1 (Moderately deep to very deep, lowland soils)	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
3	48.NGPiB2, 49.NGPmB2 82.MGLmB2 (Moderately deep to deep, black soils)	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
4	35.GWDiB2, 53.ANRhB2 55.ANRiB2, 103.TMKhA1 104.TMKiB2 (Sodic soils)	-	**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	Field Crops/Commercial crops	Horticulture Crops (Rainfed/Irrigated)	Suitable Interventions
5	17.HLGiB2,22.JNKiB2 26.DPLiB2 (Moderately shallow, sandy clay to sandy clay loam soils)	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
6	5.BDLiB2,6.BDLiB3 (Shallow soils)	-	**Agri-Silvi-Pasture:** Hybrid Napier, *Styloxanthes hamata,* Glyricidia, *Styloxanthes scabra*	Use of short duration varieties, sowing across the slope and split application of nitrogen fertilizers
7	1.BDPiB2 (Very shallow soils)	-	Hybrid Napier, *Styloxanthes hamata*, *Styloxanthes scabra*	Use of short duration varieties, sowing across the slope

PART-B

Hydrological Inventory of Khanahalli 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 Kodlur 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

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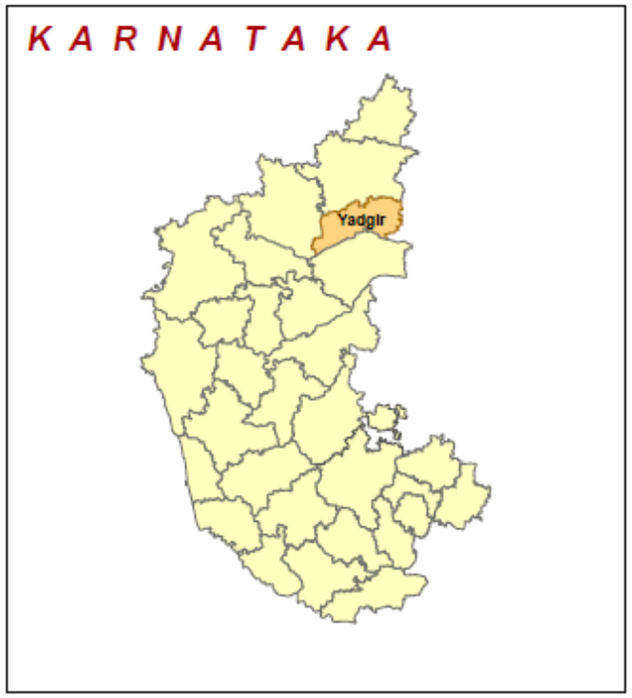
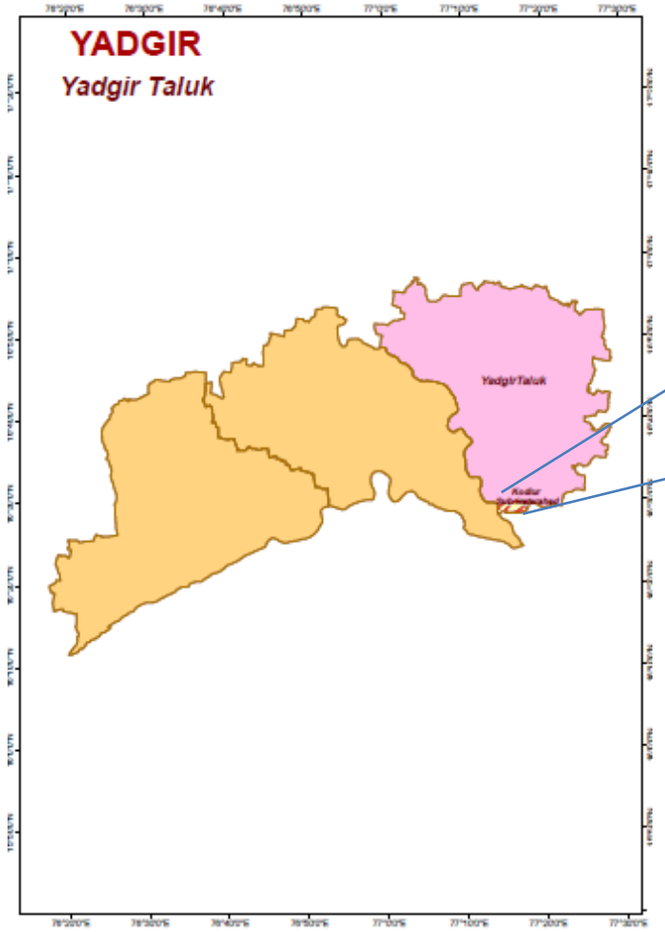
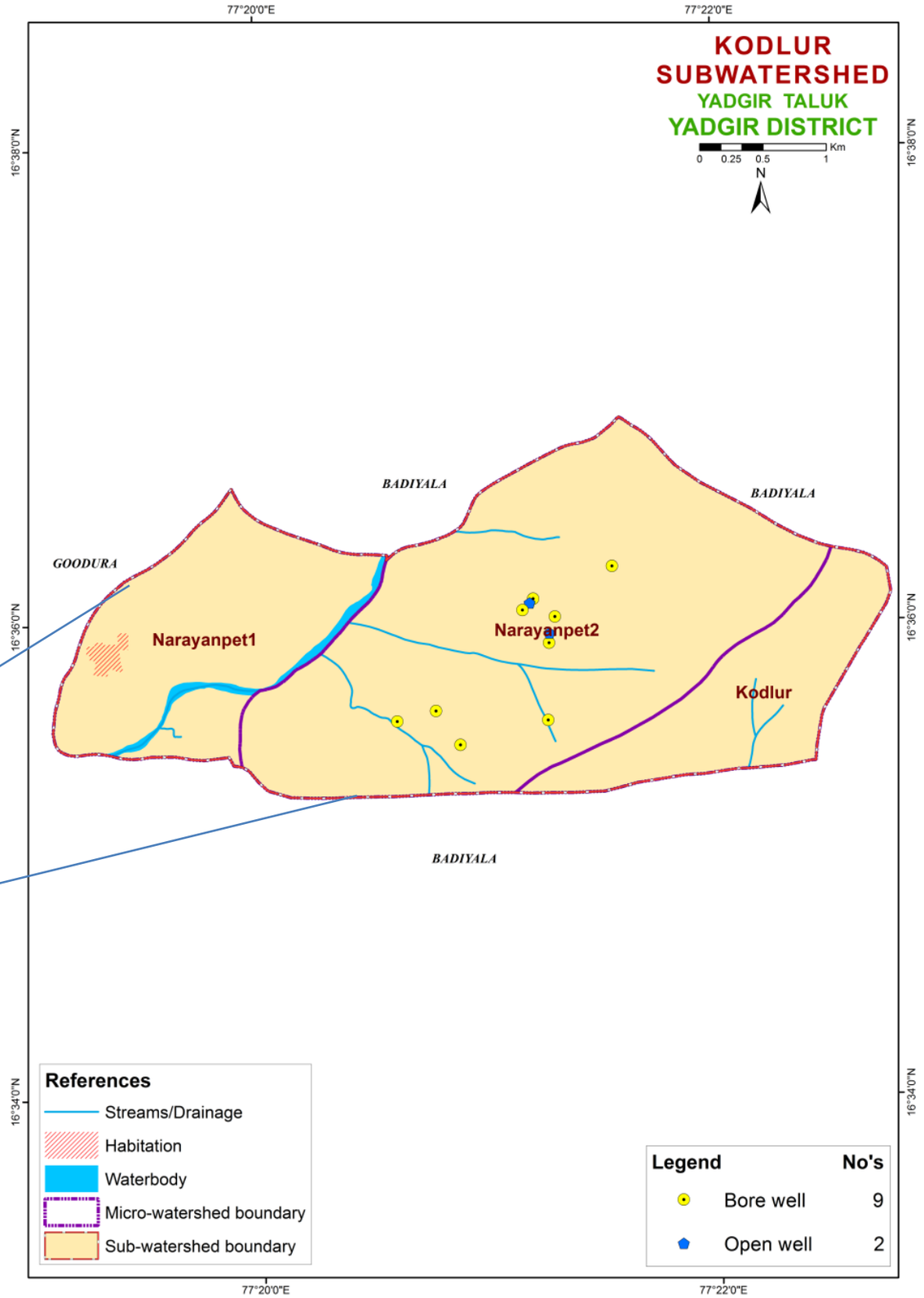
INTRODUCTION

