ICAR-NBSS&LUP Sujala SWs-LRI Atlas No. 75

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भारतीय कृषि अनुसंधान परिषद

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Land Resource and Hydrological Inventory of Hongahalli Sub-watershed for Watershed Planning and Development Gundlupet Taluk, Chamarajanagar District, Karnataka (AESR 8.2)

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

The World Bank

ICAR - National Bureau of Soil Survey & Land Use Planning, Regional Centre, Bangalore
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About ICAR - NBSS&LUP

The ICAR - 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 optimising 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 Hongahalli Sub-watershed for Watershed Planning and Development Gundlupet Taluk, Chamarajanagar District, Karnataka (AESR 8.2)

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How to read and use the Atlas

The Land Resource Inventory of Hongahalli sub-watershed (Gundlupet taluk, Chamarajanagar district) for Watershed Planning (AESR 8.2) 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 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 watershed.

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.

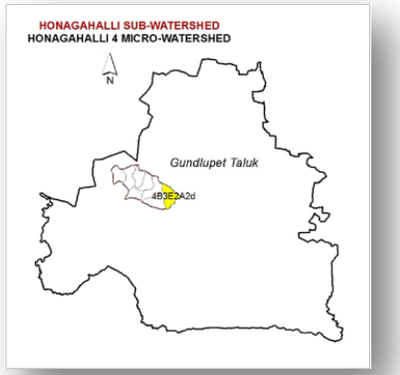
For easy map reading and understanding the information contain in different maps, the physical, cultural and scientific symbols used in the maps are illustrated in the form of colors, graphics and tables.

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.

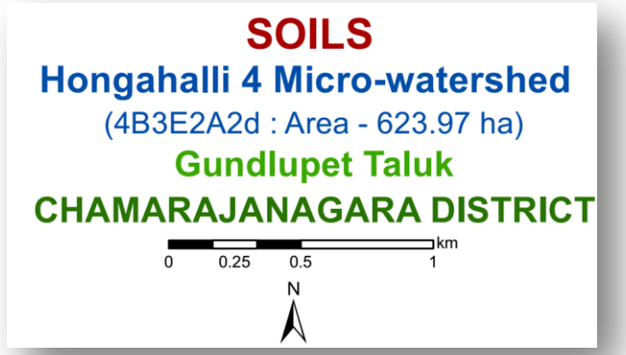
Inset map

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



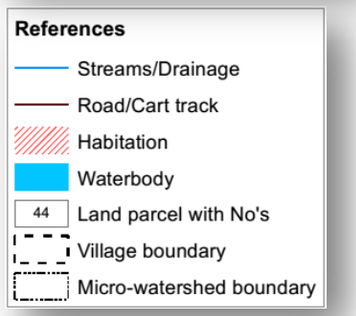
Map title

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.*



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

Map colours

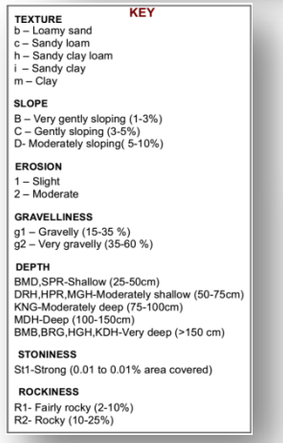
Different shades of colours are used as an aid to distinguish the different classes of soils, crop suitability and other maps.

Soil Phases	Area in ha (%)	Soil Phases	Area in ha (%)
1, SPRcB2g1	7 (1.09)	19, KDHhB1g1	18 (2.82)
2, SPRhB1g1	7 (1.2)	20, KDHiB2g2	9 (1.41)
3, SPRhB2g2	28 (4.43)	21, KDHmB1	18 (2.91)
4, SPRhB2g2St1R1	11 (1.72)	22, HGHbB2g1	13 (2.05)
5, BMDbB2g1	16 (2.55)	23, HGHcB2g1R1	13 (2.13)
6, BMDbB2g2	16 (2.6)	24, HGHhB1g1	15 (2.41)
7, BMDcC2g1	29 (4.58)	25, HGHhB2g1	9 (1.41)
8, BMDhC2g2St1	6 (0.93)	26, HGHhB2g2R1	10 (1.54)
9, MGHiC2g1	24 (3.87)	27, HGHiC2g2	9 (1.44)
10, DRHhB2g1	22 (3.59)	28, BRGhB1g1	5 (0.79)
11, DRHhB2g2	8 (1.22)	29, BRGhB2g2	10 (1.56)
12, HPRhB2g1	11 (1.7)	30, BRGhB2g2St1	18 (2.94)
13, HPRhB2g2St1R1	27 (4.31)	31, BRGmB1	39 (6.22)
14, HPRiC2g1	47 (7.51)	32, BRGmB2g1	22 (3.59)
15, KNGiB1g1	40 (6.4)	33, BMBmB1	37 (6.0)
16, KNGiC2g2	28 (4.51)	34, Forest	6 (1.04)
17, MDHhD3g2St1R2	22 (3.47)	35, Others*	14 (2.25)
18, KDHhB1	11 (1.82)		

* - Habitation & Waterbody

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

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

SLOPE
B – Very gently sloping (1-3%)
C – Gently sloping (3-5%)
D- Moderately sloping(5-10%)

EROSION
1 – Slight
2 – Moderate

GRAVELLINESS
g1 – Gravelly (15-35 %)
g2 – Very gravelly (35-60 %)

DEPTH
BMD,SPR-Shallow (25-50cm)
DRH,HPR,MGH-Moderately shallow (50-75cm)
KNG-Moderately deep (75-100cm)
MDH-Deep (100-150cm)
BMB,BRG,HGH,KDH-Very deep (>150 cm)

STONINESS
St1-Strong (0.01 to 0.01% area covered)

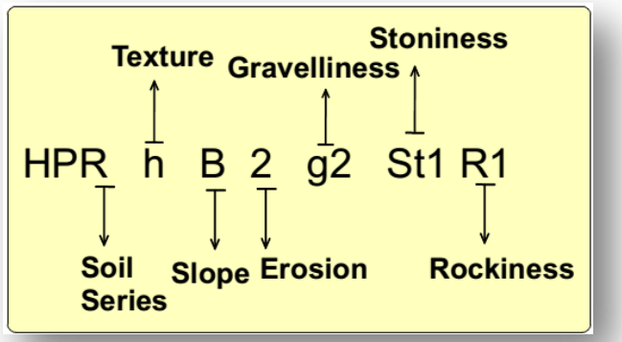
ROCKINESS
R1- Fairly rocky (2-10%)
R2- Rocky (10-25%)

Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable

Limitations
g- gravelliness/stoniness
l – topography
r- rooting condition
w- drainage
z-excess salt/calcareousness

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.



Land Management Units (LMU)

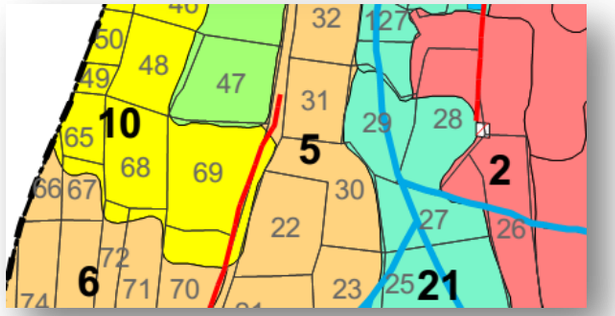
Grouping of similar soil areas based on their soil-site characteristics into management units that respond similarly for a given level of management are designated as land management units

LMU	Area in ha (%)
LMU-1	124 (19.94)
LMU-2	94 (15.1)
LMU-3	37 (6.00)
LMU-4	68 (10.91)
LMU-5	138 (22.19)
LMU-6	53 (8.44)
LMU-7	67 (10.67)
LMU-8	22 (3.47)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody

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.



LAND RESOURCE INVENTORY OF HONGAHALLI SUB-WATERSHED FOR PLANNING GUNDLUPET TALUK, CHAMARAJANAGAR DISTRICT

A pilot study by ICAR-NBSS&LUP, Bangalore

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.

Chamarajanagar district is located about 200 km away from the capital city of Karnataka. The district is located in the southern tip of Karnataka state. It is carved out of the original Mysore district and covers an area of about 510100 ha. Majority of the population is dependent on agriculture in the disctrict. The geology of the district consists of Granite gneiss, Schist and Charnockite. The average annual rainfall in the district is 751 mm. The major crops grown are Maize, Sorghum, Groundnut, Sunflower, Cotton, Sugarcane, Greengram, Blackgram and Tomato etc.

As a pilot study, **ICAR-NBSSLUP, Bangalore** carried out the generation of LRI for the Hongahalli micro-watershed. Hongahalli sub-watershed in Gundlupet Taluk, Chamarajanagar District was selected for data base generation under batch VI of Sujala III project. This sub-watershed encompasses of 8 MWs namely Berambadi Sf-1 (4B3E2A1a), Berambadi Sf-2 (4B3E2A1b), Berambadi Sf-3 (4B3E2A1c), Berambadi Sf-4 (4B3E2A1d), Hongahalli-1 (4B3E2A2c), Hongahalli-2 (4B3E2A2b), Hongahalli-3 (4B3E2A2a) and Hongahalli-4 (4B3E2A2d). Land Resource Inventory (LRI) was generated for two i.e. (Hongahalli-2 (4B3E2A2b) and Hongahalli-4 (4B3E2A2d)), among eight micro-watersheds .

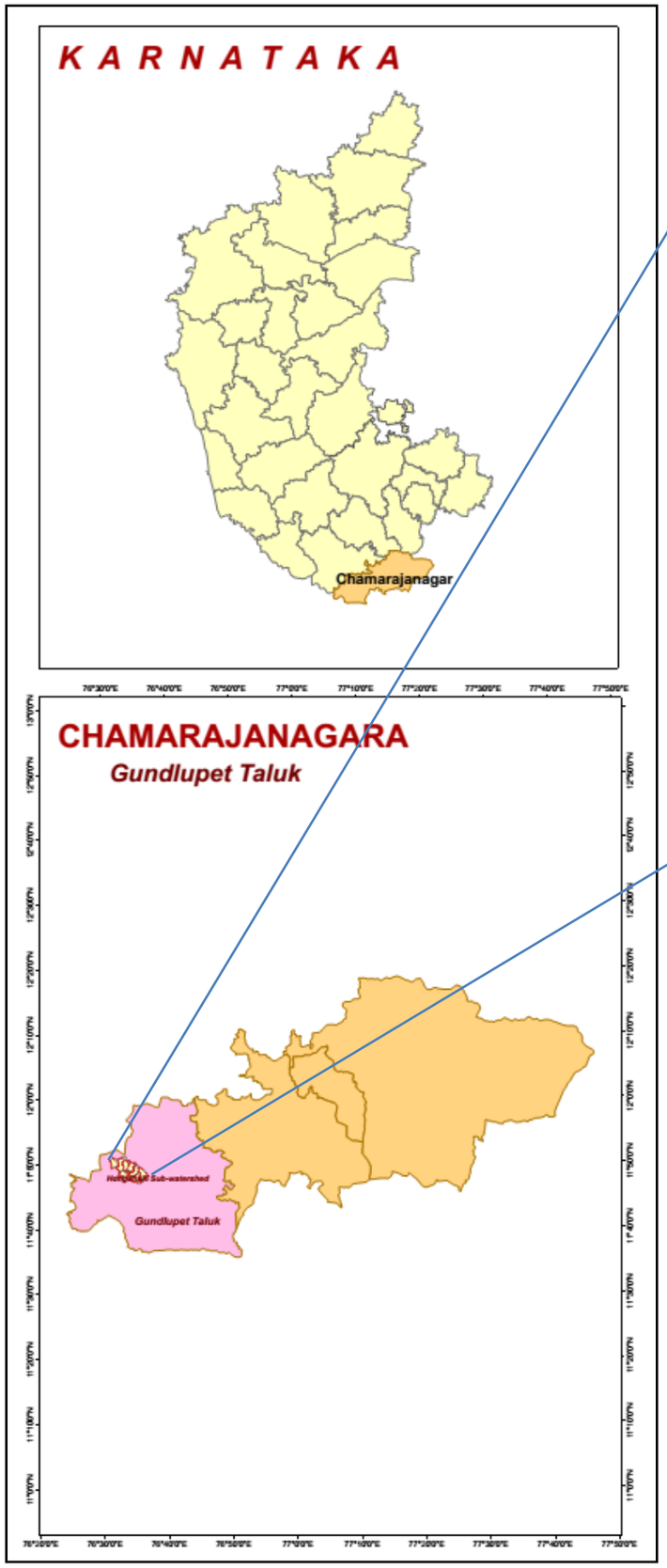
To be continued….

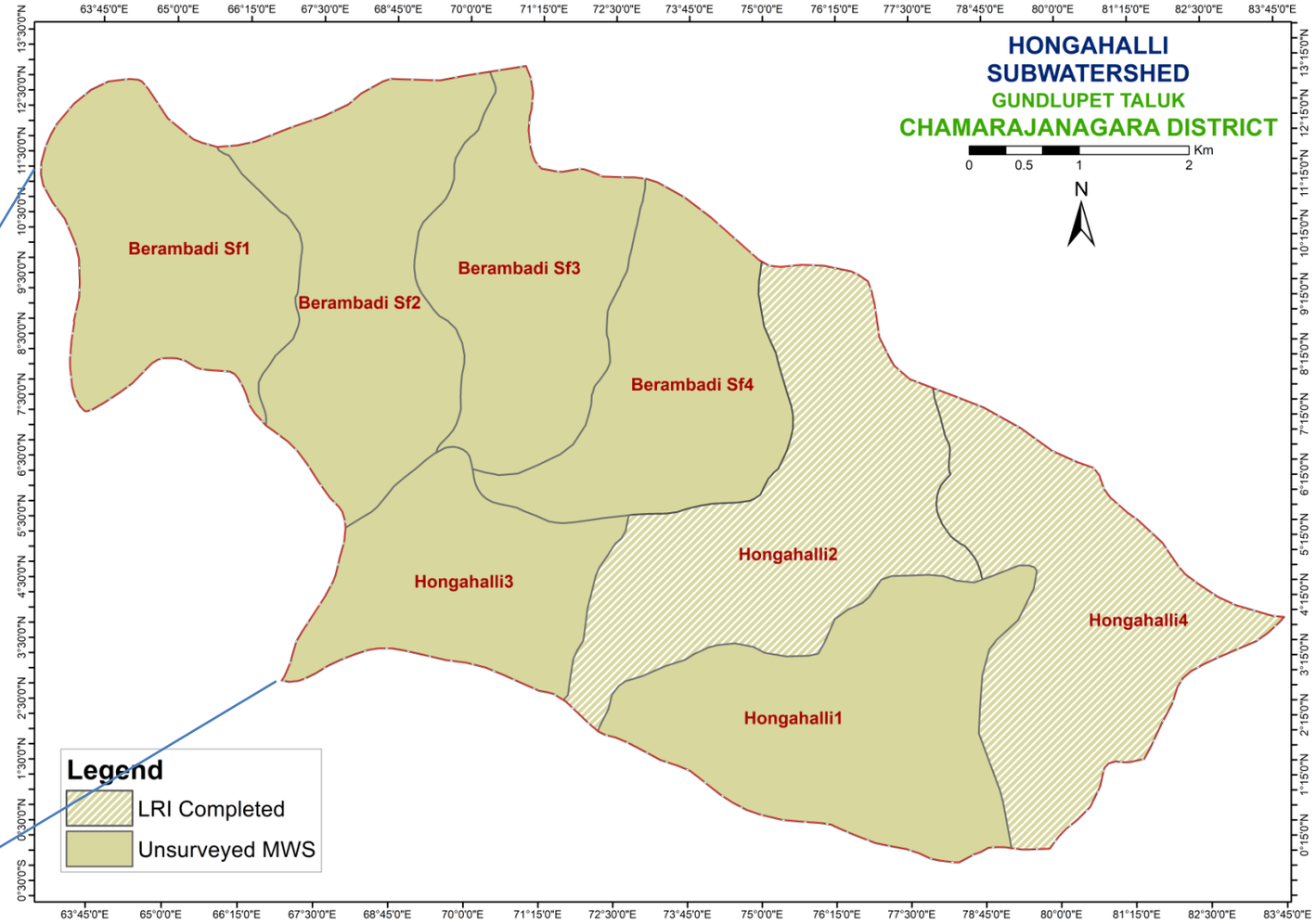
The major landforms identified in the micro-watersheds (Hongahalli-2 4B3E2A2b and Hongahalli-4 4B3E2A2d) of Hongahalli Sub-watershed are uplands and low lands. The database was generated by using cadastral map of the village as a base along with high resolution satellite imagery (IRS LISS IV and Cartosat-1). The objectives of the land resource survey carried out in the Hongahalli Sub-watershed during February-March 2015 respectively 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.

LOCATION AND EXTENT

LOCATION MAP OF HONGAHALLI SUB-WATERSHED





Hongahalli sub-watershed (Gundlupet Taluk, Chamarajanagar District) is located between $11^0$47’ 10’’–$11^0$51’ 4’’ North latitudes and 76^0 31’0.1’’- 76^0 36’57’’ East longitudes, covering an area of about 4180 ha

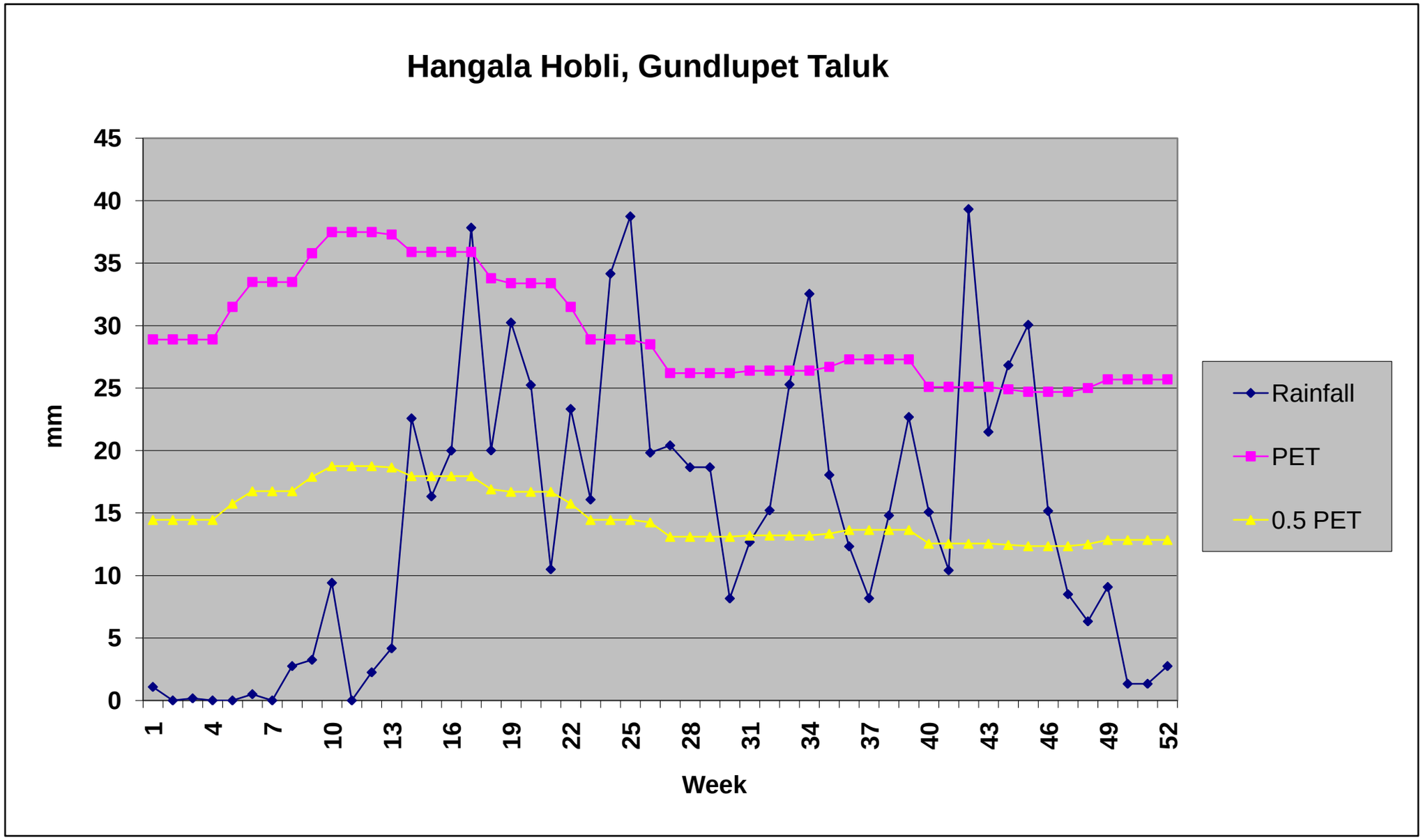
Agro Ecological Sub Region (AESR) 8.2: Central Karnataka Plateau, hot moist semi-arid ESR with medium to deep Red loamy soils, low AWC and LGP 120-150 days.