- The inventory and documentation of spatial and temporal changes in hydrological components of Kodlur sub-watershed (4D5B1S) in Yadgir Taluk, Yadgir District, has been undertaken for integrated planning, development and management.
- Kodlur sub-watershed (Yadgir Taluk, Yadgir District) is located between $16^0$28’26”–$16^0$30’3” North latitudes and 77^0 14’15”- 77^0 18’3” East longitudes, covering an area of about 1289 ha.
- This sub-watershed encompasses of 3 MWs namely Kodlur (4D5B1S2a), Narayanpet-1 (4D5B1S1b) and Narayanpet-2 (4D5B1S1a). Land Resource Inventory (LRI) was generated for all the three micro-watersheds .
- Average annual rainfall (1960-2014) of the Hobli (Block) pertaining to the sub-watershed is 887 mm.
- In this sub-watershed major *kharif* crops grown are Maize, Cotton, Sunflower, Groundnut, Red gram, Chilly, Soybean , Paddy and major *rabi* crops are Sorghum, Bengalgram, Bajra.
- Hydrological components namely rainfall (annual, *kharif*, *rabi* and summer), PET, AET, runoff, surface soil moisture, ground water status and water balance are presented.

LOCATION MAP OF KODLUR SUB-WATERSHED

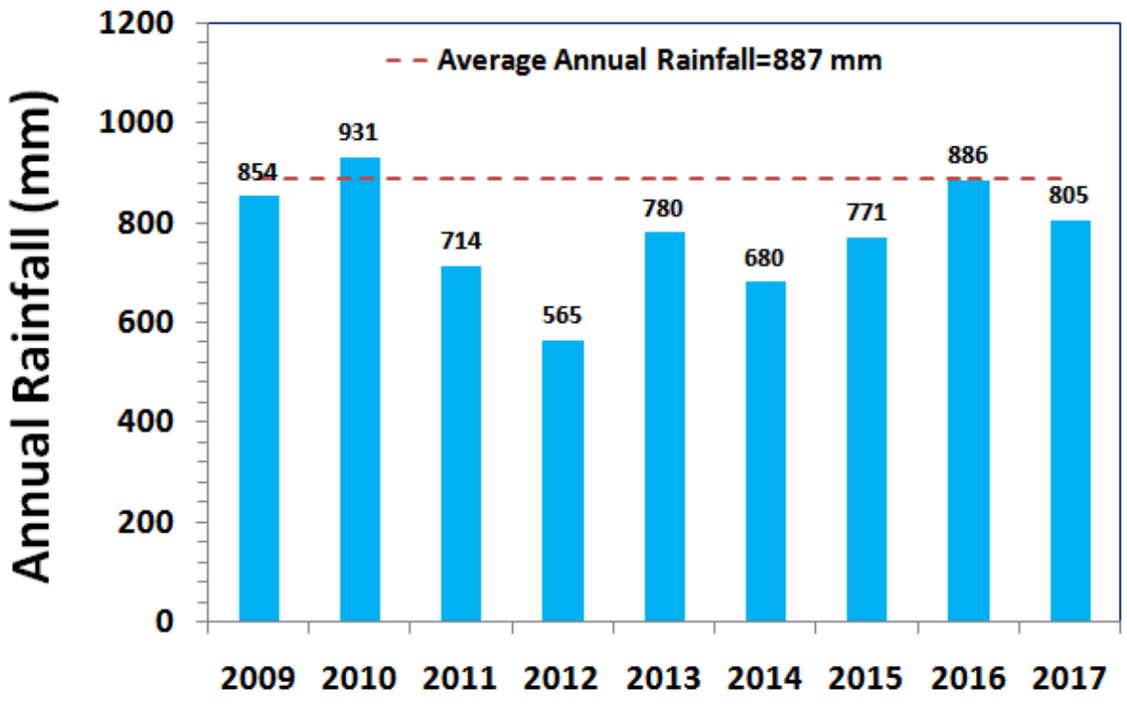






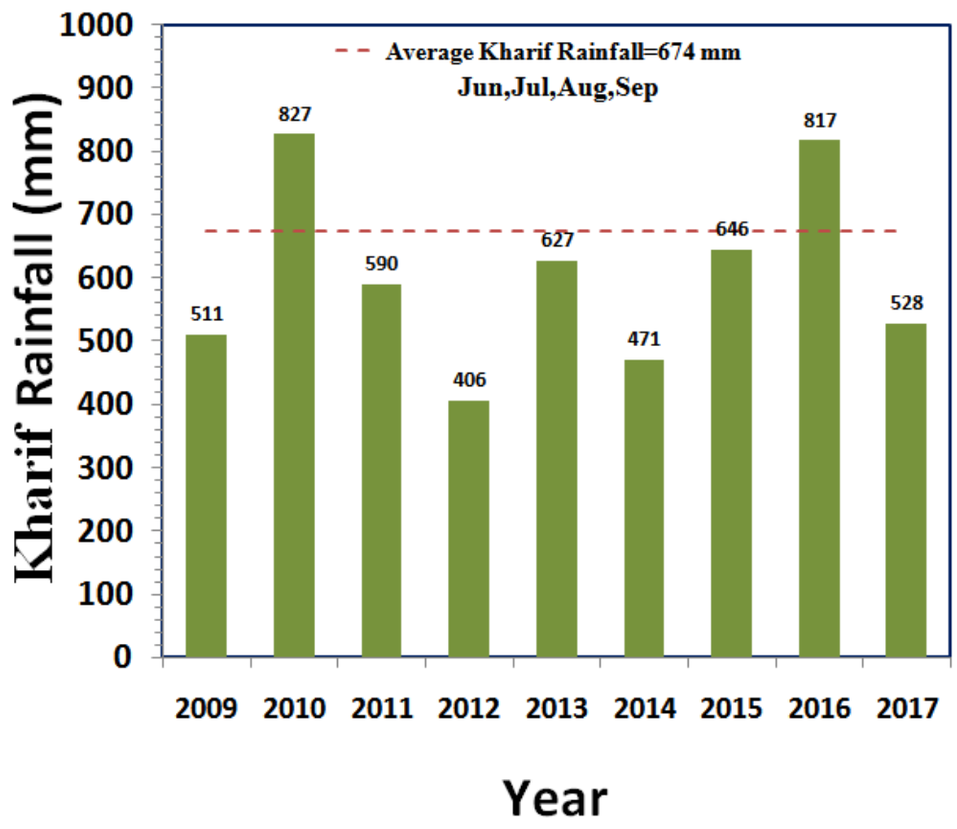
Soil & Water Conservation Structures in Kodlur sub-watershed, Yadgir Taluk, Yadgir District

RAINFALL INDEX

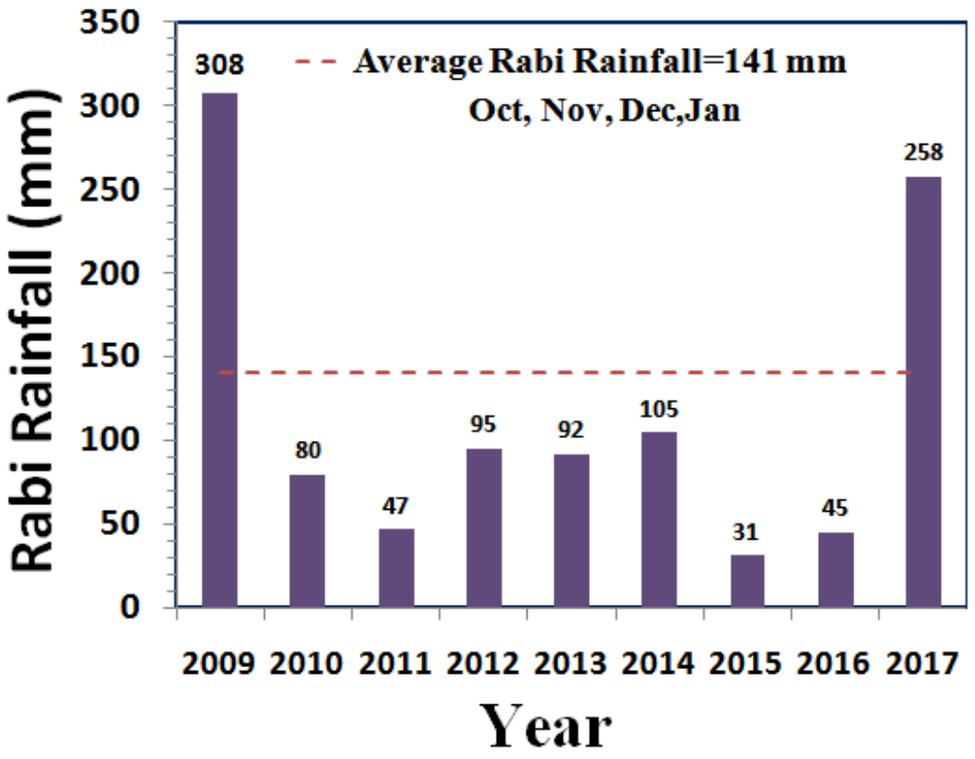


The average annual rainfall (1960-2014) recorded at the Yadgir station in Yadgir taluk of Yadgir district is 887 mm. The annual rainfall at Saidapur station (Hobli H.Q.) is presented. During the years 2009, 2011, 2012, 2013, 2014, 2015 and 2017 the annual rainfall was deficient by 5%, 27%, 51%, 17%, 33%, 18% and 13% 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 annual rainfall was deficient by 24%, 12%, 40%, 7 %, 30%, 4% and 22% respectively.

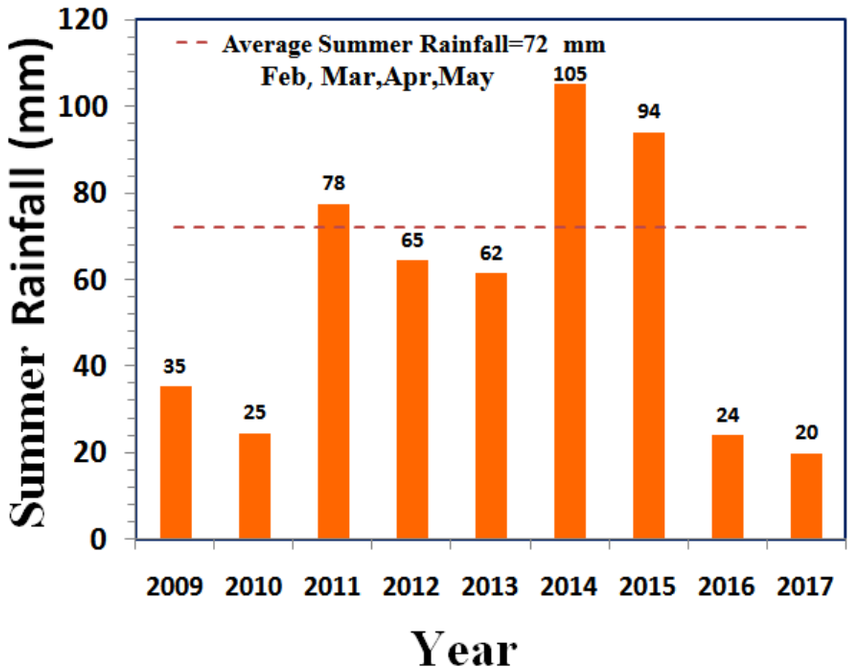


RAINFALL INDEX

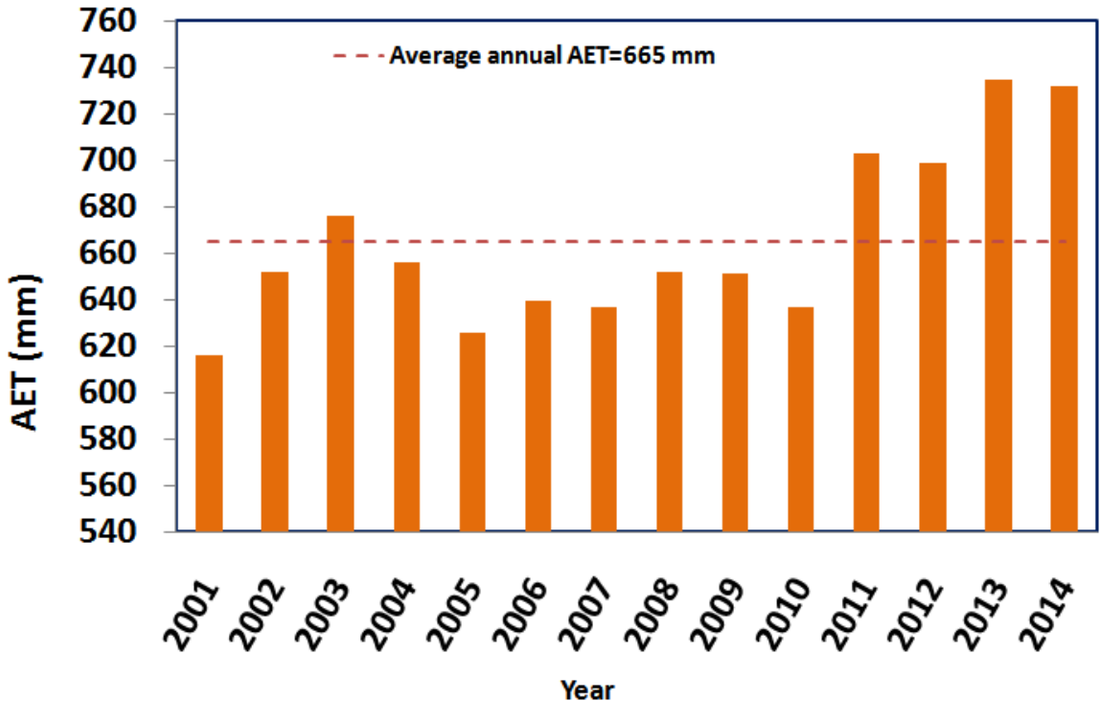


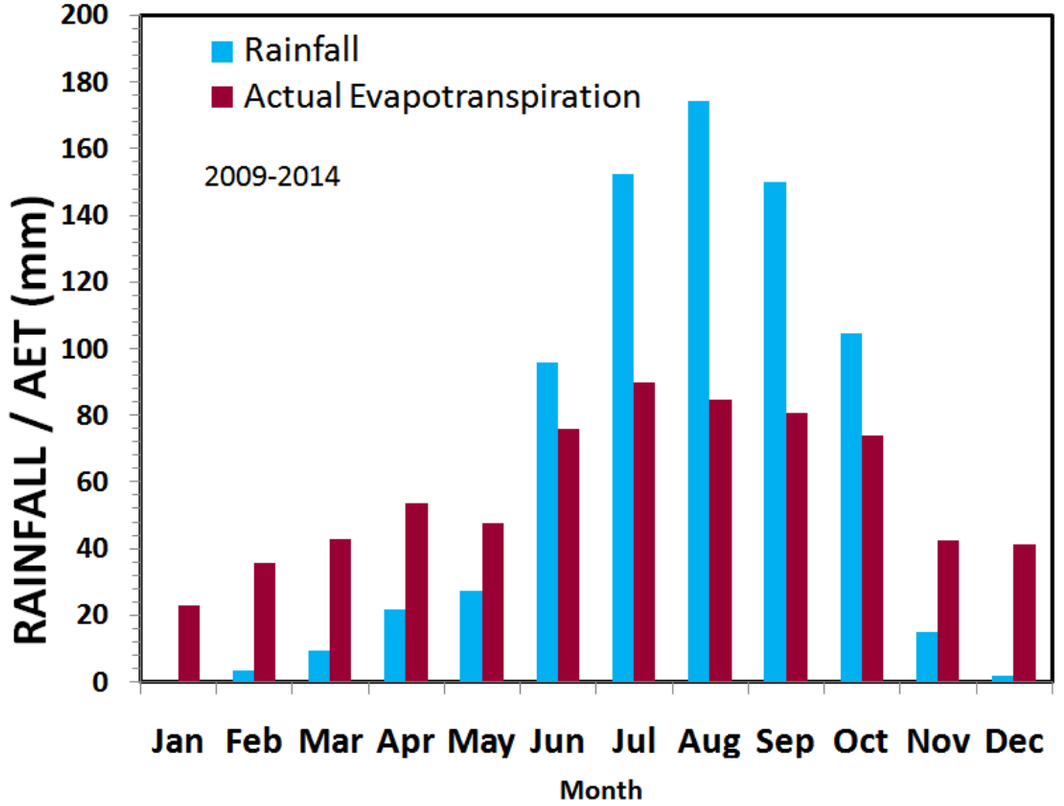
The average *rabi* rainfall (Oct-Jan) is about 15% of the Average annual rainfall. During the years 2009 and 2017 high *rabi* rainfall was received, where as other years showed deficient rainfall.