Agro-climatic Zone 6: Southern Dry Zone

It has a total geographical area of 1.56 M ha with 0.74 M ha under cultivation of which 0.22 M ha is irrigated. The mean elevation ranges from 450 to 900 m MSL; most part of the zone is situated at 800-900m. The major soils are red loams with pockets of black soils in Kollegal, Yalandur and T.N. Pura taluks of Mysore district. The average annual rainfall ranges from 670 to 890 mm, of which about 55 to 75 per cent is received during the kharif season. The major crops of the zone are rice, ragi, sugarcane, pulses and minor millets.

NOTE: In this Sub-Watershed, Land Resource Inventory (LRI) was generated for two micro-watersheds (Hongahalli-2 4B3E2A2b and Hongahalli-4 4B3E2A2d) among the eight micro-watersheds.

Climate

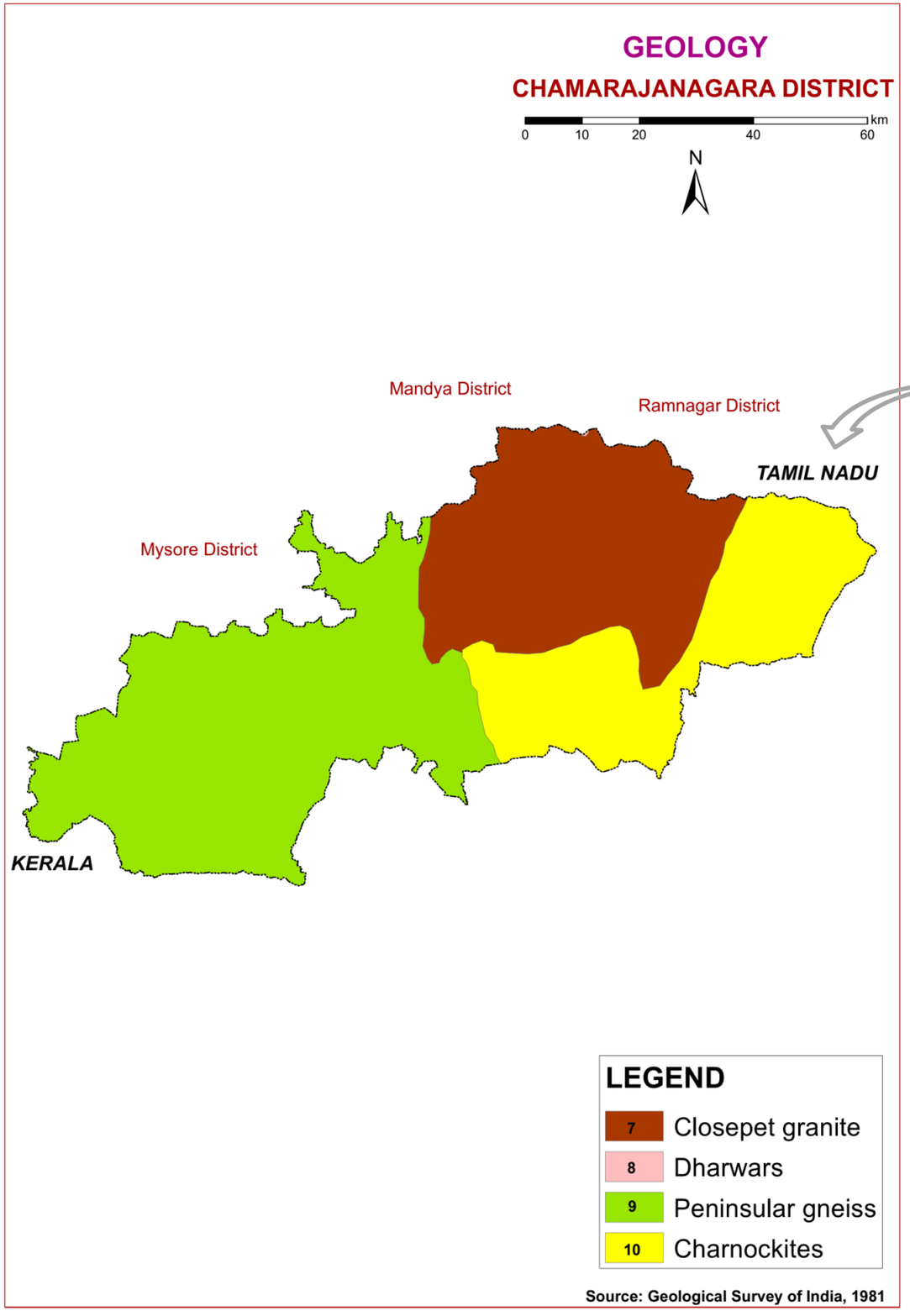


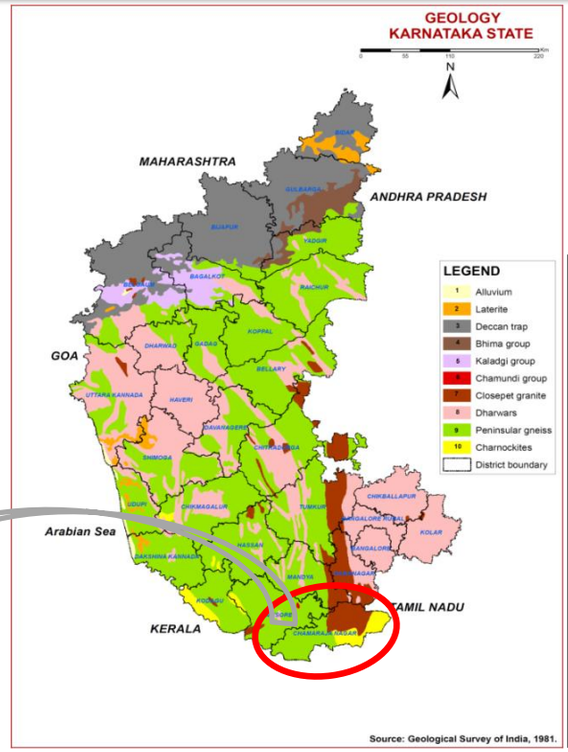
Length of Growing Period (LGP) is varying from May 2nd week to 1st week of October about 120-150 days and surplus occurs during November which may go either as run off or recharge of ground water.

Annual Rainfall : 754 mm. in the Hangala hobli, Gundlupet taluk

Source: KSNMDC (1980-2011)

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 - CHAMARAJANAGARA DISTRICT

Upper Proterozoic group: Formations of the Upper Proterozoic in Karnataka are closepet granites, Chamundi granites, Kaladgi series and Bhima series. Out of these Chamarajanagara district consists of Closepet granites.

Closepet granites

Closepet granites are also known as Ramanagaram granites, constitute a well-defined range of hills and composed of various types of granite, granodiorite and granite porphyry

Archaean group: The Archaean group of rocks of Karnataka are the oldest formations (> 3000 million years) of the earth's crust. They are unfossiliferous, thoroughly crystalline, extremely contorted and faulted rocks, with well-defined foliated structure. They are intruded by plutonic rocks. The important formations of this group are Peninsular Gneiss, Dharwar schists, and Charnockites.

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.

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.

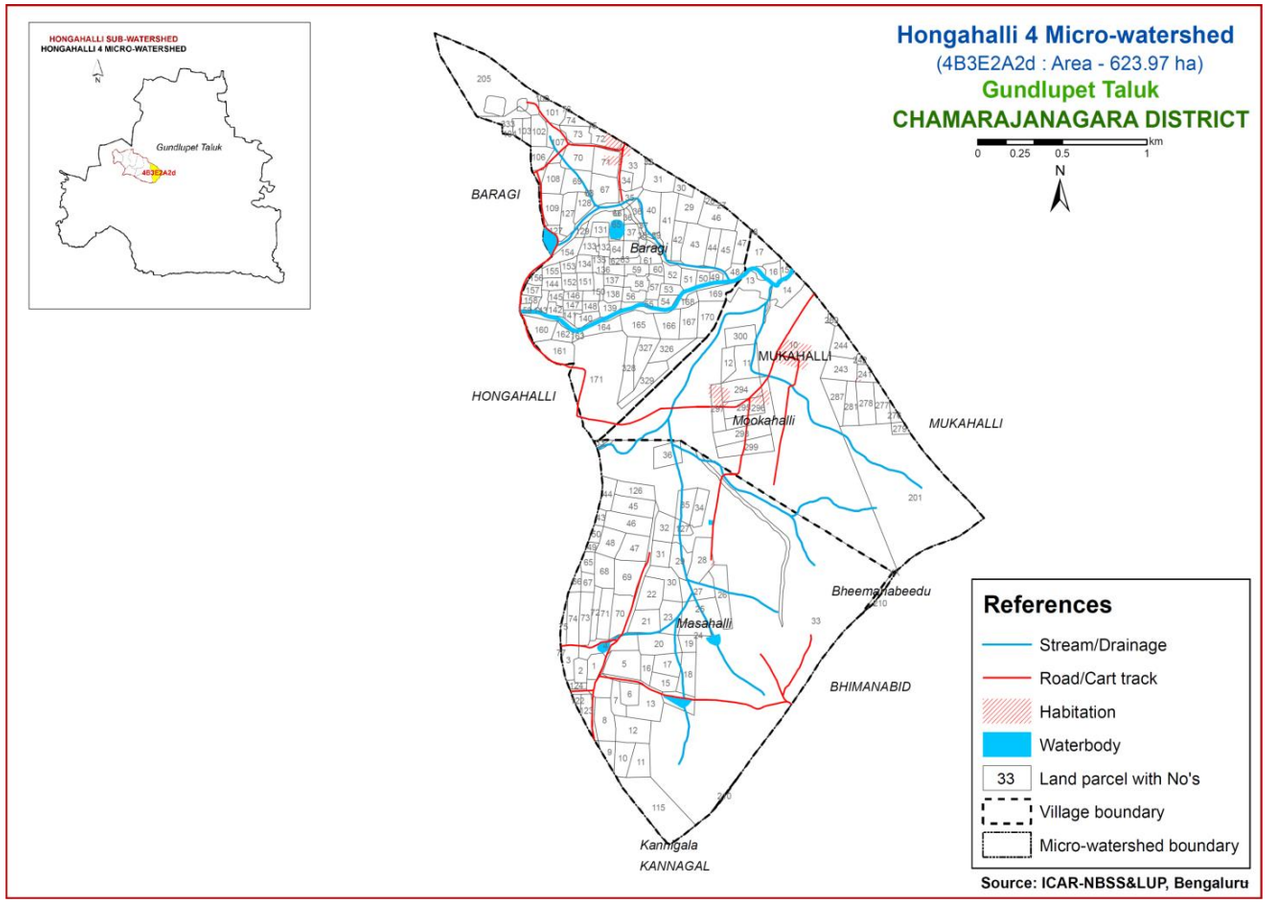
Charnockites

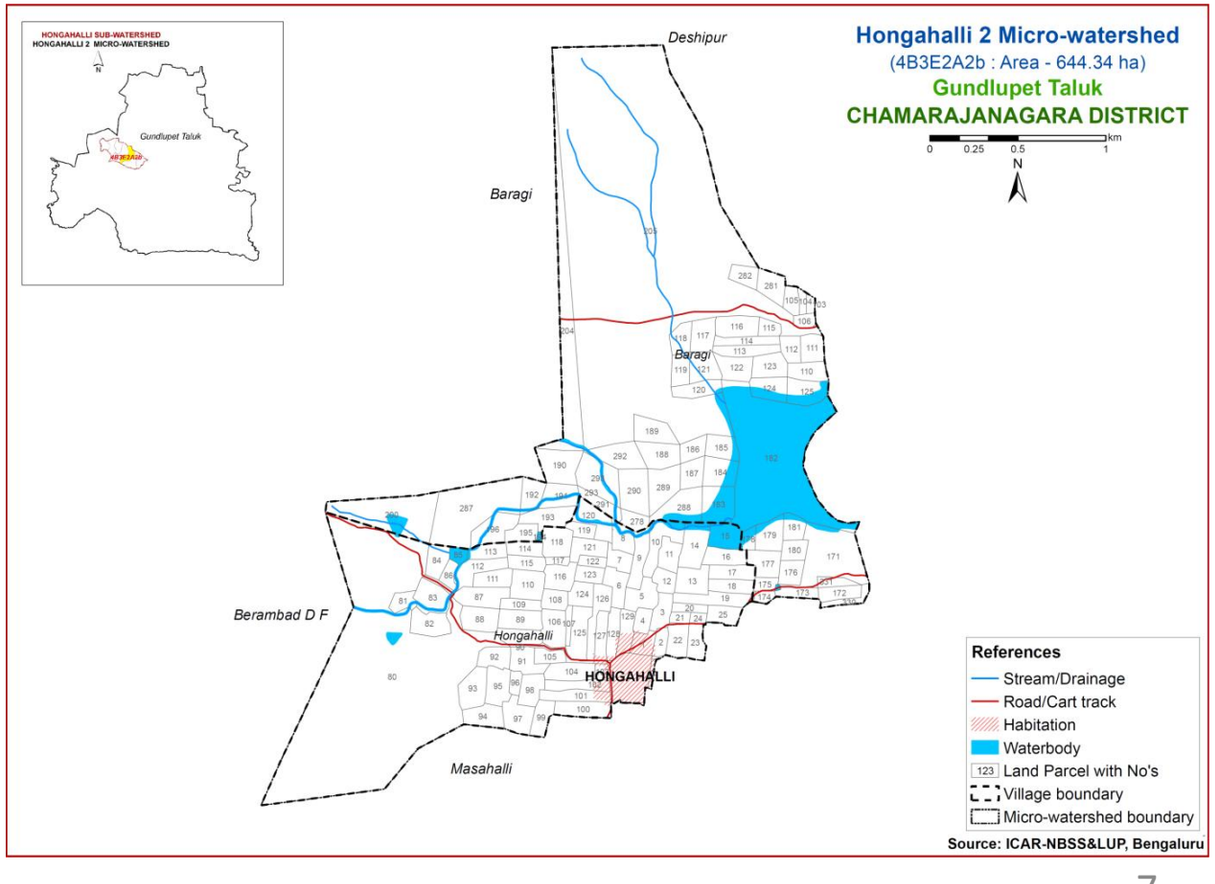
These are considered to be rocks of plutonic origin that have undergone recrystallization. The group includes a wide variety ot rocks ranging in composition from acid to ultramafic, characterized by the presence of orthopyroxene (hypersthene) and blue quartz. They are generally black in colour, and banding is common.

SURVEY METHODOLOGY
Sequence of activities in generation of LRI

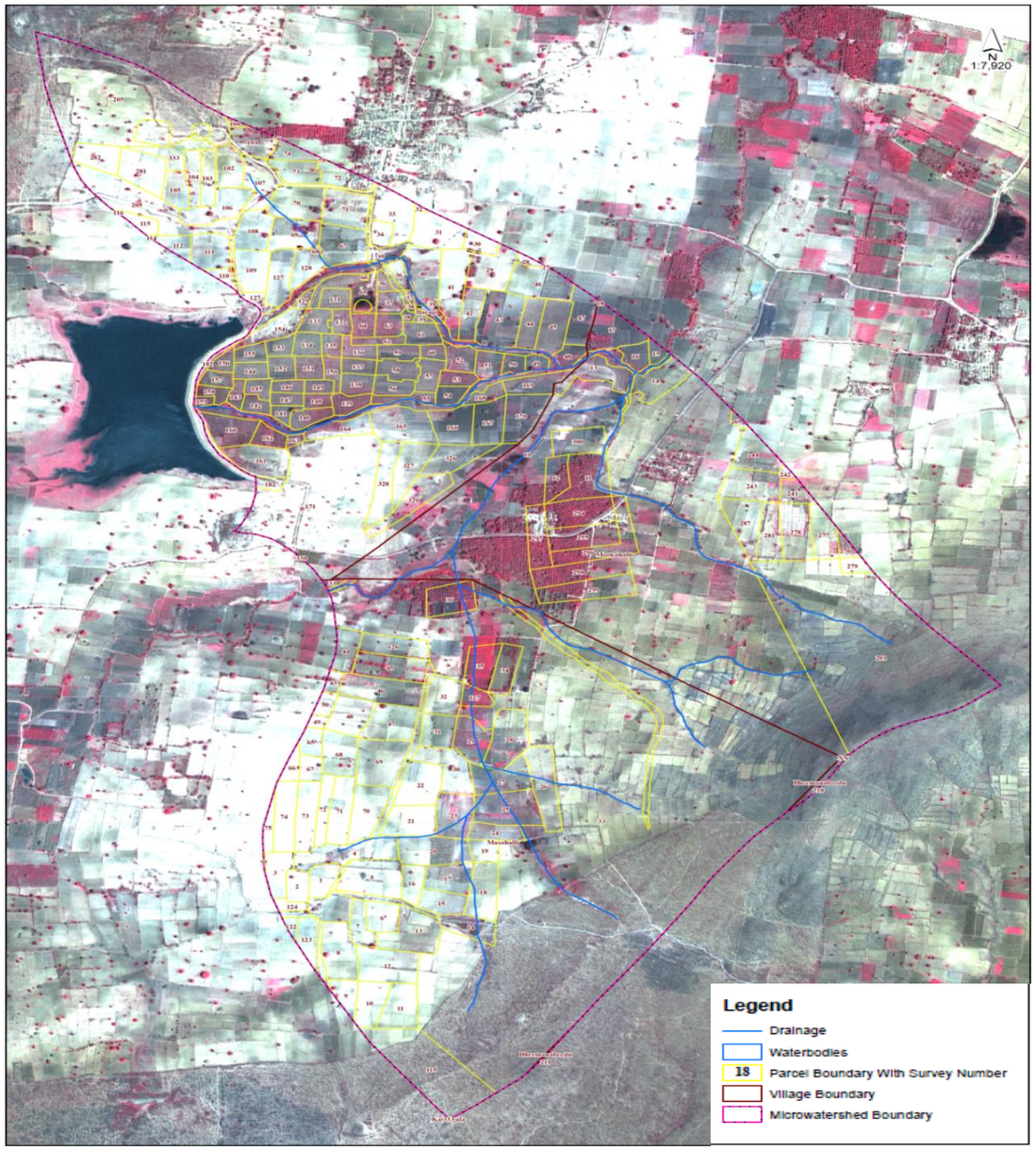
- Traversing the watershed using cadastral maps and imagery as base
- Identifying landforms, geology, land use and other features
- Selecting fields representing land units
- Opening profiles to 2 m depth
- Studying soil and site characteristics
- Grouping similar areas based on their soil-site characteristics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