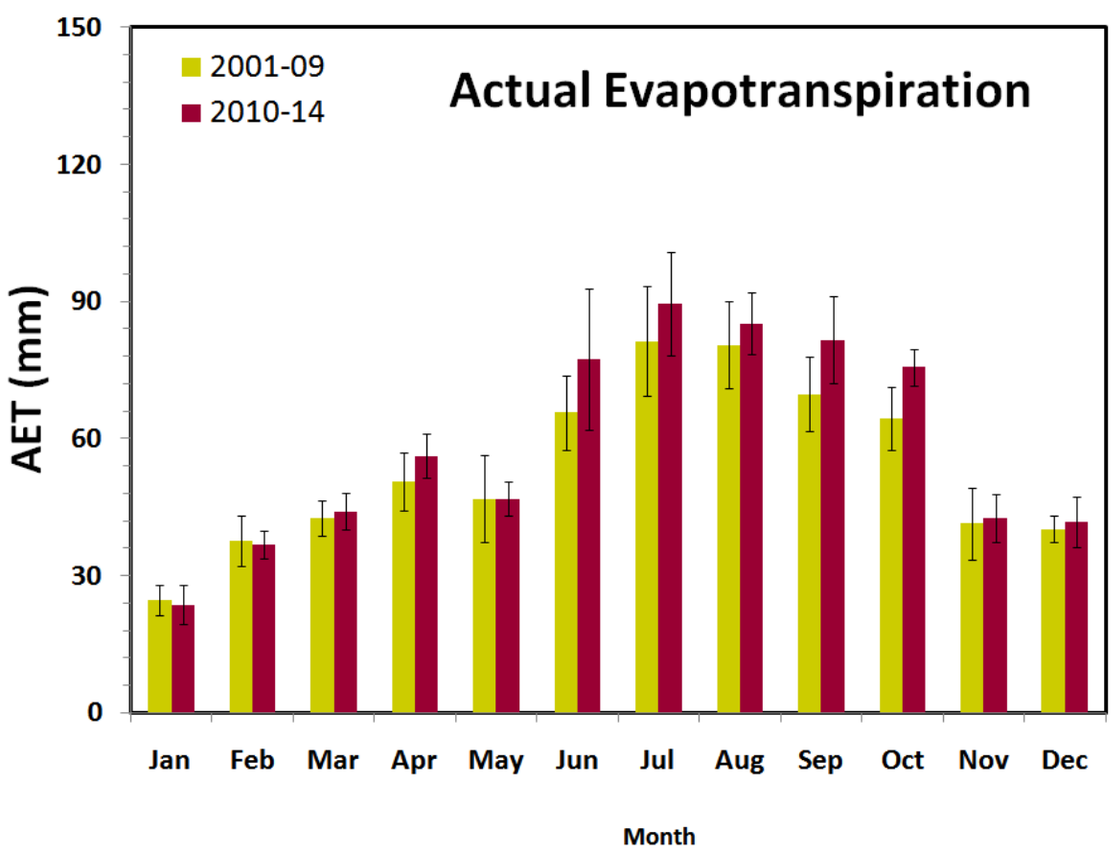
The average summer rainfall (Feb-May) is about 8% of the average annual rainfall.



EVAPOTRANSPIRATION

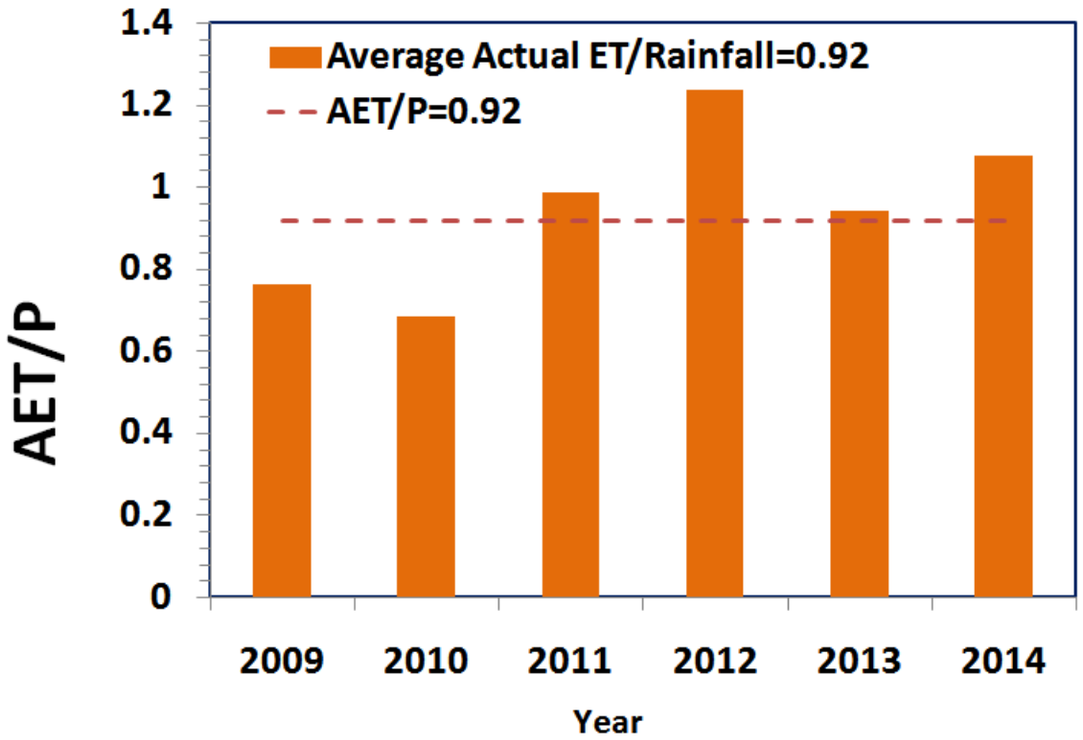


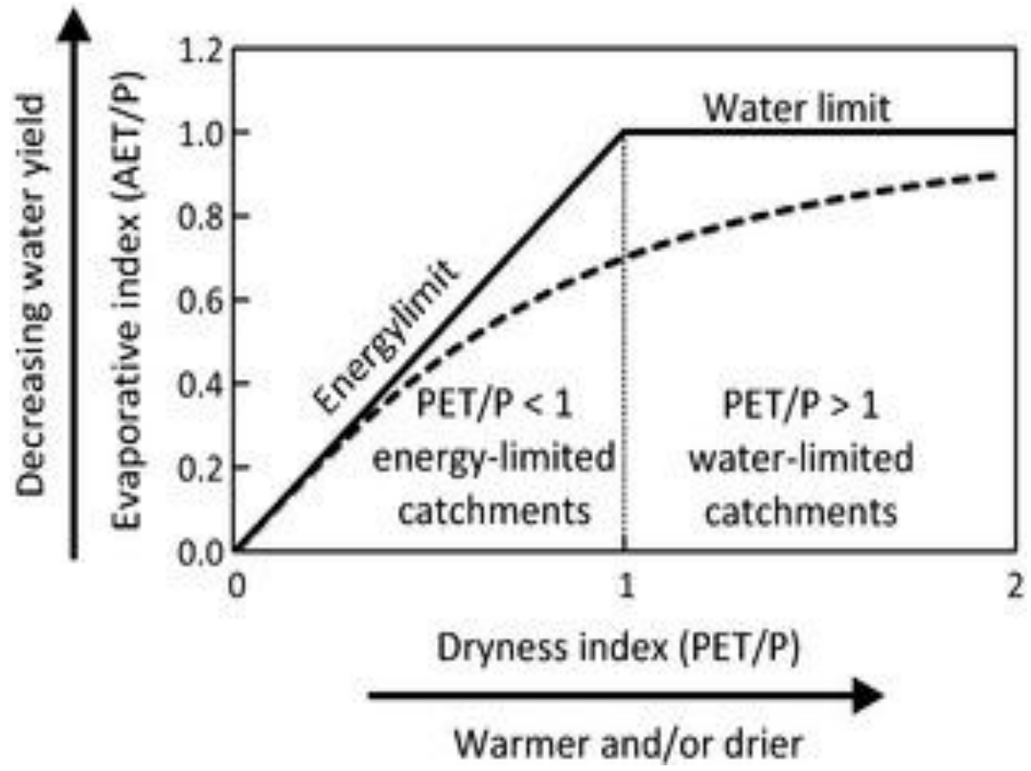




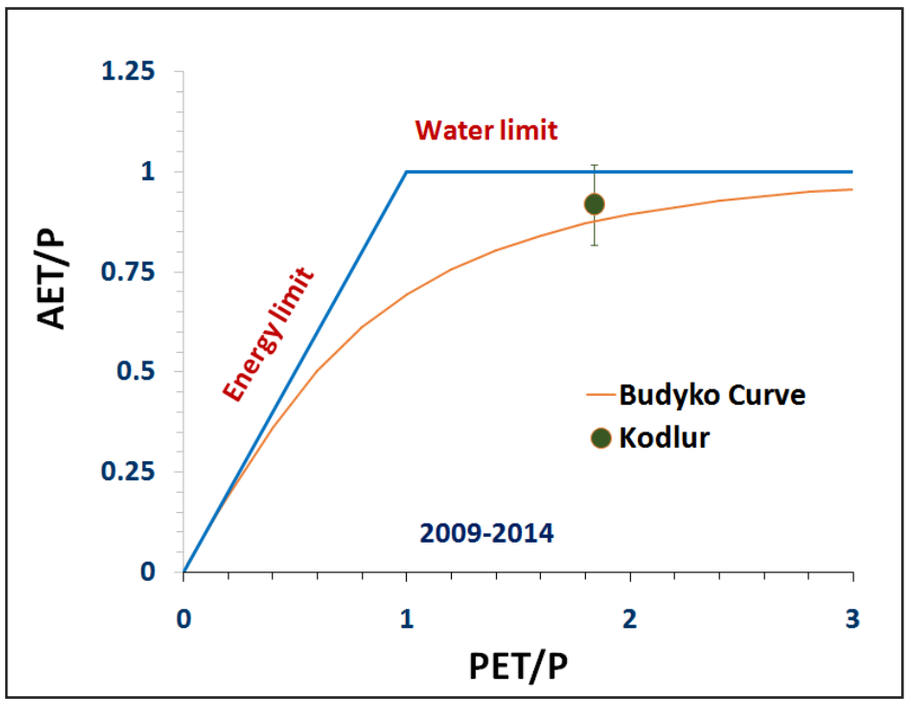
The average annual actual ET is lower than the average rainfall. During *kharif*, average rainfall and AET was found to be 674 mm and 331 mm respectively, whereas in *rabi* it was about 141 mm and 181 mm. The annual ET increased by 8% during 2010-2014 compared to 2001-2009 .