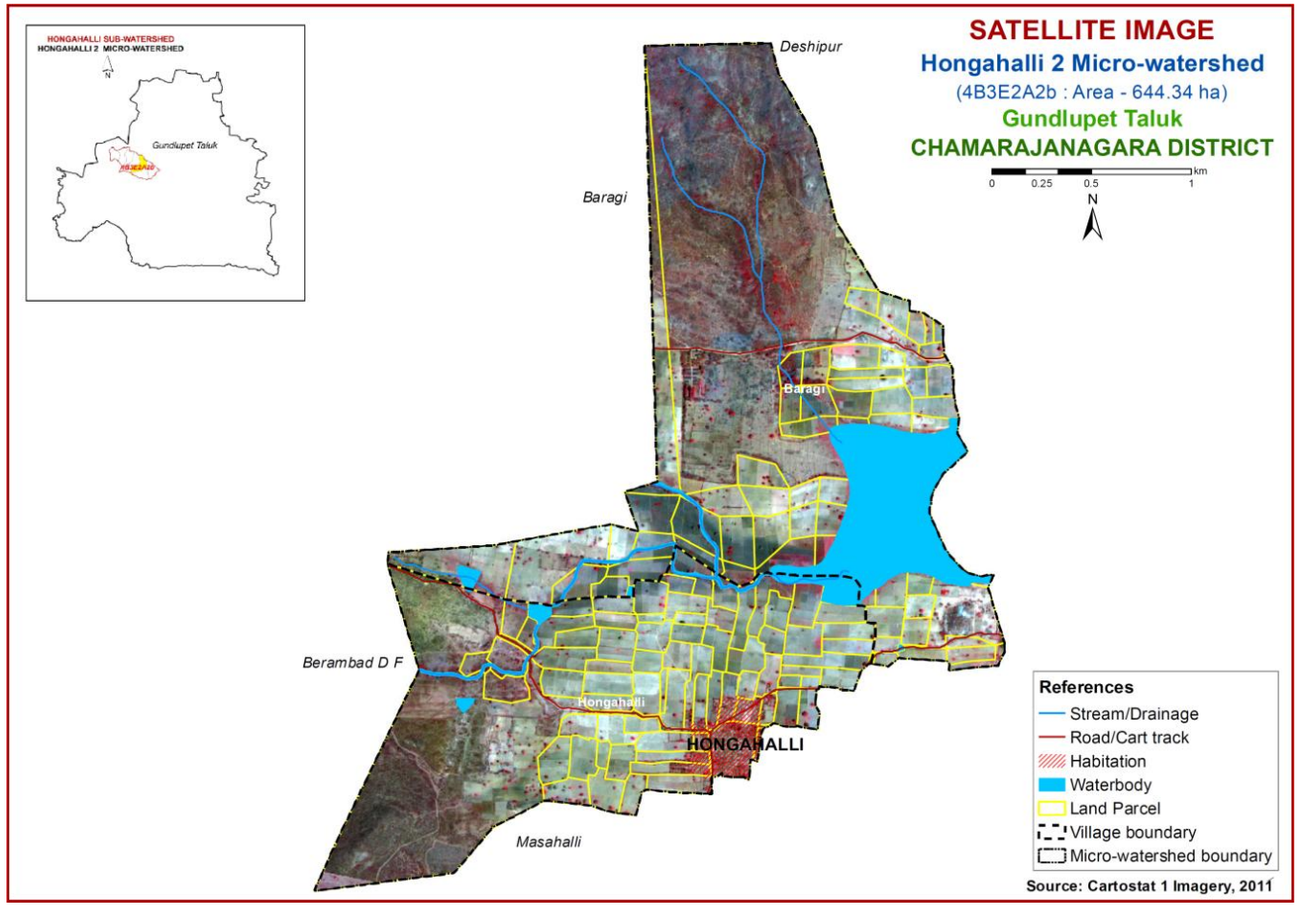
The required site and soil characteristics are described and recorded on a standard proforma by following the protocols and guidelines given in the soil survey manual and field guide. Collection of soil samples from representative pedons for laboratory characterization and collection of surface soil samples from selected fields covering most of the management units for macro and micro-nutrient analysis is being carried out (250m 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.

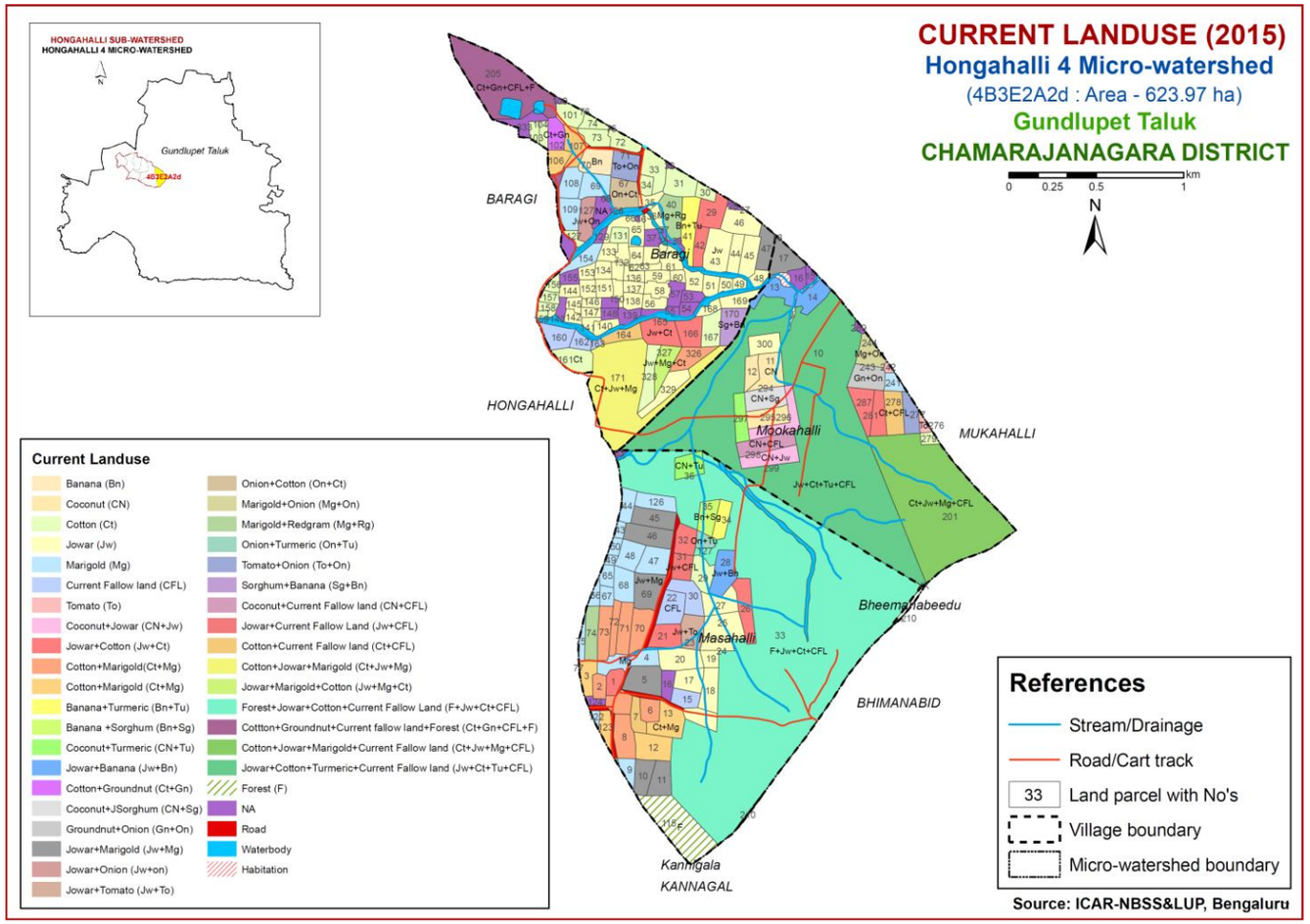

HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
BARAGI
Baragi
HONGAHALLI
MUKAHALLI
Mookahalli
MUKAHALLI
Bheemanabeedu
Masahalli
BHIMANABID
Kannigala
KANNAGAL
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

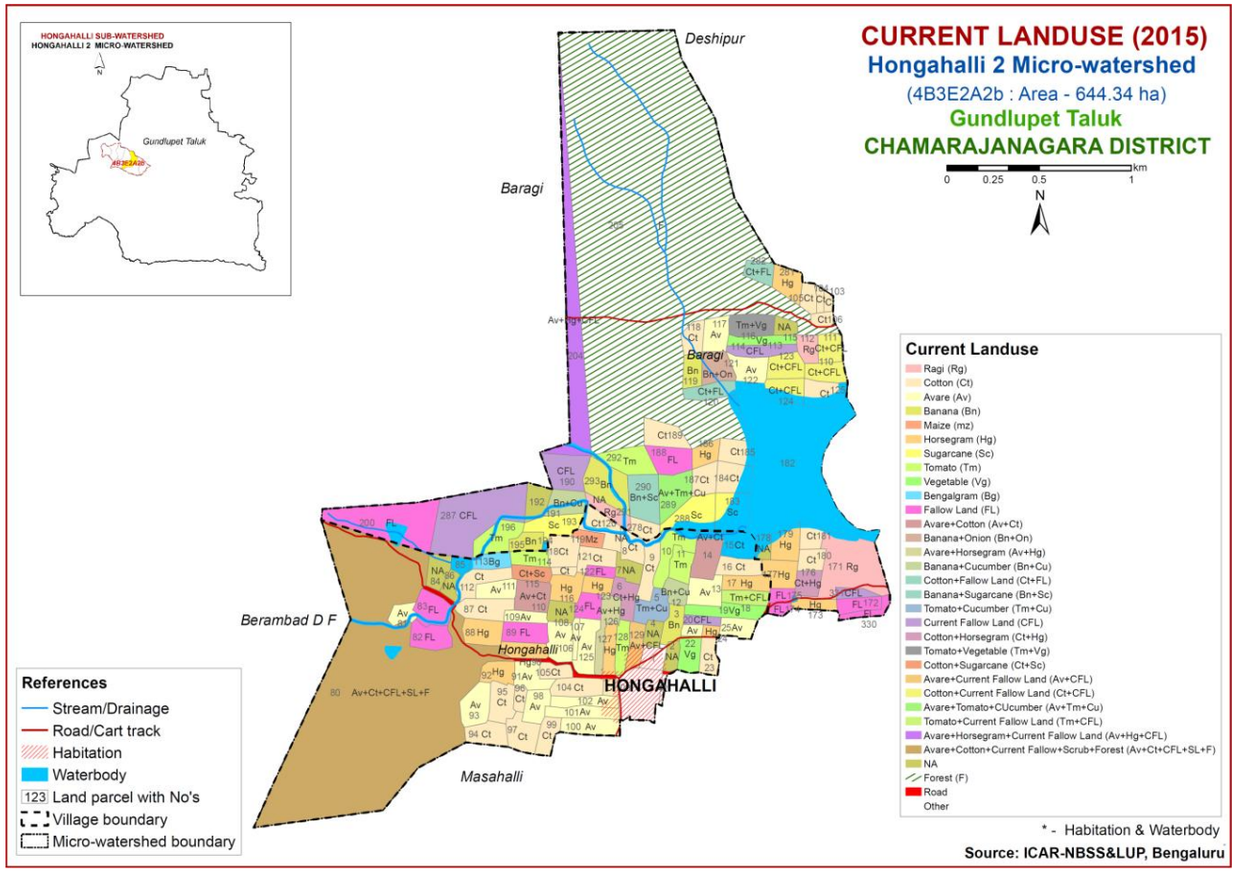

HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
Deshipur
Baragi
Baragi
Berambad D F
Hongahalli
HONGAHALLI
Masahalli
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

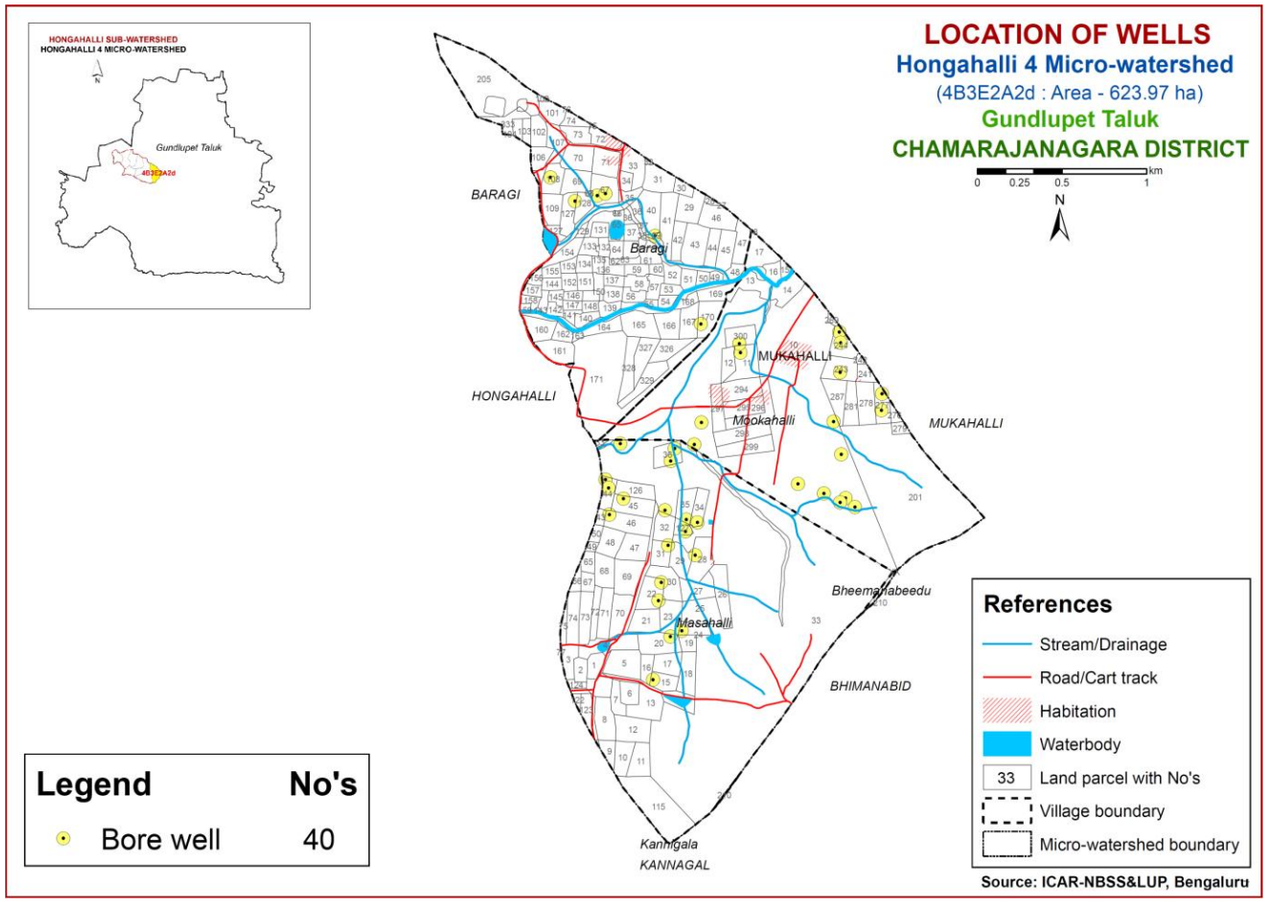
Satellite Image

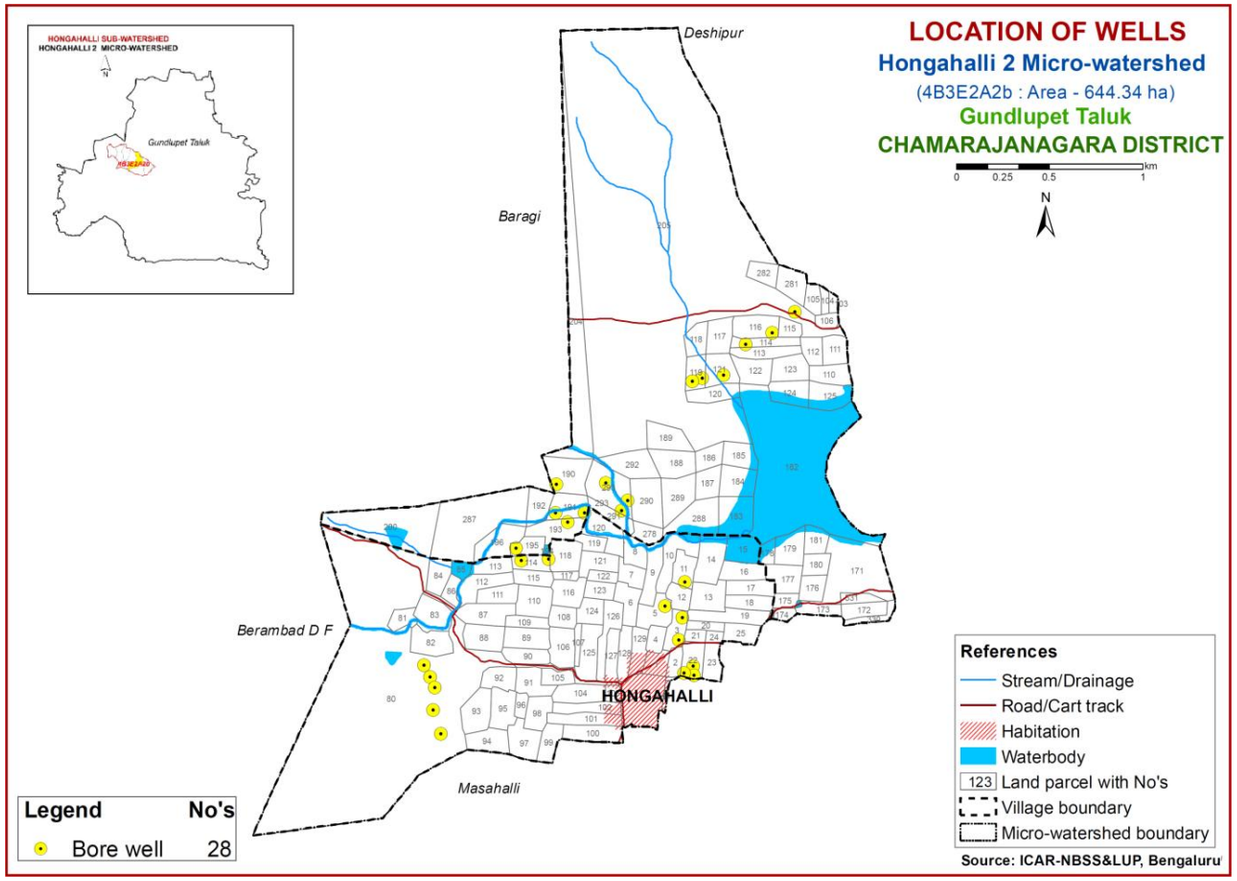





CURRENT LANDUSE (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
Kannigala
KANNAGAL
Baragi
Mookahalli
Masahalli
Bheemanabeedu
Current Landuse
Banana (Bn)
Coconut (CN)
Cotton (Ct)
Jowar (Jw)
Marigold (Mg)
Current Fallow land (CFL)
Tomato (To)
Coconut+Jowar (CN+Jw)
Jowar+Cotton (Jw+Ct)
Cotton+Marigold(Ct+Mg)
Cotton+Marigold (Ct+Mg)
Banana+Turmeric (Bn+Tu)
Banana +Sorghum (Bn+Sg)
Coconut+Turmeric (CN+Tu)
Jowar+Banana (Jw+Bn)
Cotton+Groundnut (Ct+Gn)
Coconut+JSorghum (CN+Sg)
Groundnut+Onion (Gn+On)
Jowar+Marigold (Jw+Mg)
Jowar+Onion (Jw+on)
Jowar+Tomato (Jw+To)
Onion+Cotton (On+Ct)
Marigold+Onion (Mg+On)
Marigold+Redgram (Mg+Rg)
Onion+Turmeric (On+Tu)
Tomato+Onion (To+On)
Sorghum+Banana (Sg+Bn)
Coconut+Current Fallow land (CN+CFL)
Jowar+Current Fallow Land (Jw+CFL)
Cotton+Current Fallow land (Ct+CFL)
Cotton+Jowar+Marigold (Ct+Jw+Mg)
Jowar+Marigold+Cotton (Jw+Mg+Ct)
Forest+Jowar+Cotton+Current Fallow Land (F+Jw+Ct+CFL)
Cottton+Groundnut+Current fallow land+Forest (Ct+Gn+CFL+F)
Cotton+Jowar+Marigold+Current Fallow land (Ct+Jw+Mg+CFL)
Jowar+Cotton+Turmeric+Current Fallow land (Jw+Ct+Tu+CFL)
Forest (F)
NA
Road
Waterbody
Habitation
References
Stream/Drainage
Road/Cart track
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


CURRENT LANDUSE (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
Deshipur
Baragi
Berambad D F
Hongahalli
HONGAHALLI
Masahalli
Current Landuse
Ragi (Rg)
Cotton (Ct)
Avare (Av)
Banana (Bn)
Maize (mz)
Horsegram (Hg)
Sugarcane (Sc)
Tomato (Tm)
Vegetable (Vg)
Bengalgram (Bg)
Fallow Land (FL)
Avare+Cotton (Av+Ct)
Banana+Onion (Bn+On)
Avare+Horsegram (Av+Hg)
Banana+Cucumber (Bn+Cu)
Cotton+Fallow Land (Ct+FL)
Banana+Sugarcane (Bn+Sc)
Tomato+Cucumber (Tm+Cu)
Current Fallow Land (CFL)
Cotton+Horsegram (Ct+Hg)
Tomato+Vegetable (Tm+Vg)
Cotton+Sugarcane (Ct+Sc)
Avare+Current Fallow Land (Av+CFL)
Cotton+Current Fallow Land (Ct+CFL)
Avare+Tomato+CUcumber (Av+Tm+Cu)
Tomato+Current Fallow Land (Tm+CFL)
Avare+Horsegram+Current Fallow Land (Av+Hg+CFL)
Avare+Cotton+Current Fallow+Scrub+Forest (Av+Ct+CFL+SL+F)
NA
Forest (F)
Road
Other
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru


LOCATION OF WELLS
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
Baragi
HONGAHALLI
MUKAHALLI
Mookahalli
Bheemanabeedu
Masahalli
BHIMANABID
Kannigala
KANNAGAL
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Legend No's
Bore well 40
Source: ICAR-NBSS&LUP, Bengaluru


LOCATION OF WELLS
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
Deshipur
Baragi
Berambad D F
HONGAHALLI
Masahalli
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Legend No's
Bore well 28
Source: ICAR-NBSS&LUP, Bengaluru

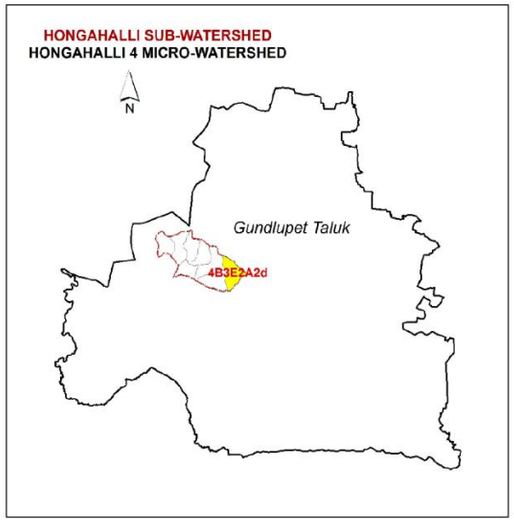
SOILS

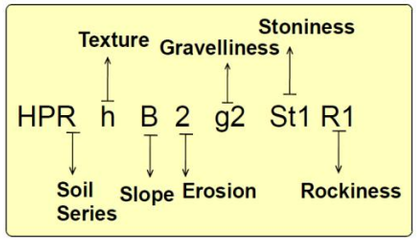
Hongahalli 4 Micro-watershed

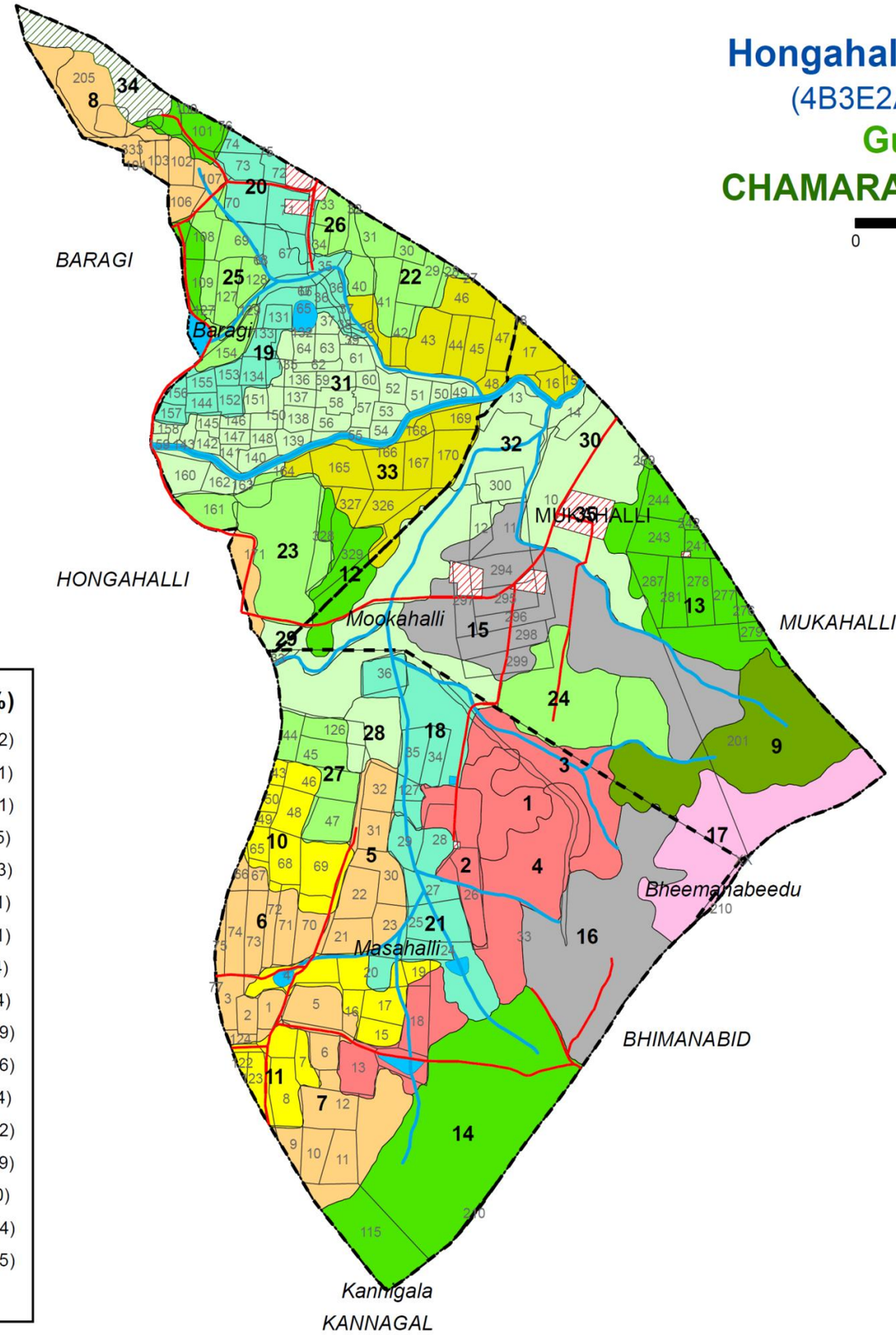
(4B3E2A2d : Area - 623.97 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT







Soil Phases	Area in ha (%)	Soil Phases	Area in ha (%)
1, SPRcB2g1	7 (1.09)	19, KDHhB1g1	18 (2.82)
2, SPRhB1g1	7 (1.2)	20, KDHiB2g2	9 (1.41)
3, SPRhB2g2	28 (4.43)	21, KDHmB1	18 (2.91)
4, SPRhB2g2St1R1	11 (1.72)	22, HGHbB2g1	13 (2.05)
5, BMDbB2g1	16 (2.55)	23, HGHcB2g1R1	13 (2.13)
6, BMDbB2g2	16 (2.6)	24, HGHhB1g1	15 (2.41)
7, BMDcC2g1	29 (4.58)	25, HGHhB2g1	9 (1.41)
8, BMDhC2g2St1	6 (0.93)	26, HGHhB2g2R1	10 (1.54)
9, MGHiC2g1	24 (3.87)	27, HGHiC2g2	9 (1.44)
10, DRHhB2g1	22 (3.59)	28, BRGhB1g1	5 (0.79)
11, DRHhB2g2	8 (1.22)	29, BRGhB2g2	10 (1.56)
12, HPRhB2g1	11 (1.7)	30, BRGhB2g2St1	18 (2.94)
13, HPRhB2g2St1R1	27 (4.31)	31, BRGmB1	39 (6.22)
14, HPRiC2g1	47 (7.51)	32, BRGmB2g1	22 (3.59)
15, KNGiB1g1	40 (6.4)	33, BMBmB1	37 (6.0)
16, KNGiC2g2	28 (4.51)	34, Forest	6 (1.04)
17, MDHhD3g2St1R2	22 (3.47)	35, Others*	14 (2.25)
18, KDHhB1	11 (1.82)		

* - Habitation & Waterbody

KEY

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

SLOPE
- B – Very gently sloping (1-3%)
- C – Gently sloping (3-5%)
- D- Moderately sloping(5-10%)

EROSION
- 1 – Slight
- 2 – Moderate

GRAVELLINESS
- g1 – Gravelly (15-35 %)
- g2 – Very gravelly (35-60 %)

DEPTH
- BMD,SPR-Shallow (25-50cm)
- DRH,HPR,MGH-Moderately shallow (50-75cm)
- KNG-Moderately deep (75-100cm)
- MDH-Deep (100-150cm)
- BMB,BRG,HGH,KDH-Very deep (>150 cm)

STONINESS
- St1-Strong (0.01 to 0.01% area covered)

ROCKINESS
- R1- Fairly rocky (2-10%)
- R2- Rocky (10-25%)

References

- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 33 Land parcel with No's
- Village boundary
- Micro-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

Table 1. Mapping unit description of Hongahalli - 4 Micro-watershed in Gundlupet taluk, Chamarajanagara district

Soil No*	Soil Series	Soil Phases	Mapping unit description	Area in ha (%)
	SPR	Shivapura soils are shallow (25-50 cm), well drained, have dark reddish brown gravelly sandy clay loam to sandy clay soils occurring on very gently sloping uplands and very strongly sloping hills, mounds and ridges.		**53 (8.44)**
1		SPRcB2g1	Sandy loam surface, slope 1-3 %, moderate erosion, gravelly (15-35 %)	7 (1.09)
2		SPRhB1g1	Sandy clay loam surface, slope 1-3 %, slight erosion, gravelly (15-35 %)	7 (1.20)
3		SPRhB2g2	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %)	28 (4.43)
4		SPRhB2g2St1R1	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %), strong stoniness (<2-10%), few to fairly rocky (0.01-0.1%)	11 (1.72)
	BMD	Berambadi soils are shallow (25-50 cm), well drained, dark brown to dark greyish brown clayey soils occurring on very gently to gently sloping uplands under cultivation		**67 (10.66)**
5		BMDbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35 %)	16 (2.55)
6		BMDbB2g2	Loamy sand surface, slope 1-3 %, moderate erosion,very gravelly (35-60 %)	16 (2.60)
7		BMDcC2g1	Sandy loam surface, slope 3-5 %, moderate erosion, gravelly (15-35 %)	29 (4.58)
8		BMDhC2g2St1	Sandy clay loam surface, slope 3-5 %, moderate erosion, very gravelly (35-60 %), strong stoniness (0.01-0.1%)	6 (0.93)
	MGH	Magoonahalli soils are moderately shallow (50-75 cm), well drained, have very dark brown to dark brown gravelly sandy clay loam soils occurring on gently sloping uplands		**24 (3.87)**
9		MGHiC2g1	Sandy clay surface, slope 3-5 %, moderate erosion, gravelly (15-35 %)	24 (3.87)
	DRH	Devarahalli soils are moderately shallow (50-75 cm), well drained, have dark red to reddish brown and dusky red gravelly sandy clay loam to sandy clay soils occurring on very gently sloping uplands under cultivation		**30 (4.81)**
10		DRHhB2g1	Sandy clay loam surface, slope 1-3 %, moderate erosion, gravelly (15-35 %)	22 (3.59)
11		DRHhB2g2	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %)	8 (1.22)

To be continued….

Soil No*	Soil Series	Soil Phases	Mapping unit description	Area in ha (%)
	HPR	Hullipura soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark brown gravelly sandy clay loam to sandy clay soils occurring on very gently to gently sloping uplands under cultivation		**85 (13.52)**
12		HPRhB2g1	Sandy clay loam surface, slope 1-3 %, moderate erosion, gravelly (15-35 %)	11 (1.70)
13		HPRhB2g2St1R1	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %), strong stoniness (0.01-0.1%), few to fairly rocky (0.01-0.1%)	27 (4.31)
14		HPRiC2g1	Sandy clay surface, slope 3-5 %, moderate erosion, gravelly (15-35 %)	47 (7.51)
	KNG	Kannigala soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red gravelly sandy clay loam to sandy clay soils occurring on very gently to gently sloping uplands		**68 (10.91)**
15		KNGiB1g1	Sandy clay surface, slope 1-3 %, slight erosion, gravelly (15-35 %)	40 (6.40)
16		KNGiC2g2	Sandy clay surface, slope 3-5 %, moderate erosion, very gravelly (35-60 %)	28 (4.51)
	MDH	Maddinahundi soils are deep (100-150 cm), well drained, have dark reddish brown gravelly sandy clay soils occurring on moderately sloping uplands under cultivation.		**22 (3.47)**
17		MDHhD3g2St1R2	Sandy clay loam surface, slope 5-10 %, severe erosion, very gravelly (35-60%), strong stoniness (0.01-0.1%), rocky (10-25%)	22 (3.47)
	KDH	Kalligaudanahalli soils are very deep (>150 cm), well drained, have dark red to dark reddish brown and dark brown sandy clay to clay soils occurring on very gently sloping uplands under cultivation.		**56 (8.96)**
18		KDHhB1	Sandy clay loam surface, slope 1-3 %, slight erosion	11 (1.82)
19		KDHhB1g1	Sandy clay loam surface, slope 1-3 %, slight erosion	18 (2.82)
20		KDHiB2g2	Sandy clay surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %)	9 (1.41)
21		KDHmB1	Clay surface, slope 1-3 %, slight erosion	18 (2.91)
	HGH	Honnegaudanahalli soils are very deep (>150 cm), well drained, have very dark brown to brown and dark reddish brown sandy clay loam soils occurring on very gently sloping uplands under cultivation.		**69 (10.98)**
22		HGHbB2g1	Loamy sand surface, slope 1-3 %, moderate erosion, gravelly (15-35%)	13 (2.05)
23		HGHcB2g1R1	Sandy loam surface, slope 1-3 %, moderate erosion, gravelly (15-35%), few to fairly rocky (<2-10%)	13 (2.13)

To be continued….

Soil No*	Soil Series	Soil Phases	Mapping unit description	Area in ha (%)
24		HGHhB1g1	Sandy clay loam surface, slope 1-3 %, slight erosion, gravelly (15-35 %)	15 (2.41)
25		HGHhB2g1	Sandy clay loam surface, slope 1-3 %, moderate erosion, gravelly (15-35 %)	9 (1.41)
26		HGHhB2g2R1	Sandy clay loam surface, slope 1-3 %, moderate erosion, gravelly (15-35 %), few to fairly rocky (0.01-0.1%)	10 (1.54)
27		HGHiC2g2	Sandy clay surface, slope 3-5 %, moderate erosion, very gravelly (35-60 %)	9 (1.44)
	BRG	Bargi soils are very deep (>150 cm), well drained, have very dark brown to very dark grayish brown clay soils occurring on very gently sloping uplands under cultivation.		**94 (15.1)**
28		BRGhB1g1	Sandy clay loam surface, slope 1-3 %, slight erosion, gravelly (15-35 %)	5 (0.79)
29		BRGhB2g2	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %)	10 (1.56)
30		BRGhB2g2St1	Sandy clay loam surface, slope 1-3 %, moderate erosion, very gravelly (35-60 %), strong stoniness (0.0.1-0.1%)	18 (2.94)
31		BRGmB1	Clay surface, slope 1-3 %, slight erosion	39 (6.22)
32		BRGmB2g1	Clay surface, slope 1-3 %, moderate erosion, gravelly (15-35%)	22 (3.59)
	BMB	Beemanabeedu soils are very deep (>150 cm), moderately well drained, have very dark greyish brown to dark grey and very dark brown clayey soils occurring on very gently sloping lowlands under cultivation		**37 (6.00)**
33		BMBmB1	Clay surface, slope 1-3 %, slight erosion	37 (6.00)
34	Forest			6 (1.04)
35	Habitation			14 (2.25)

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

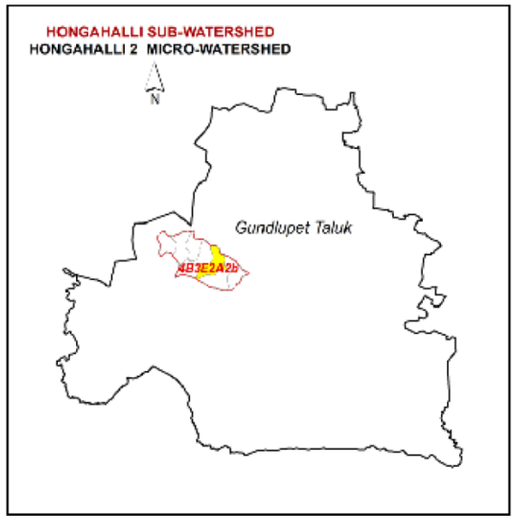
SOILS

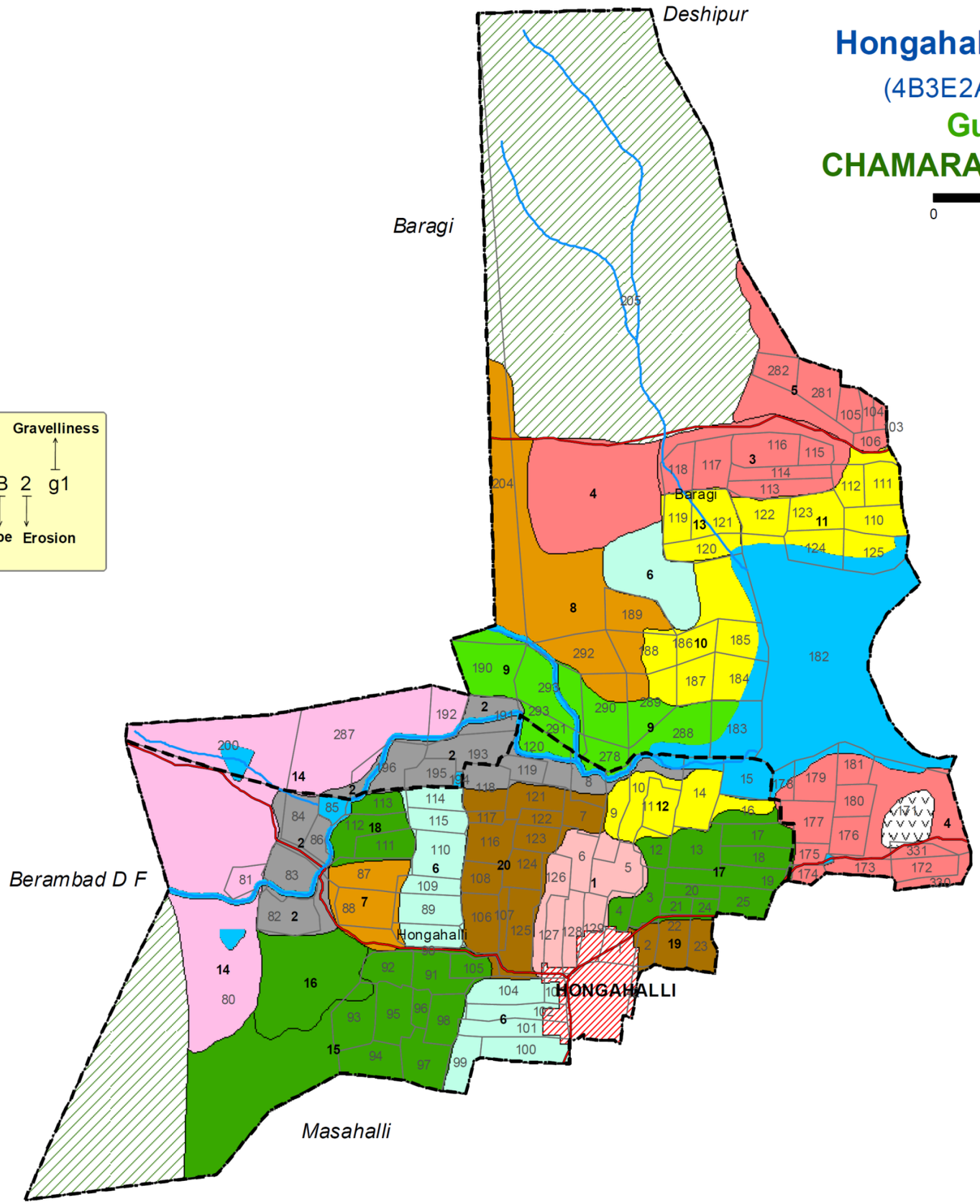
Hongahalli 2 Micro-watershed

(4B3E2A2b : Area - 644.34 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT





Soil Phases	Area in ha. (%)
1, ARKbB2	13 (2.01)
2, BMBiB1	26 (4.1)
3, BMDcB1g1	17 (2.58)
4, BMDcB2g1	41 (6.42)
5, BMDcC2g1	14 (2.17)
6, DRHcB2g1	32 (4.89)
7, HDRbB1g1	8 (1.18)
8, HDRcB1g1	30 (4.63)
9, HGHiB1	23 (3.51)
10, HPRbB1	15 (2.3)
11, HPRbB2g1	15 (2.37)
12, HPRcB1g1	10 (1.52)
13, HPRhB1g1	7 (1.05)
14, KLPcC2g1	58 (8.96)
15, KNGbB1g1	39 (6.12)
16, KNGbB2g2	12 (1.86)
17, KNGcB1	19 (3.0)
18, KNGcB2	6 (0.96)
19, MGHbB1g1	5 (0.79)
20, MGHcB2g1	22 (3.46)
21, Rockout crop	3 (0.46)
22, Forest	163 (25.23)
23, Others*	67 (10.43)