EVAPOTRANSPIRATION INDEX

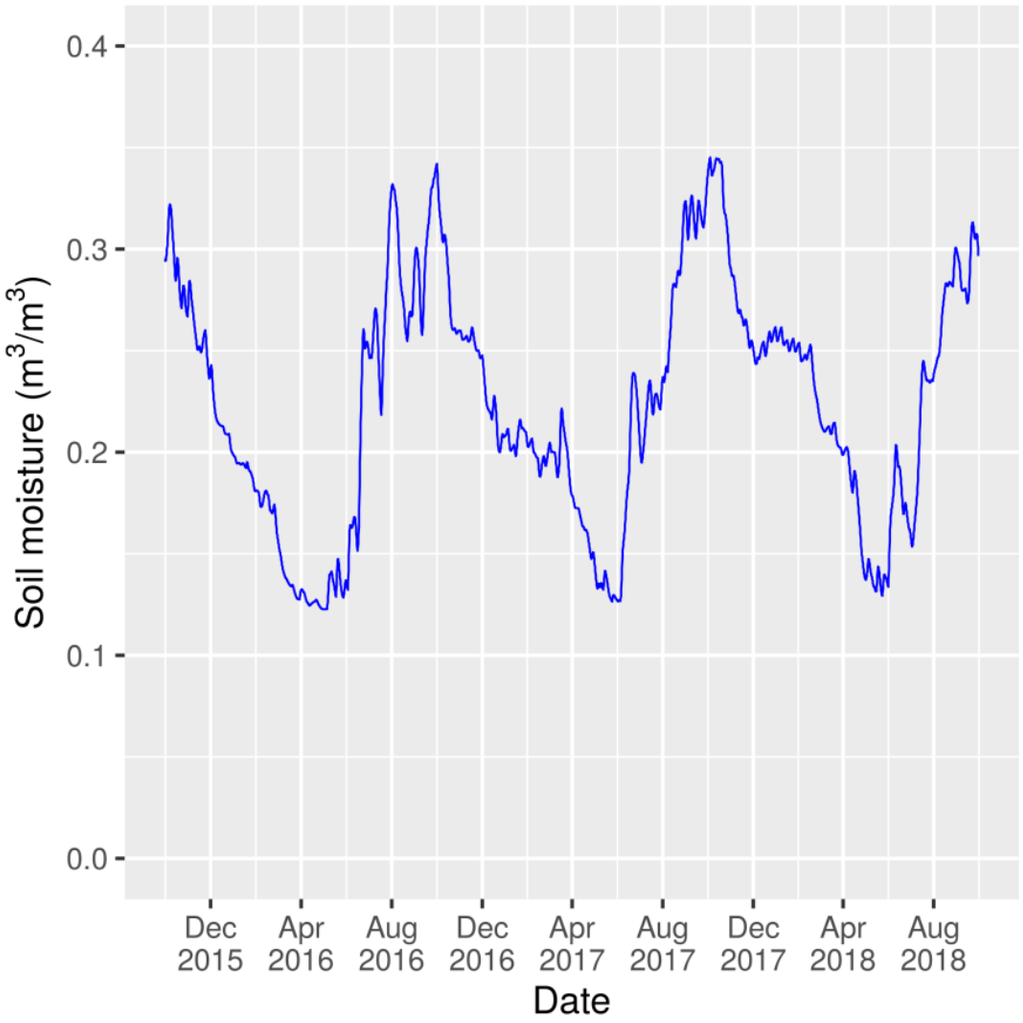




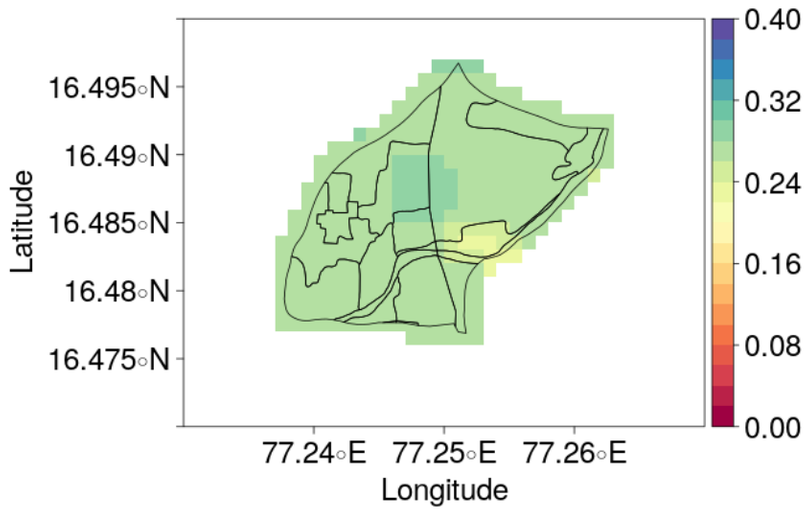
The average AET/P ratio was about 92%, which is slightly higher than the sustainable limit of about 80%. Even during extremely lower rainfall year of 2012, AET was 670 mm. This suggests the presence of water storage and utilization from other sources such as groundwater, which buffered the lower rainfall.