* - Habitation & Waterbody

Texture — Gravelliness

BMD c B 2 g1

Soil Series — Slope — Erosion

KEY

TEXTURE
b – Loamy sand
c – Sandy loam
i - Sandy clay

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

EROSION
1 – Slight
2 – Moderate

GRAVELLINESS
g1 – Gravelly (15-35 %)

DEPTH
HDR,BMD-Shallow(25-50 cm)
DRH,MGH,HPR-Moderately shallow(50-75 cm)
KNG-Moderately deep(75-100 cm)
KLP-Deep(100-150 cm)
ARK,HGH,BMB-Very deep(>150 cm)

References

- Streams/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 123 Land Parcel with No's
- Village boundary
- Micro-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru

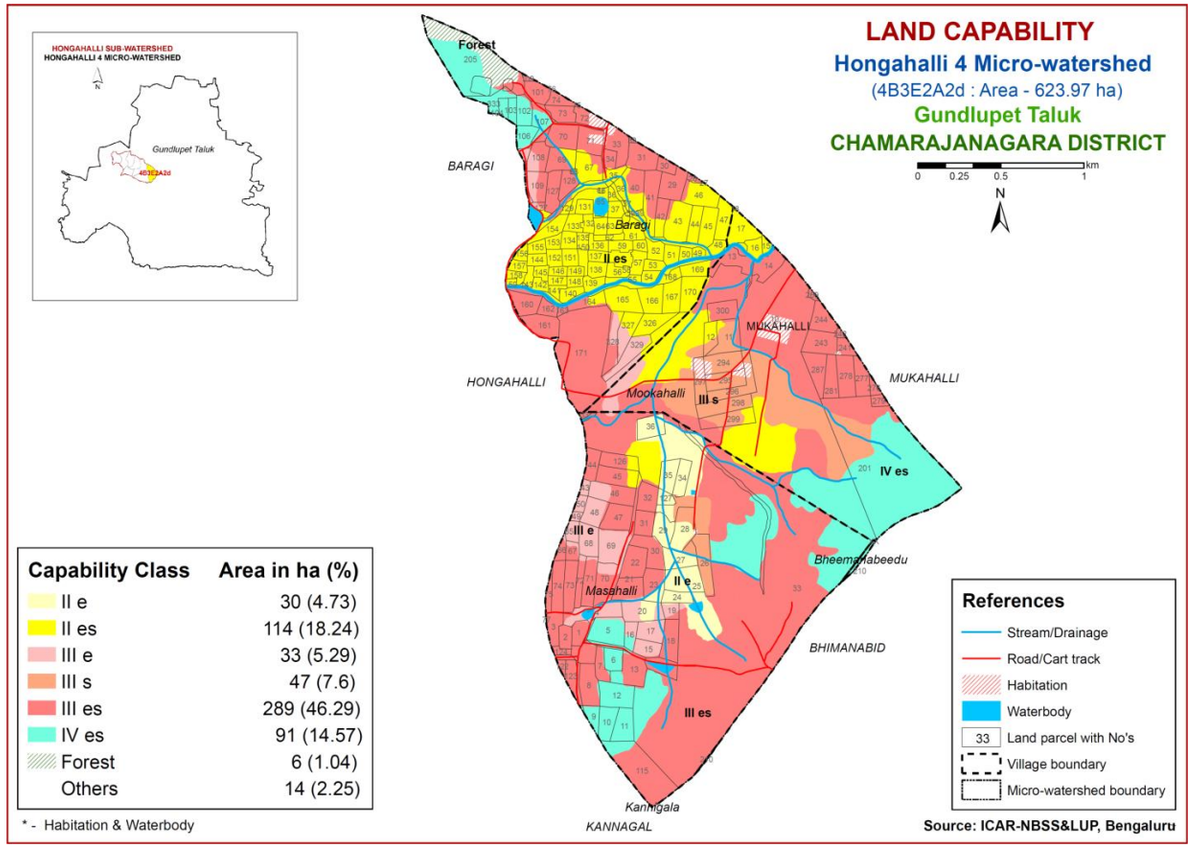
Table 2. Mapping unit description of Hongahalli - 2 Micro-watershed in Gundlupet taluk, Chamarajanagara district

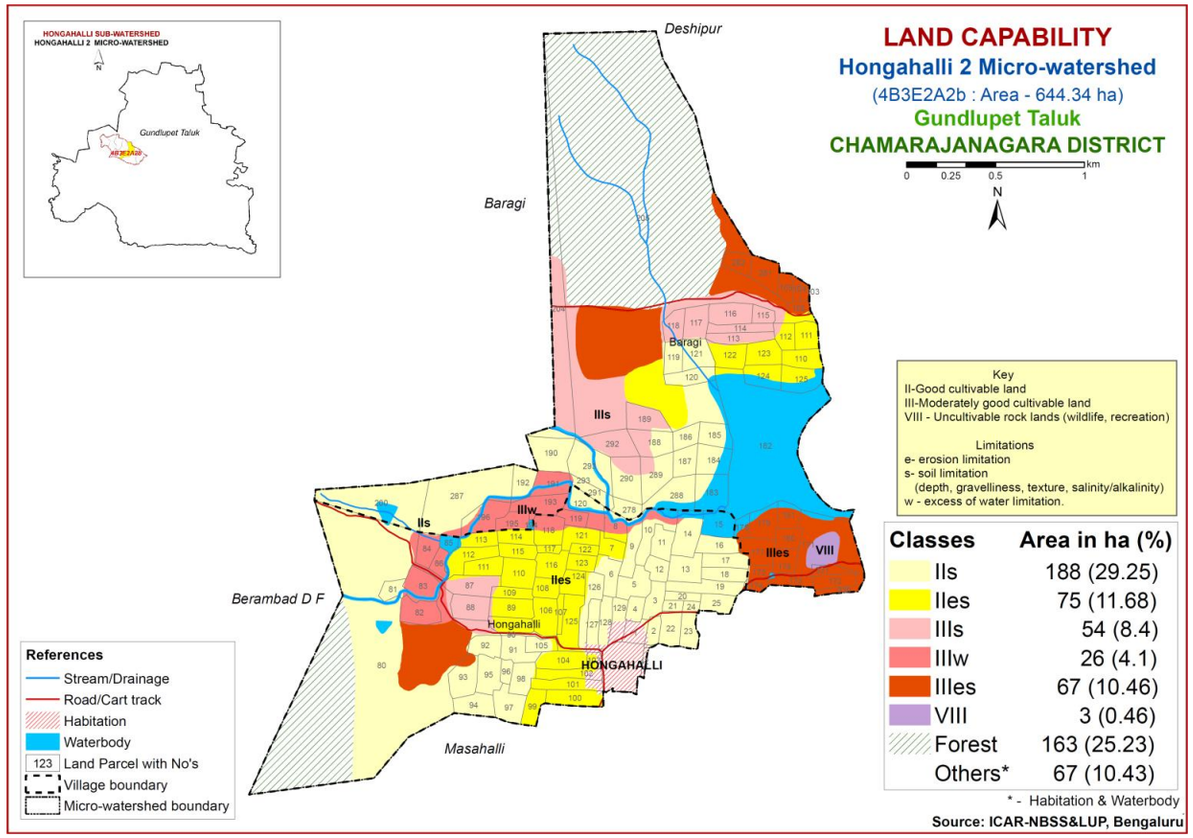
Soil No *	Soil series	Soil Phase	Mapping Unit Description	Area in ha (%)
	ARK	Annurkeri soils are very deep (>150 cm), well drained, have dark reddish brown to very dusky red sandy clay to clay soils occurring on very gently sloping uplands under cultivation		**12.95 (2.01)**
1		ARKbB2	Loamy sand surface, slope 1-3% , moderate erosion	12.95 (2.01)
	BMB	Beemanabeedu soils are very deep (>150 cm), moderately well drained, have very dark greyish brown to dark grey and very dark brown clayey soils occurring on very gently sloping lowlands under cultivation		**26.41 (4.10)**
2		BMBiB1	Sandy clay surface, slope 1-3%, slight erosion	26.41 (4.10)
	BMD	Berambadi soils are Shallow (25-50 cm), well drained, dark brown to dark greyish brown clayey soils occurring on gently to very gently sloping uplands under cultivation		**72.01 (11.17)**
3		BMDcB1g1	Sandy loam surface, slope 1-3% slight erosion, gravelly (15-35%)	16.64 (2.58)
4		BMDcB2g1	Sandy loam surface, slope 1-3 %, moderate erosion, gravelly (15-35%)	41.37 (6.42)
5		BMDcC2g1	Sandy loam surface, slope 3-5%, moderate erosion, gravelly (15-35%)	14.00 (2.17)
	DRH	Devarahalli soils are moderately shallow (50-75 cm), well drained, have dark red to reddish brown and dusky red gravelly sandy clay loam to sandy clay soils occurring on very gently sloping uplands under cultivation		**31.51 (4.89)**
6		DRHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	31.51 (4.89)
	HDR	Hindupur soils are shallow (25-50 cm), well drained, have dark reddish brown to dusky red sandy clay loam to sandy clay soils occurring on very gently sloping uplands		**37.49 (5.81)**
7		HDRbB1g1	Loamy sand surface, slope 1-3%, slight erosion and gravelly (15-35%)	7.63 (1.18)
8		HDRcB1g1	Sandy loam surface, slope 1-3%, slight erosion and gravelly (15-35%)	29.86 (4.63)
	HGH	Honnegaudanahalli soils are very deep (>150 cm), well drained, have very dark brown to brown and dark reddish brown sandy clay loam soils occurring on very gently sloping uplands under cultivation		**22.60 (3.51)**
9		HGHiB1	Sandy clay surface, slope 1-3%, slight erosion	22.60 (3.51)

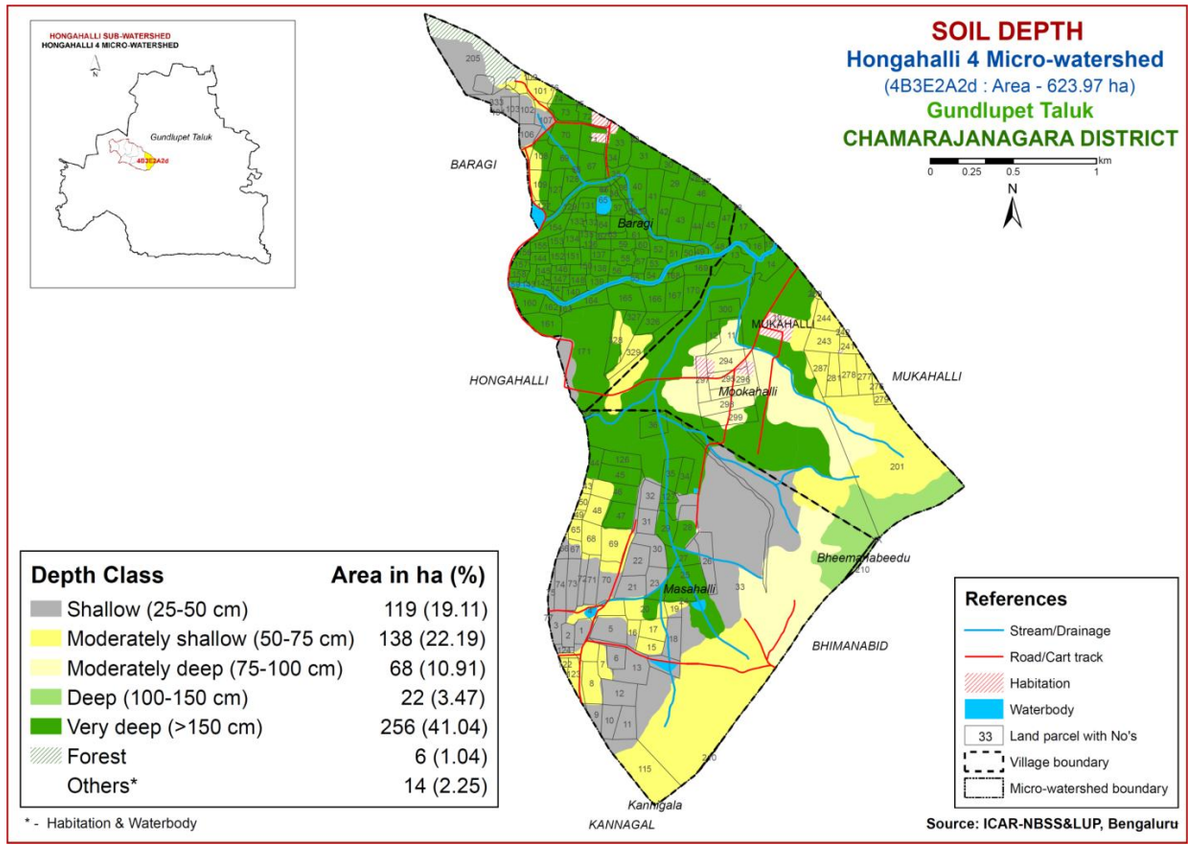
To be continued….

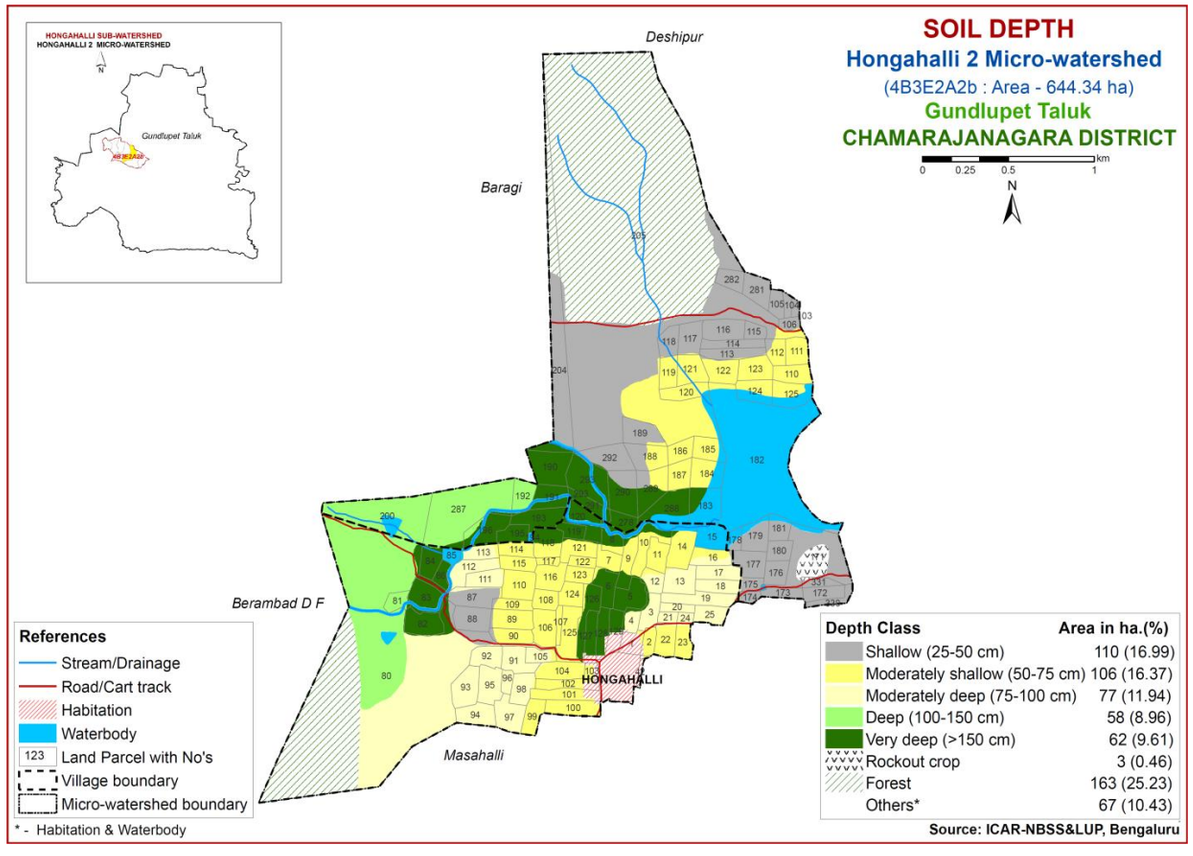
Soil No *	Soil series	Soil Phase	Mapping Unit Description	Area in ha (%)
	HPR	Hullipura soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark brown gravelly sandy clay loam to sandy clay soils occurring on very gently sloping uplands under cultivation		**46.6 (7.24)**
10		HPRbB1	Loamy Sand surface, slope 1-3%, slight erosion	14.82 (2.30)
11		HPRbB2g1	Loamy sand surface, slope 1-3%, moderate erosion, gravelly (15-35%)	15.25 (2.37)
12		HPRcB1g1	Sandy loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	9.79 (1.52)
13		HPRhB1g1	Sandy clay loam surface, slope 1-3%, slight erosion, gravelly (15-35%)	6.74 (1.05)
	KLP	Kallipura soils are deep (100-150 cm), well drained, have dark reddish brown to dark red gravelly sandy clay loam to sandy clay soils occurring on gently sloping uplands under cultivation.		**57.74 (8.96)**
14		KLPcC2g1	Sandy loam, slope 3-5%, moderate erosion, gravelly (15-35%)	57.74 (8.96)
	KNG	Kannigala soils are moderately deep (75-100 cm), well drained, have dark reddish brown to dark red gravelly sandy clay loam to sandy clay soils occurring on very gently sloping uplands		**76.94 (11.94)**
15		KNGbB1g1	Loamy sand surface, slope 1-3%, slight erosion, gravelly (15-35%)	39.41 (6.12)
16		KNGbB2g2	Loamy sand surface, slope 1-3%, moderate erosion, very gravelly (35-60%)	12.00 (1.86)
17		KNGcB1	Sandy loam surface, slope 1-3%, slight erosion	19.34 (3.00)
18		KNGcB2	Sandy loam surface, slope 1-3%, moderate erosion	6.19 (0.96)
	MGH	Magoonahalli soils are moderately shallow (50-75 cm), well drained, have very dark brown to dark brown gravelly sandy clay loam soils occurring on very gently sloping uplands		**27.39 (4.25)**
19		MGHbB1g1	Loamy sand surface, slope 1-3%, slight erosion, gravelly (15-35%)	5.09 (0.79)
20		MGHcB2g1	Sandy loam surface, slope 1-3%, moderate erosion, gravelly (15-35%)	22.30 (3.46)
21	Rock outcrops			2.97 (0.46)
22	Forest			162.55 (25.23)
23	Others			67.18 (10.43)