SATELLITE RETRIEVED SOIL MOISTURE

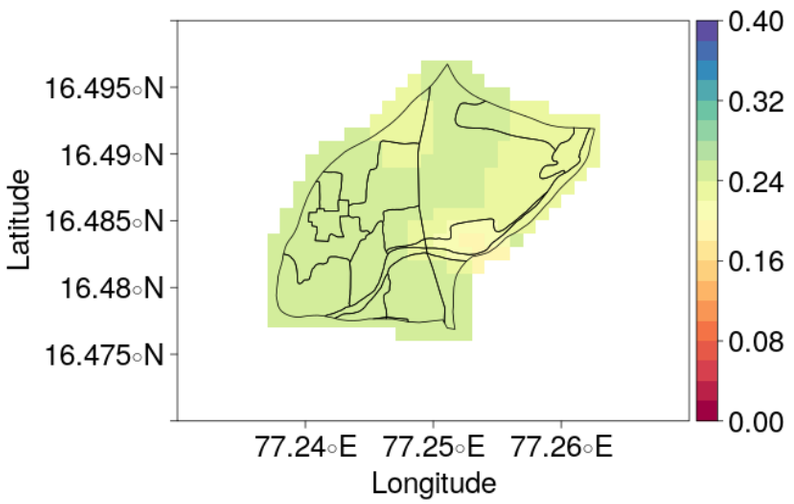


Kodlur– Rabi Soil Moisture



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 17-30 % in *kharif* and 22-34% in *rabi* seasons of 2016 and 14-33% in *Kharif* and 22-34% in *rabi* seasons of 2017.