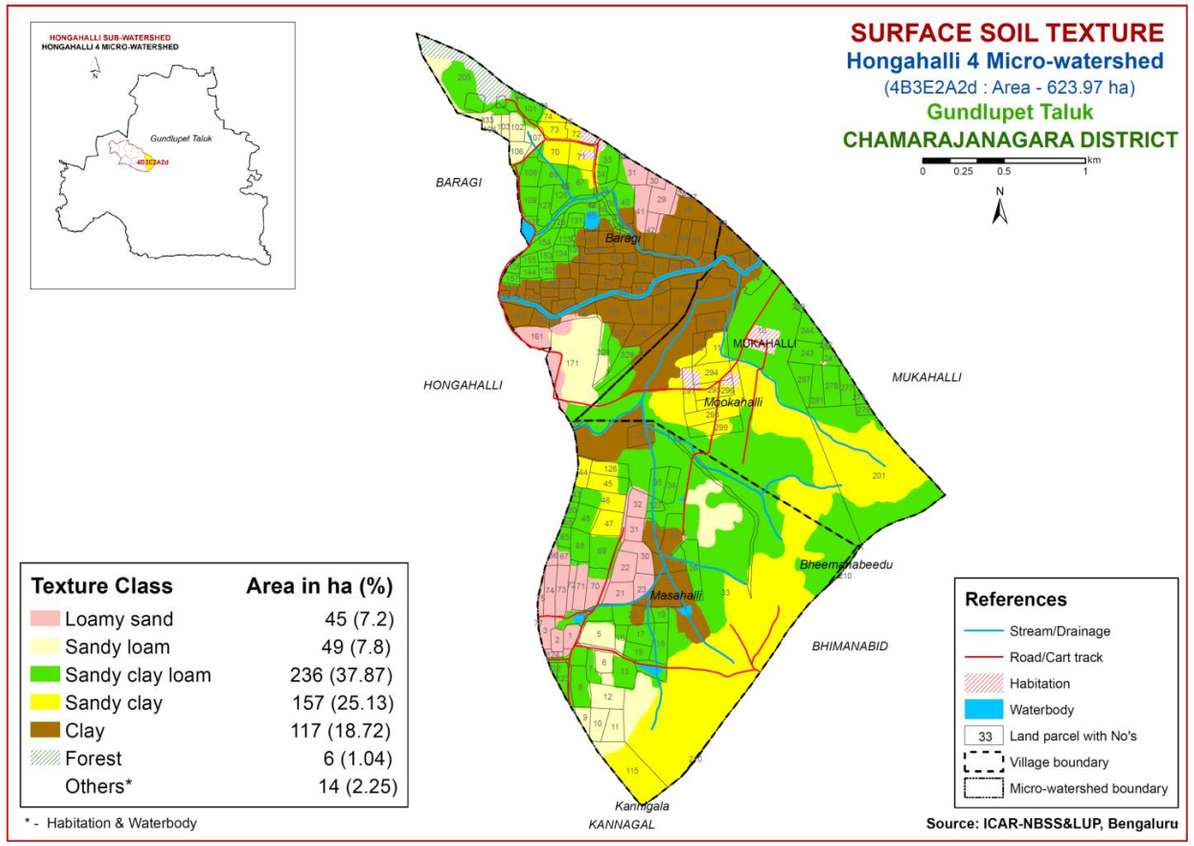
*Soil map unit numbers are continuous for the taluk, not the micro-watershed

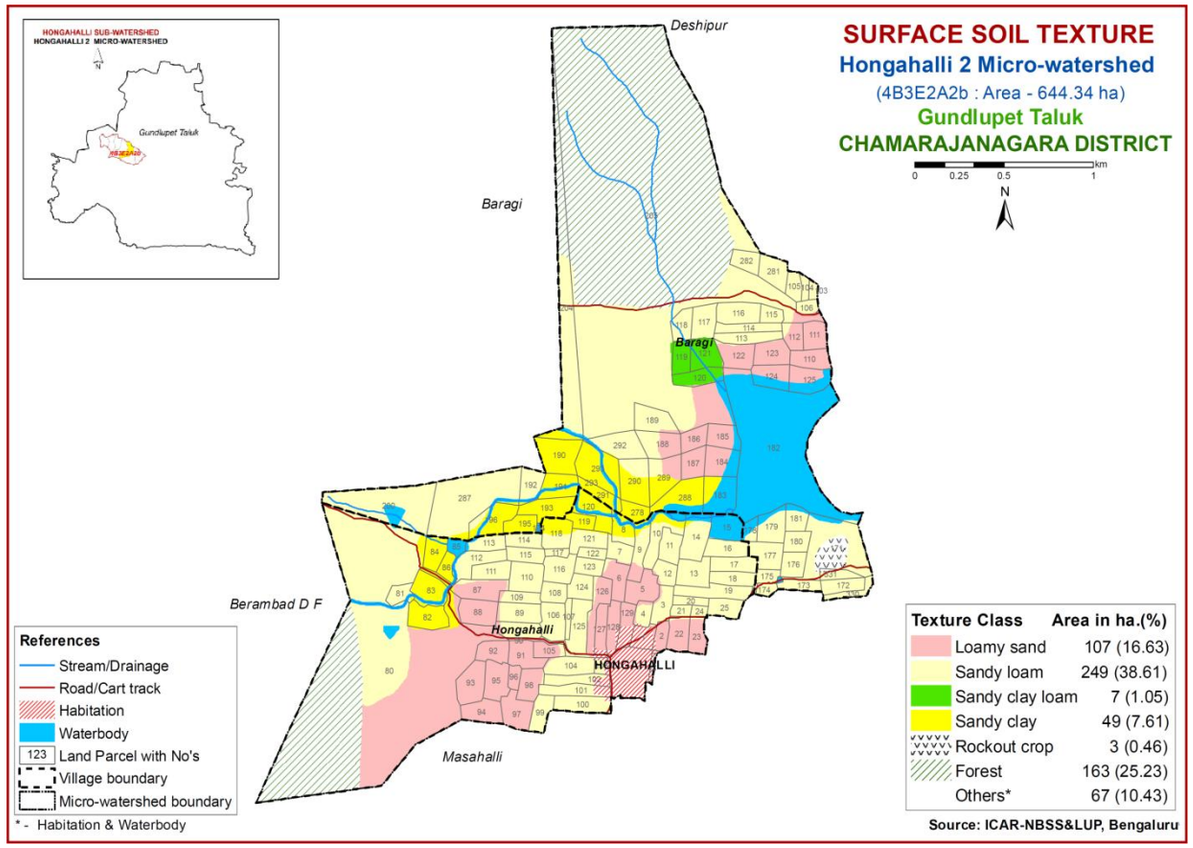

HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
LAND CAPABILITY
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
Forest
BARAGI
Baragi
II es
MUKAHALLI
HONGAHALLI
Mookahalli
III s
IV es
III e
Bheemanabeedu
Masahalli
II e
BHIMANABID
III es
Kanmgala
KANNAGAL
Capability Class | Area in ha (%)
II e | 30 (4.73)
II es | 114 (18.24)
III e | 33 (5.29)
III s | 47 (7.6)
III es | 289 (46.29)
IV es | 91 (14.57)
Forest | 6 (1.04)
Others | 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

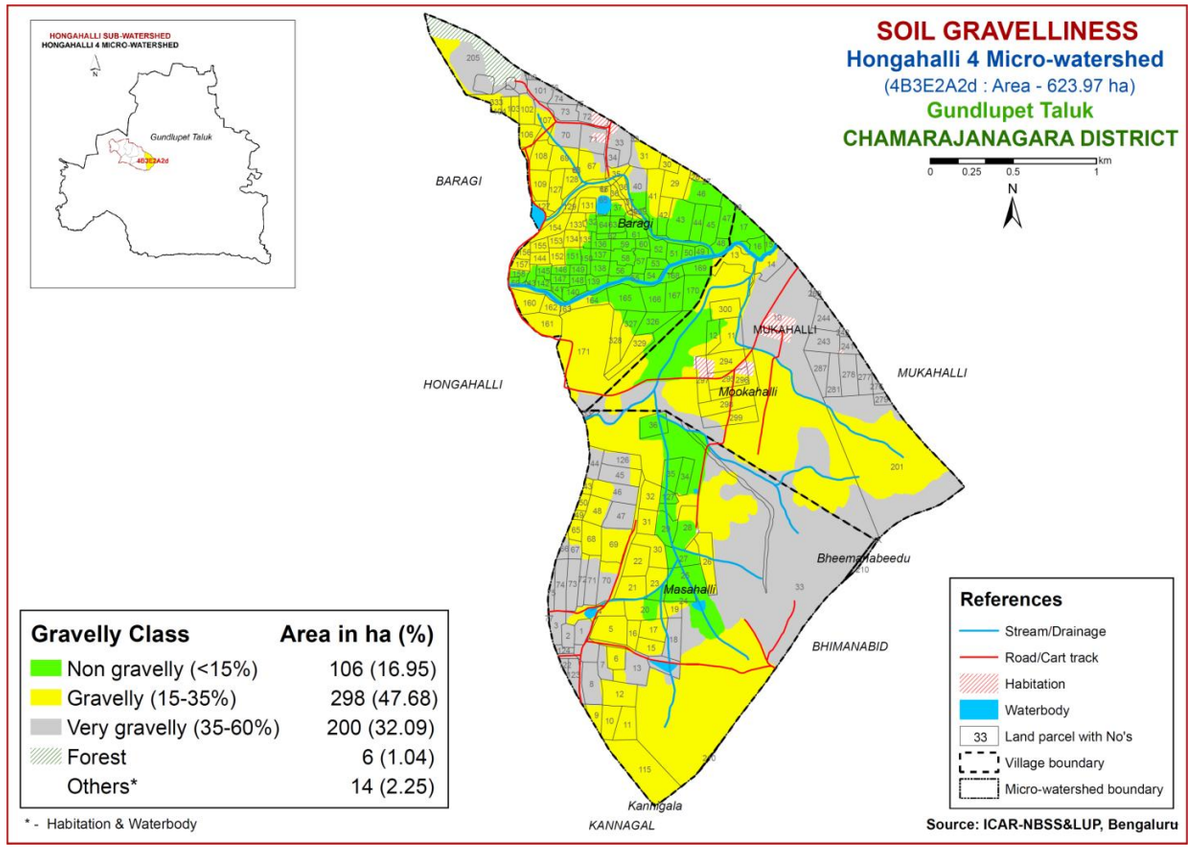

HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
LAND CAPABILITY
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
Deshipur
Baragi
IIIs
IIs
IIIw
IIIes
VIII
Berambad D F
Hongahalli
HONGAHALLI
Masahalli
Key
II-Good cultivable land
III-Moderately good cultivable land
VIII - Uncultivable rock lands (wildlife, recreation)
Limitations
e- erosion limitation
s- soil limitation
(depth, gravelliness, texture, salinity/alkalinity)
w - excess of water limitation.
Classes | Area in ha (%)
IIs | 188 (29.25)
IIes | 75 (11.68)
IIIs | 54 (8.4)
IIIw | 26 (4.1)
IIIes | 67 (10.46)
VIII | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

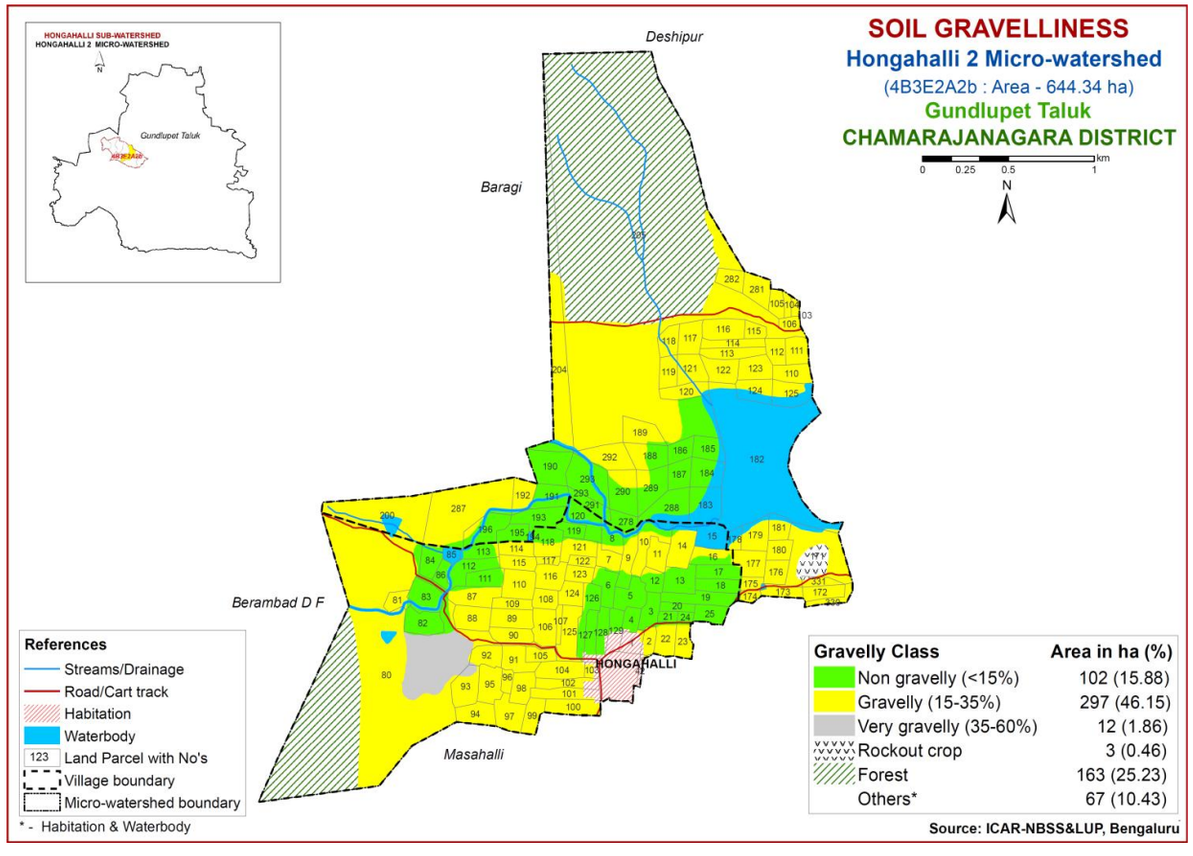

HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
SOIL DEPTH
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
BARAGI
Baragi
MUKAHALLI
HONGAHALLI
Mookahalli
Bheemanabeedu
Masahalli
BHIMANABID
Kanmgala
KANNAGAL
Depth Class | Area in ha (%)
Shallow (25-50 cm) | 119 (19.11)
Moderately shallow (50-75 cm) | 138 (22.19)
Moderately deep (75-100 cm) | 68 (10.91)
Deep (100-150 cm) | 22 (3.47)
Very deep (>150 cm) | 256 (41.04)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

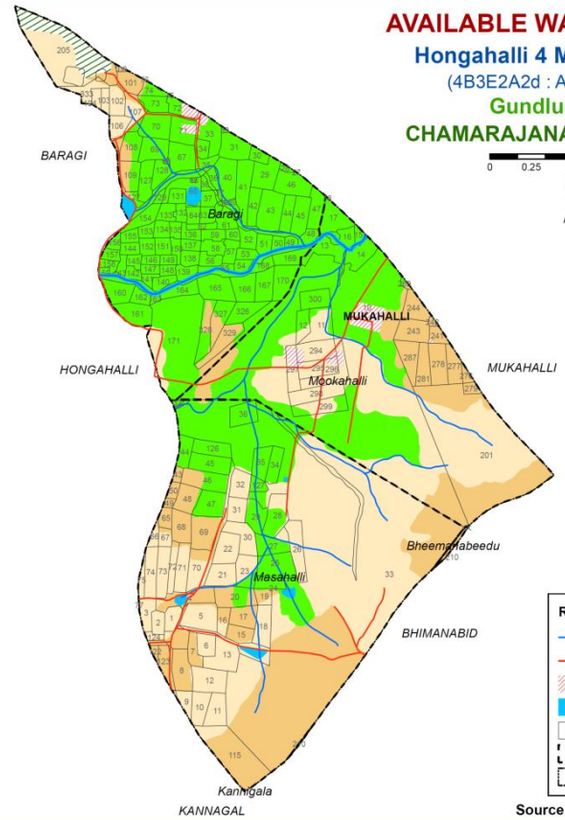

HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
SOIL DEPTH
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
Deshipur
Baragi
Berambad D F
HONGAHALLI
Masahalli
Depth Class | Area in ha.(%)
Shallow (25-50 cm) | 110 (16.99)
Moderately shallow (50-75 cm) | 106 (16.37)
Moderately deep (75-100 cm) | 77 (11.94)
Deep (100-150 cm) | 58 (8.96)
Very deep (>150 cm) | 62 (9.61)
Rockout crop | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru


SURFACE SOIL TEXTURE
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mookahalli
Masahalli
Kannigala
Bheemanabeedu
Texture Class | Area in ha (%)
Loamy sand | 45 (7.2)
Sandy loam | 49 (7.8)
Sandy clay loam | 236 (37.87)
Sandy clay | 157 (25.13)
Clay | 117 (18.72)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


SURFACE SOIL TEXTURE
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
Deshipur
Baragi
Berambad D F
Hongahalli
HONGAHALLI
Masahalli
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Texture Class | Area in ha.(%)
Loamy sand | 107 (16.63)
Sandy loam | 249 (38.61)
Sandy clay loam | 7 (1.05)
Sandy clay | 49 (7.61)
Rockout crop | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
Source: ICAR-NBSS&LUP, Bengaluru


SOIL GRAVELLINESS
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mookahalli
Masahalli
Kannigala
Bheemanabeedu
Gravelly Class | Area in ha (%)
Non gravelly (<15%) | 106 (16.95)
Gravelly (15-35%) | 298 (47.68)
Very gravelly (35-60%) | 200 (32.09)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


SOIL GRAVELLINESS
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
Deshipur
Baragi
Berambad D F
HONGAHALLI
Masahalli
References
Streams/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Gravelly Class | Area in ha (%)
Non gravelly (<15%) | 102 (15.88)
Gravelly (15-35%) | 297 (46.15)
Very gravelly (35-60%) | 12 (1.86)
Rockout crop | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
Source: ICAR-NBSS&LUP, Bengaluru



AVAILABLE WATER CAPACITY

Hongahalli 4 Micro-watershed

(4B3E2A2d : Area - 623.97 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT

0 0.25 0.5 1 km

N

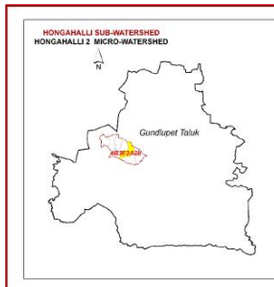
Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	211 (33.88)
Low (51-100 mm/m)	136 (21.79)
Very high (>200 mm/m)	256 (41.04)
Forest	6 (1.04)
Others*	14 (2.25)

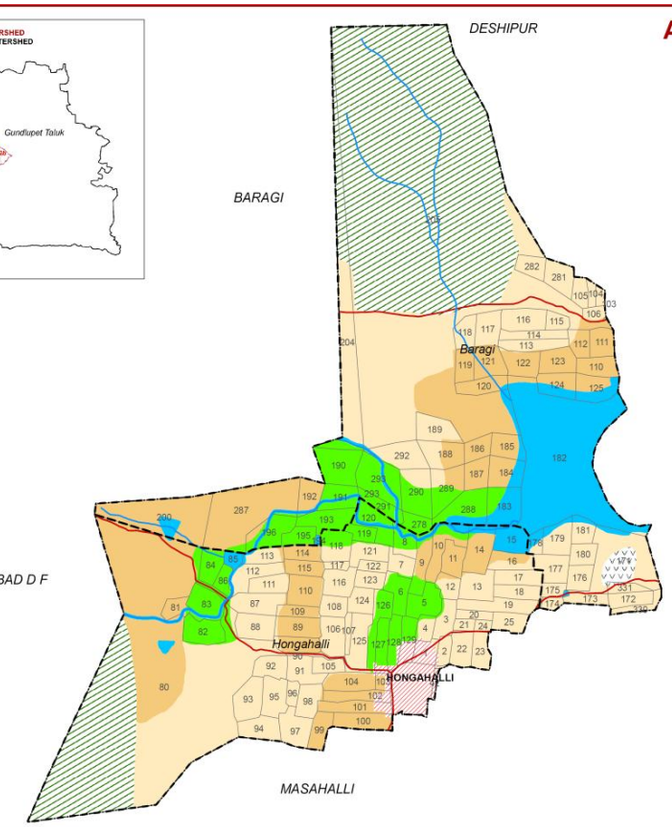
* - Habitation & Waterbody

References

- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 33 Land parcel with No's
- Village boundary
- Micro-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru