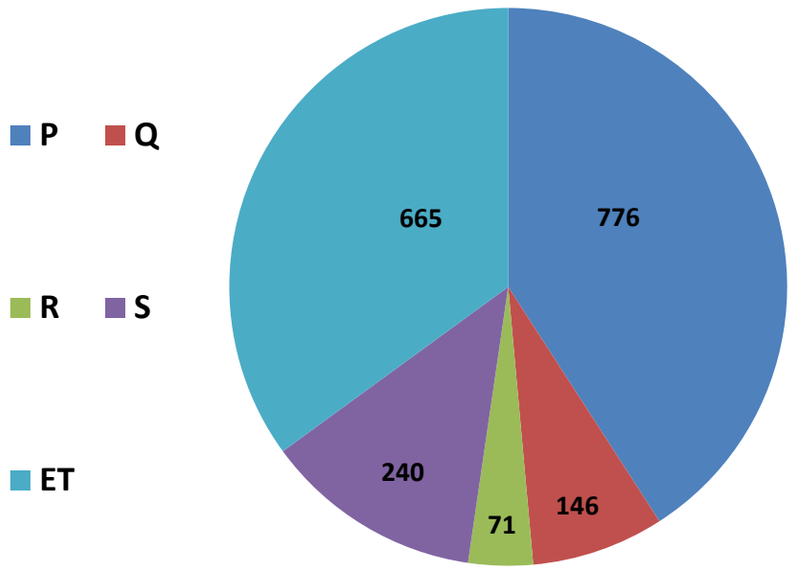
Kodlur– Kharif Soil Moisture



WATER BALANCE

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

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

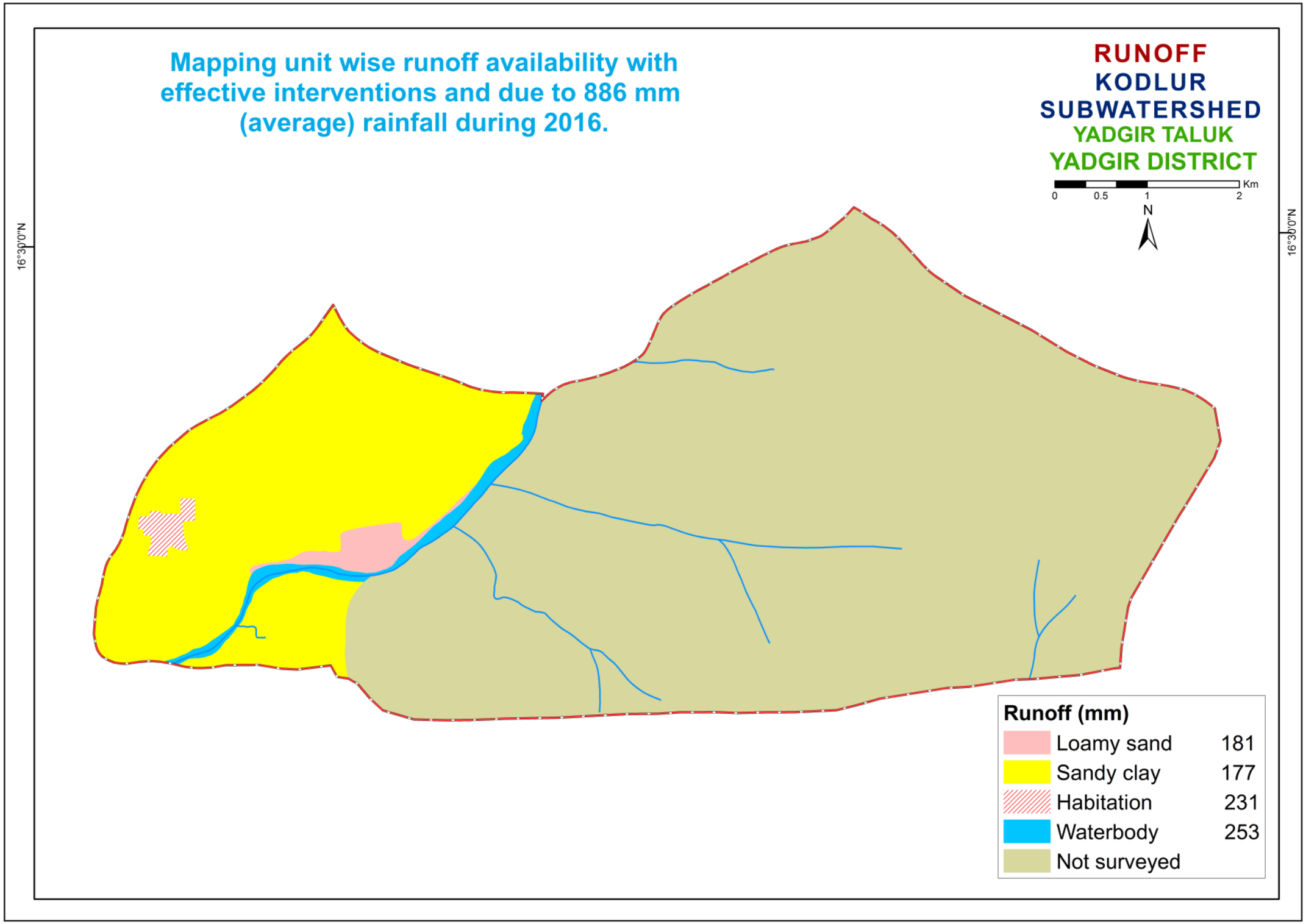


During June-October months, Precipitation is higher than Evapotranspiration, hence Runoff can occur in the watershed.

P = 776 mm (average of 2009-2017) ET = 665 mm R = 71 mm S = 240 mm Q = 146 mm

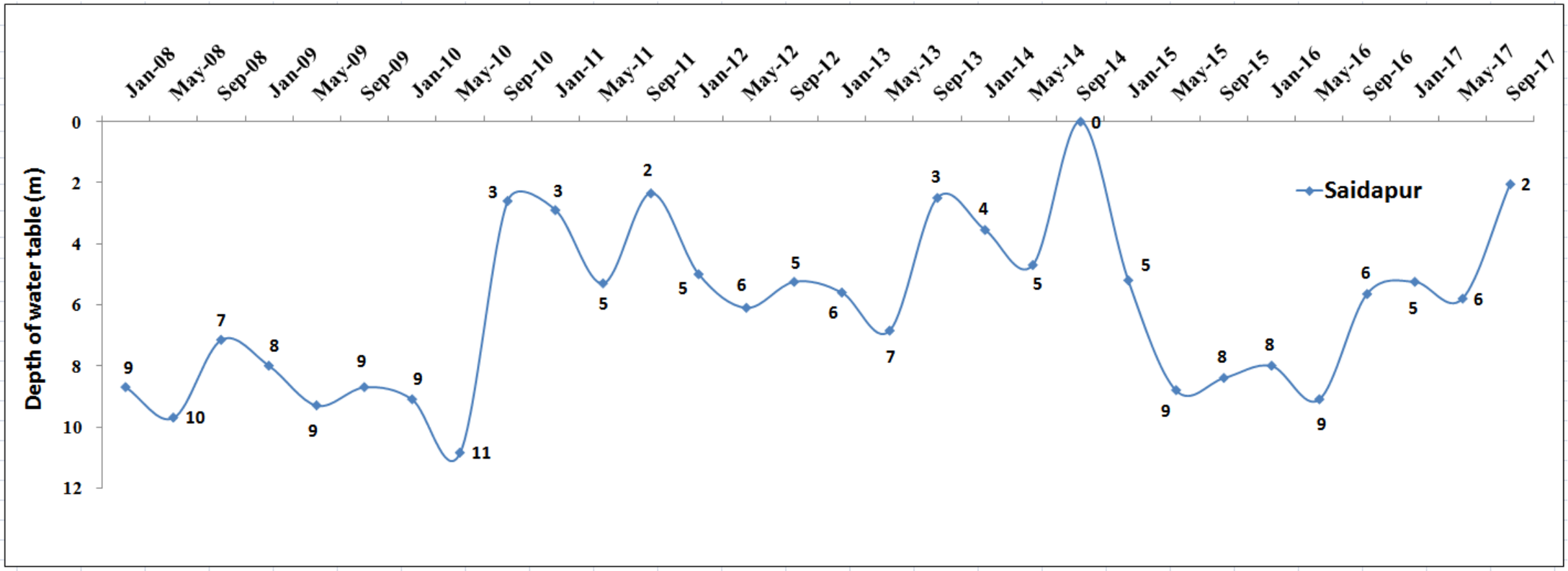
Sl. No.	Parameters	Average_ 2016 (mm)
1.	Rainfall	886
2.	Runoff availability with existing conditions	203
3.	Runoff availability with effective interventions	182
4.	Runoff allowed as environmental flow at the outlet	36.35
5.	Runoff excess for harvesting by construction of structures	146

RUNOFF


Mapping unit wise runoff availability with effective interventions and due to 886 mm (average) rainfall during 2016.
RUNOFF
KODLUR
SUBWATERSHED
YADGIR TALUK
YADGIR DISTRICT
0
0.5
1
2
Km
N
16°30'0"N
16°30'0"N
Runoff (mm)
Loamy sand 181
Sandy clay 177
Habitation 231
Waterbody 253
Not surveyed

GROUND WATER STATUS

SAIDAPUR STATION



The total number of wells present in Kodlur Sub-watershed as per LRI data is 11 wells (9 Bore wells & 2 open wells). The groundwater level shown above is from the data obtained from Dept. of Mines & Geology for the nearest station Saidapur. The graph depicts the groundwater level during the years 2008-2017 were slightly varying, where as during the year 2014 was found constant.

X

SUMMARY

- The average annual rainfall of 887 mm in the Kodlur sub-watershed as recorded from the Saidapur station data.

- 77%, 15% and 8% of the annual rainfall occurs during *kharif, rabi* and summer seasons respectively and exhibited a higher temporal variability.

- The evapotranspiration estimation tool developed indicates that the watershed water balance is in deficit. The cropping & irrigation choices are not appropriate and need to be altered to shift the deficit water balance.

- The estimated runoff available to use is 146 mm for an average 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 (240 mm) and utilizable runoff plus recharge is 436 (=240+146+50)

- The average actual evapotranspiration estimated in the watershed based on the current land use and irrigation practices for the kharif and rabi seasons is 512 mm. Hence the amount of water use for kharif and rabi seasons may be estimated as 640 mm (i.e 125% of AET). This demand for the two seasons is higher by 204 mm, i.e. (640-436). The AET in June-Sept months is only 58% of rainfall. Hence, there is a good opportunity to harvest the excess water through watershed management practices for utilizing during rabi season.

- The total number of wells present in Kodlur Sub-watershed as per LRI data is 11 wells (9 Bore wells & 2 open wells). The groundwater level data obtained from Dept. of Mines & Geology for the nearest station Saidapur. The groundwater level during the years 2008-2017 were slightly varying, where as during the year 2014 was found constant.