AVAILABLE WATER CAPACITY

Hongahalli 2 Micro-watershed

(4B3E2A2b : Area - 644.34 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT

0 0.25 0.5 1 km

N

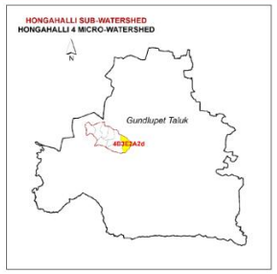
References

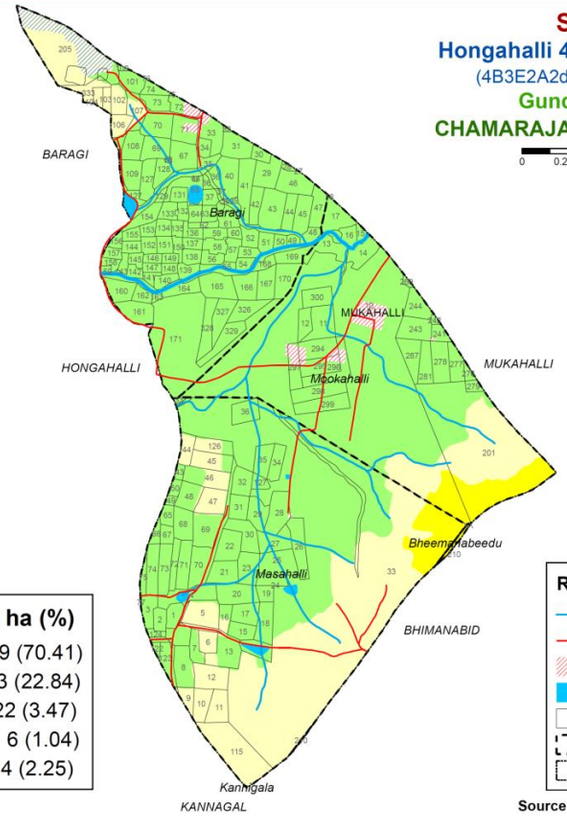
- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 123 Land Parcel with No's
- Village boundary
- Micro-watershed boundary

Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	214 (33.19)
Low (51-100 mm/m)	136 (21.08)
Very high (>200 mm/m)	62 (9.61)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru





SLOPE

Hongahalli 4 Micro-watershed

(4B3E2A2d : Area - 623.97 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT

0 0.25 0.5 1 km

N

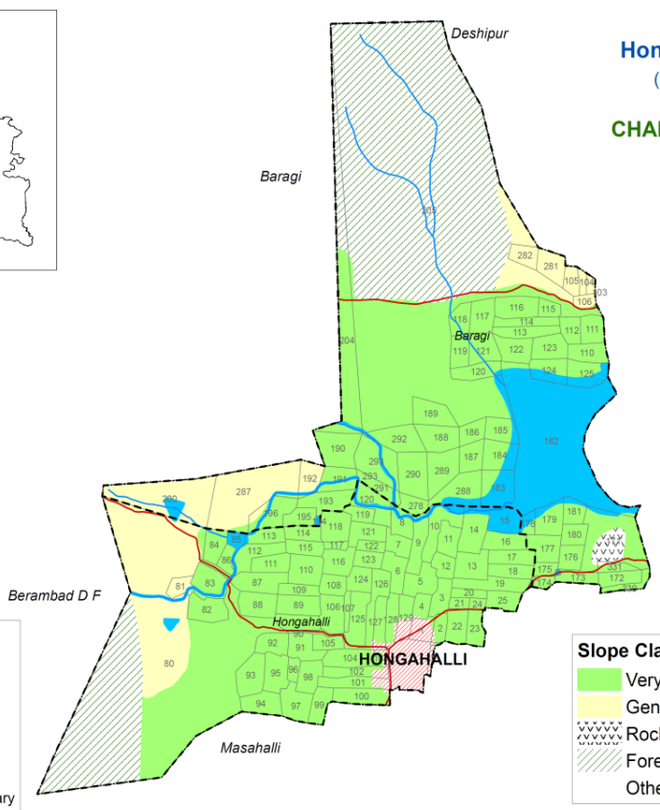
Slope Class	Area in ha (%)
Very gently sloping (1-3%)	439 (70.41)
Gently sloping (3-5%)	143 (22.84)
Moderately sloping (5-10%)	22 (3.47)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody

References

- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 33 Land parcel with No's
- Village boundary
- Micro-watershed boundary

Source: ICAR-NBSS&LUP, Bengaluru



SLOPE

Hongahalli 2 Micro-watershed

(4B3E2A2b : Area - 644.34 ha)

Gundlupet Taluk

CHAMARAJANAGARA DISTRICT

0 0.25 0.5 1 km

N

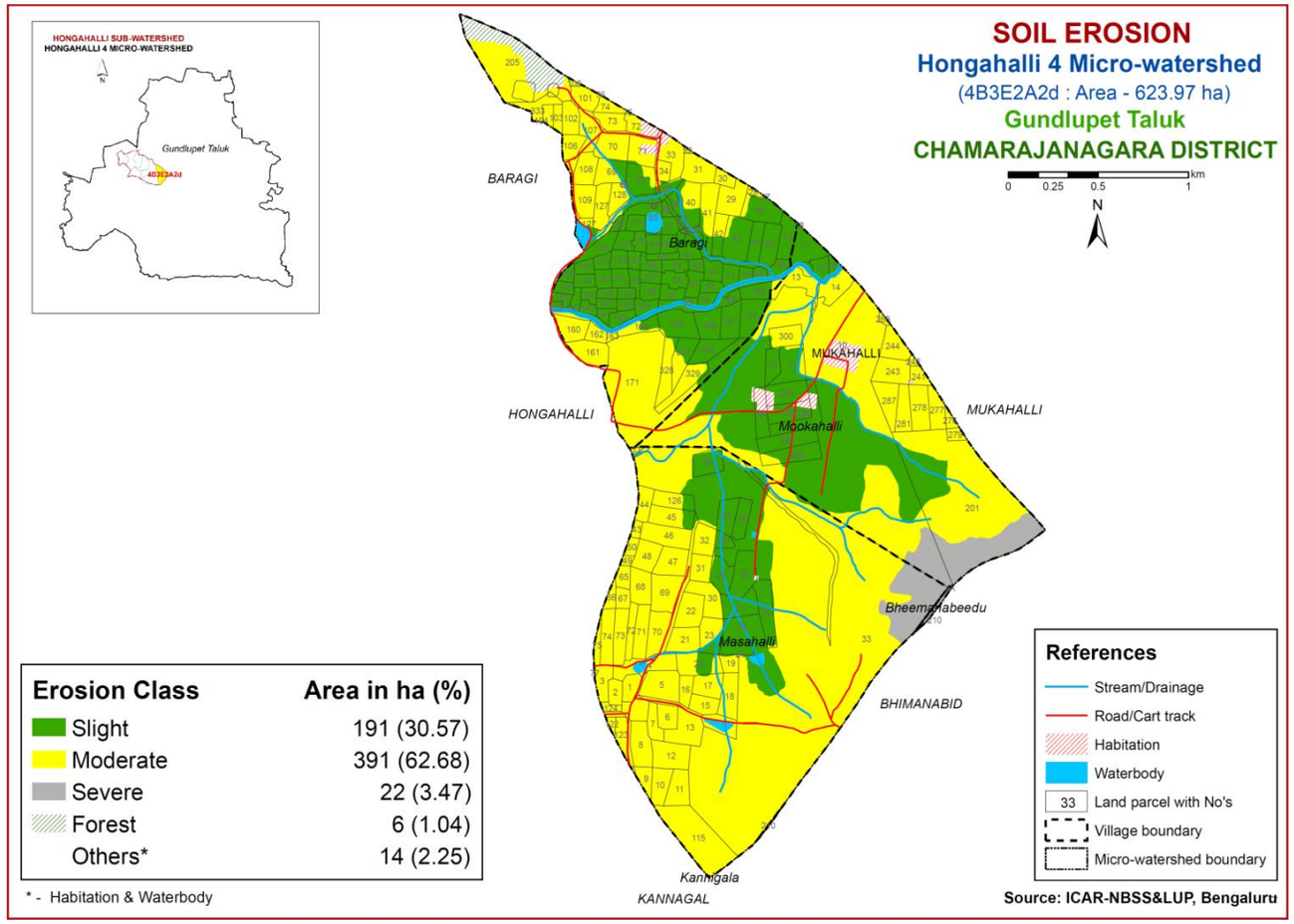
References

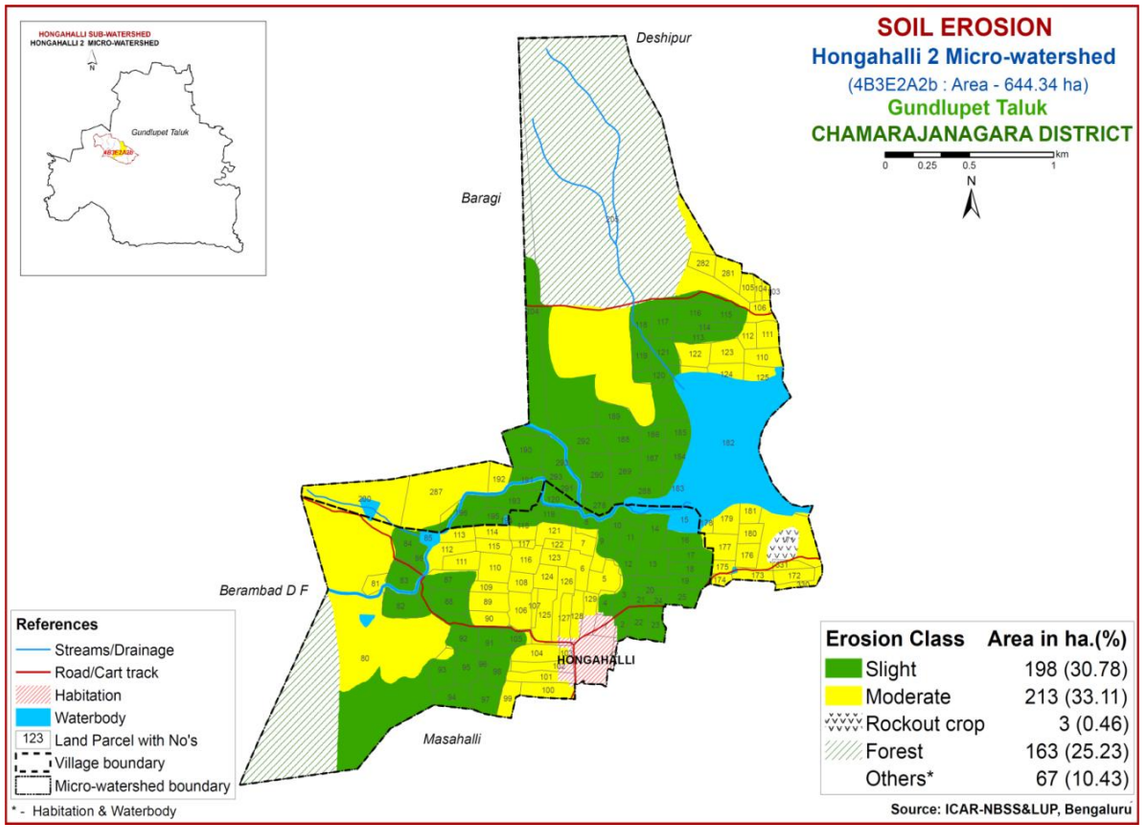
- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 123 Land Parcel with No's
- Village boundary
- Micro-watershed boundary

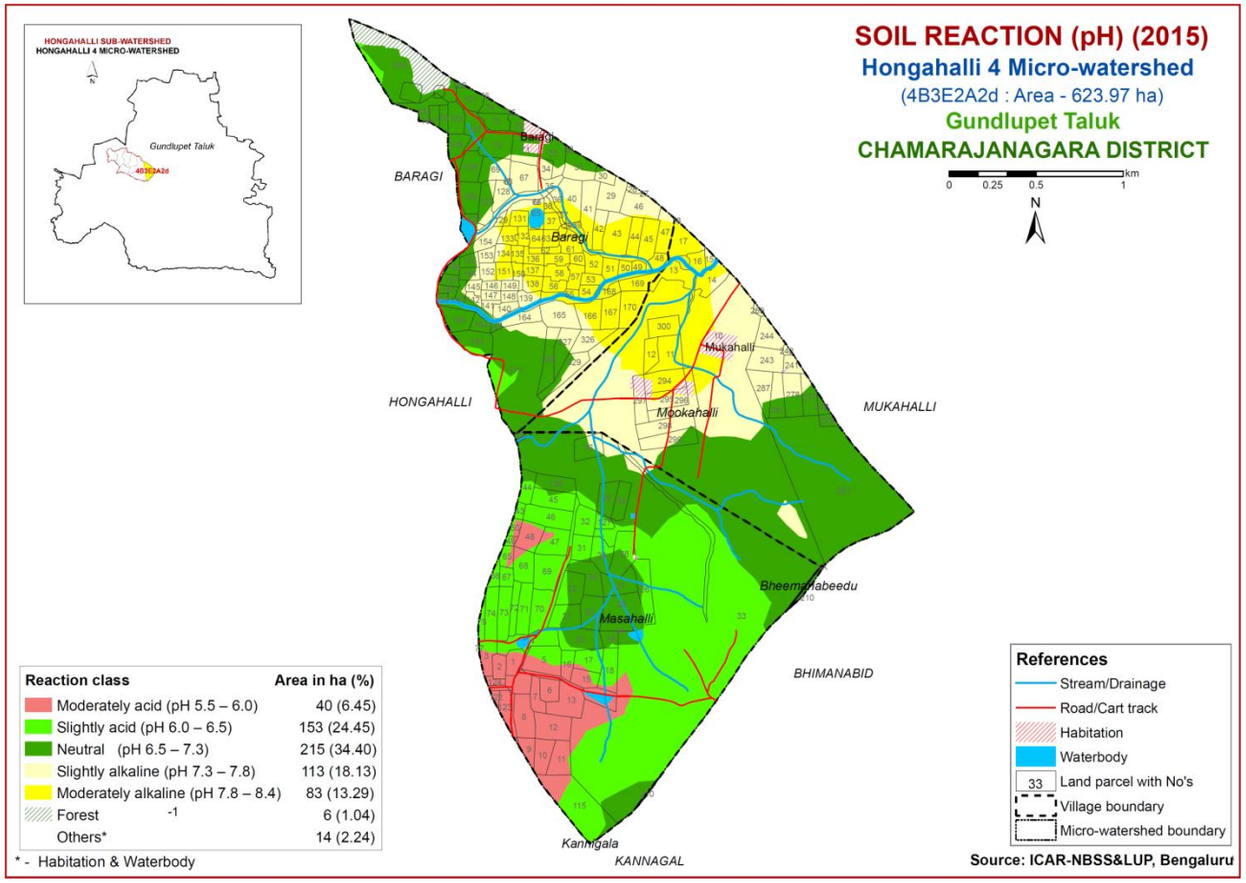
* - Habitation & Waterbody

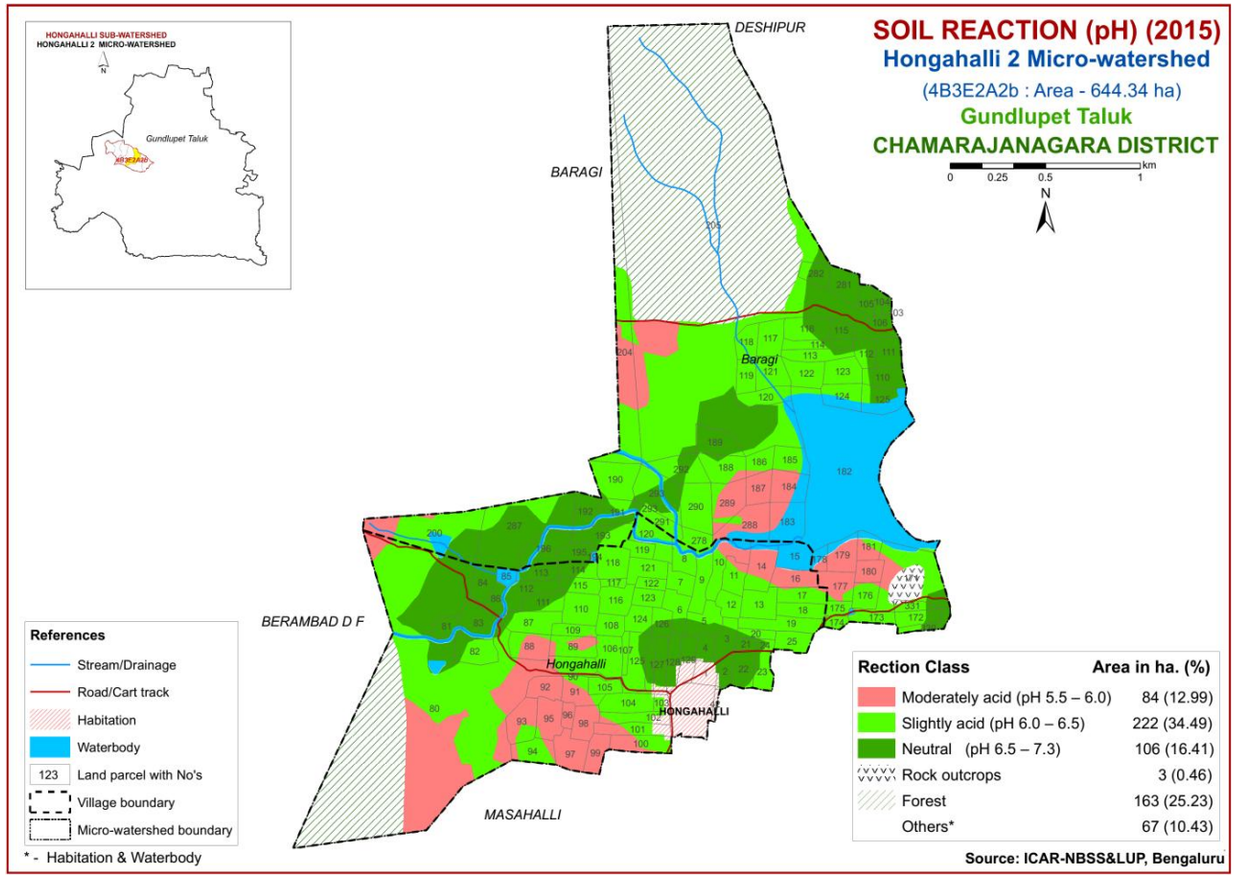
Slope Class	Area in ha.(%)
Very gently sloping (1-3%)	340 (52.75)
Gently sloping (3-5%)	72 (11.13)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

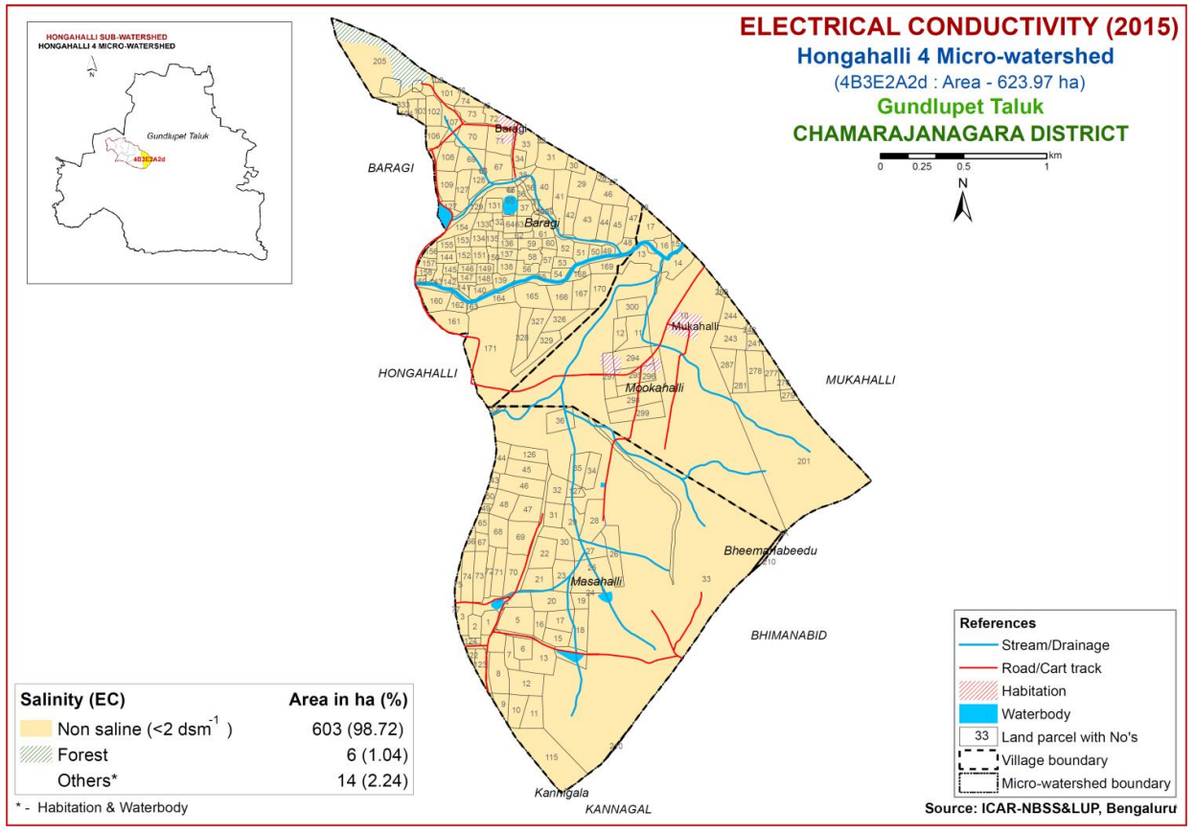
Source: ICAR-NBSS&LUP, Bengaluru

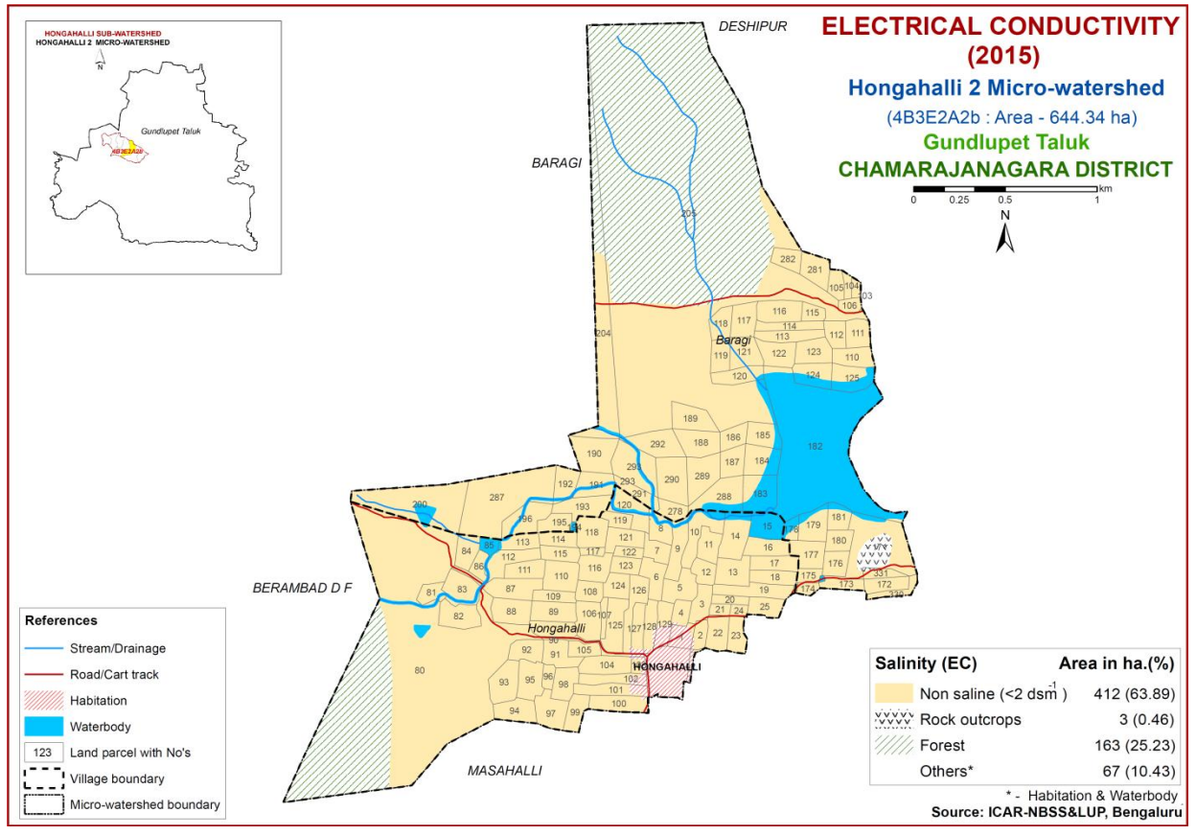

SOIL EROSION
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
Baragi
MUKAHALLI
HONGAHALLI
Mookahalli
MUKAHALLI
Bheemanabeedu
Masahalli
BHIMANABID
Kannigala
KANNAGAL
Erosion Class | Area in ha (%)
Slight | 191 (30.57)
Moderate | 391 (62.68)
Severe | 22 (3.47)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

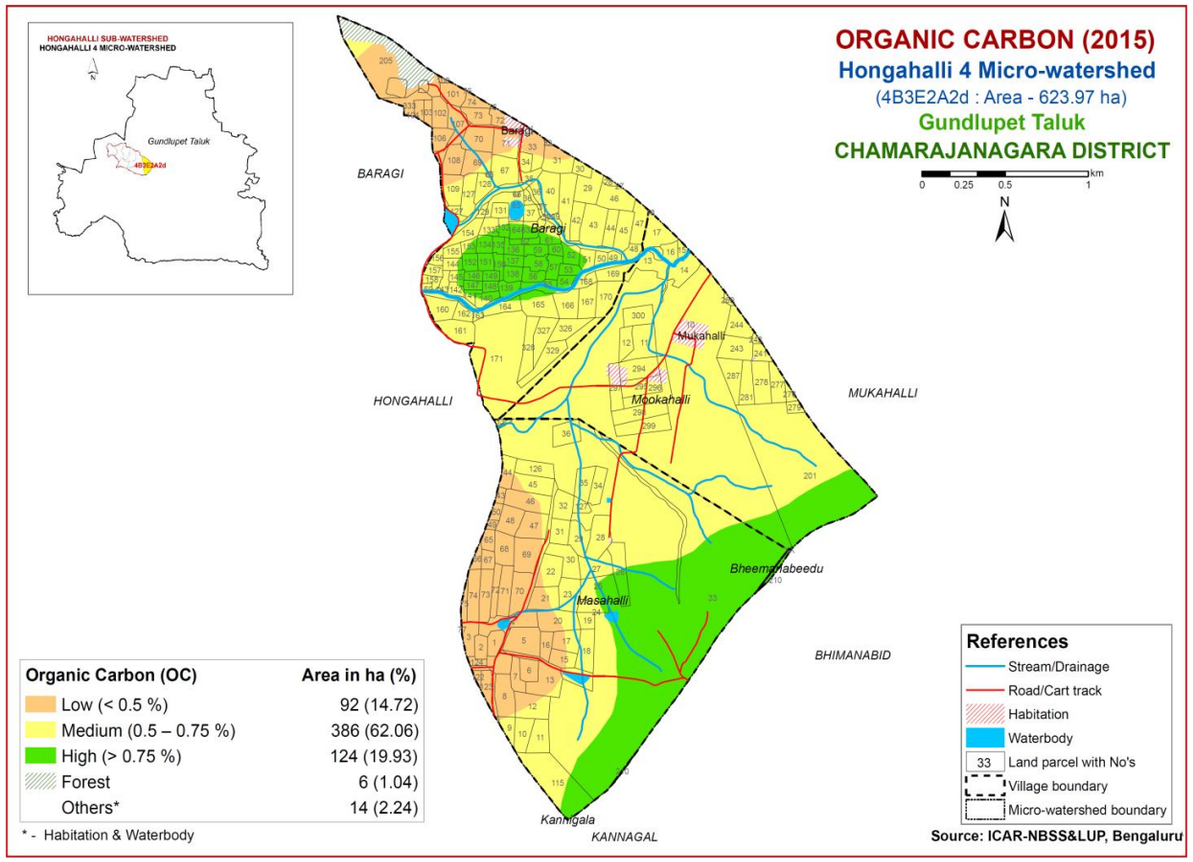

SOIL EROSION
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
Deshipur
Baragi
Berambad D F
HONGAHALLI
Masahalli
References
Streams/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Erosion Class | Area in ha.(%)
Slight | 198 (30.78)
Moderate | 213 (33.11)
Rockout crop | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
Source: ICAR-NBSS&LUP, Bengaluru

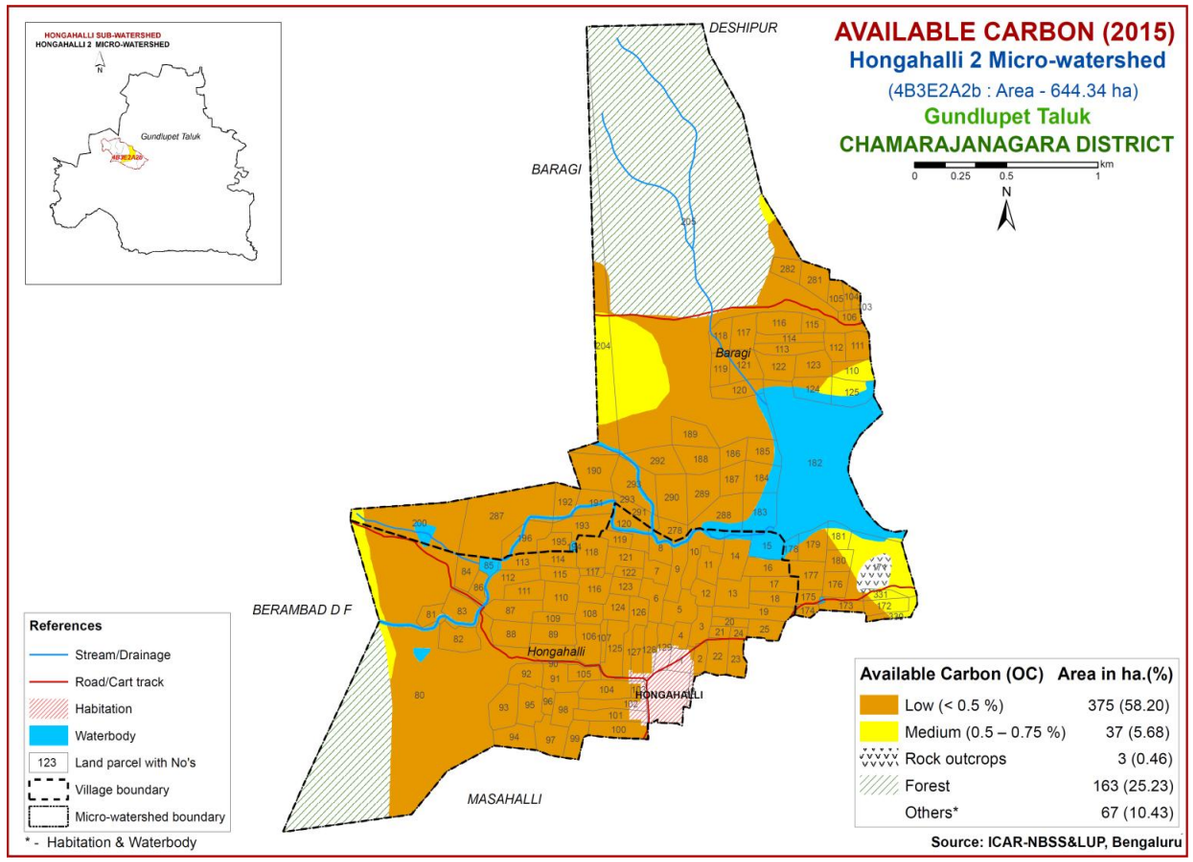

SOIL REACTION (pH) (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Masahalli
Bheemanabeedu
Kannigala
Reaction class | Area in ha (%)
Moderately acid (pH 5.5 – 6.0) | 40 (6.45)
Slightly acid (pH 6.0 – 6.5) | 153 (24.45)
Neutral (pH 6.5 – 7.3) | 215 (34.40)
Slightly alkaline (pH 7.3 – 7.8) | 113 (18.13)
Moderately alkaline (pH 7.8 – 8.4) | 83 (13.29)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

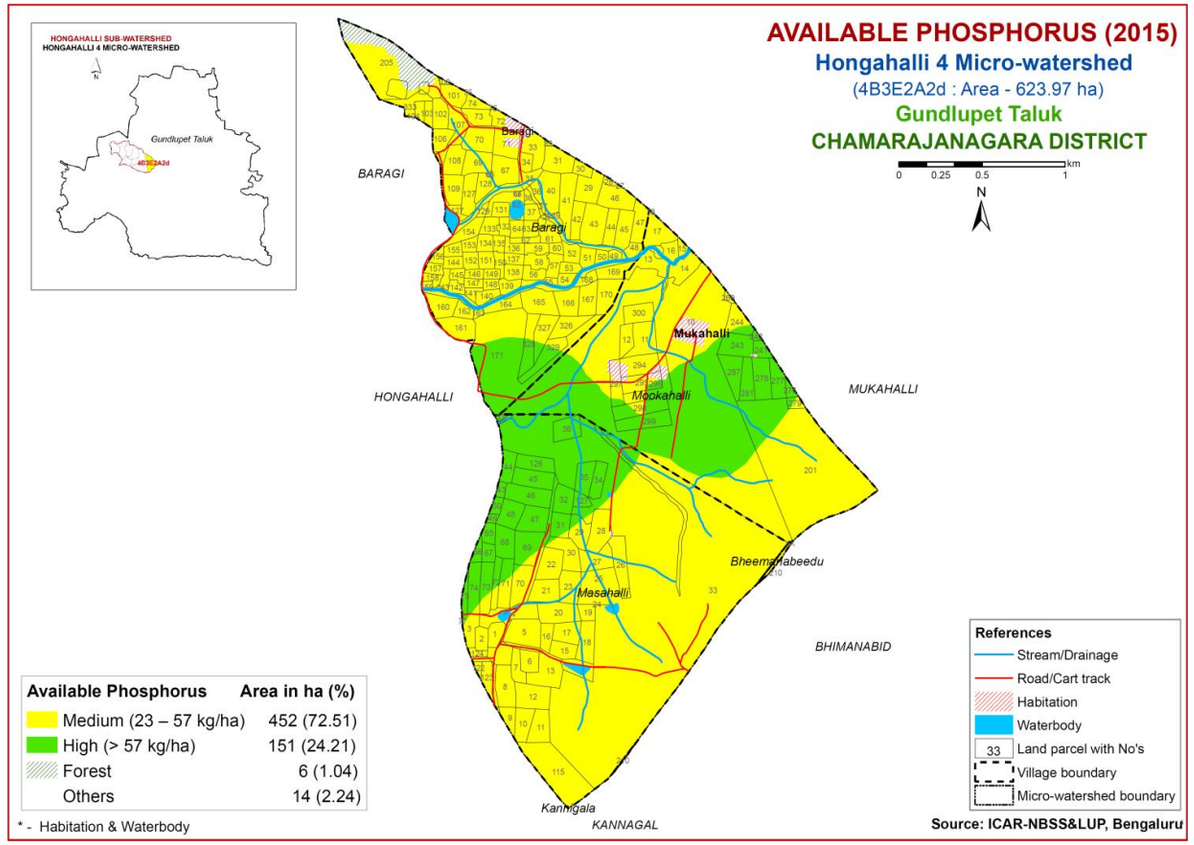

SOIL REACTION (pH) (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
0 0.25 0.5 1 km
N
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
HONGAHALLI
Baragi
Hongahalli
Rection Class | Area in ha. (%)
Moderately acid (pH 5.5 – 6.0) | 84 (12.99)
Slightly acid (pH 6.0 – 6.5) | 222 (34.49)
Neutral (pH 6.5 – 7.3) | 106 (16.41)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru

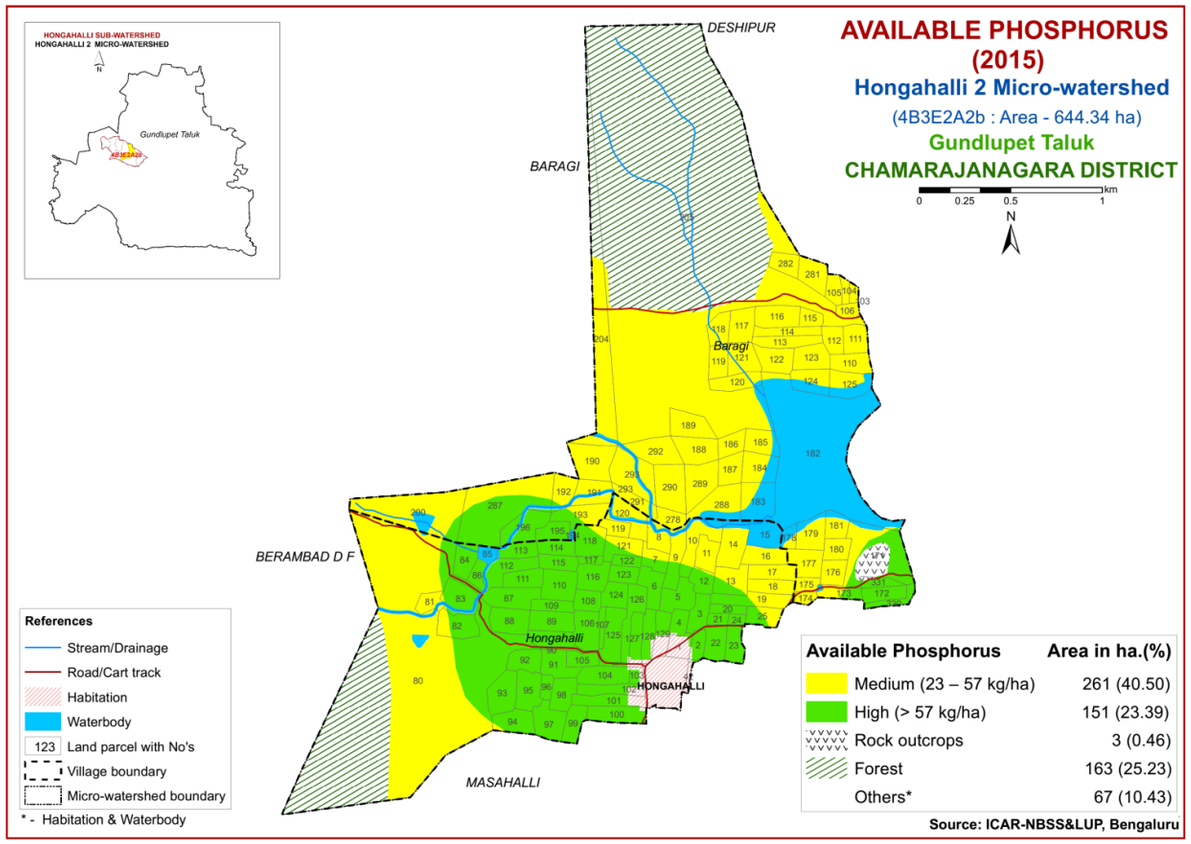

ELECTRICAL CONDUCTIVITY (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Masahalli
Bheemanabeedu
Kannigala
0 0.25 0.5 1 km
N
Salinity (EC) | Area in ha (%)
Non saline (<2 dsm-1) | 603 (98.72)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

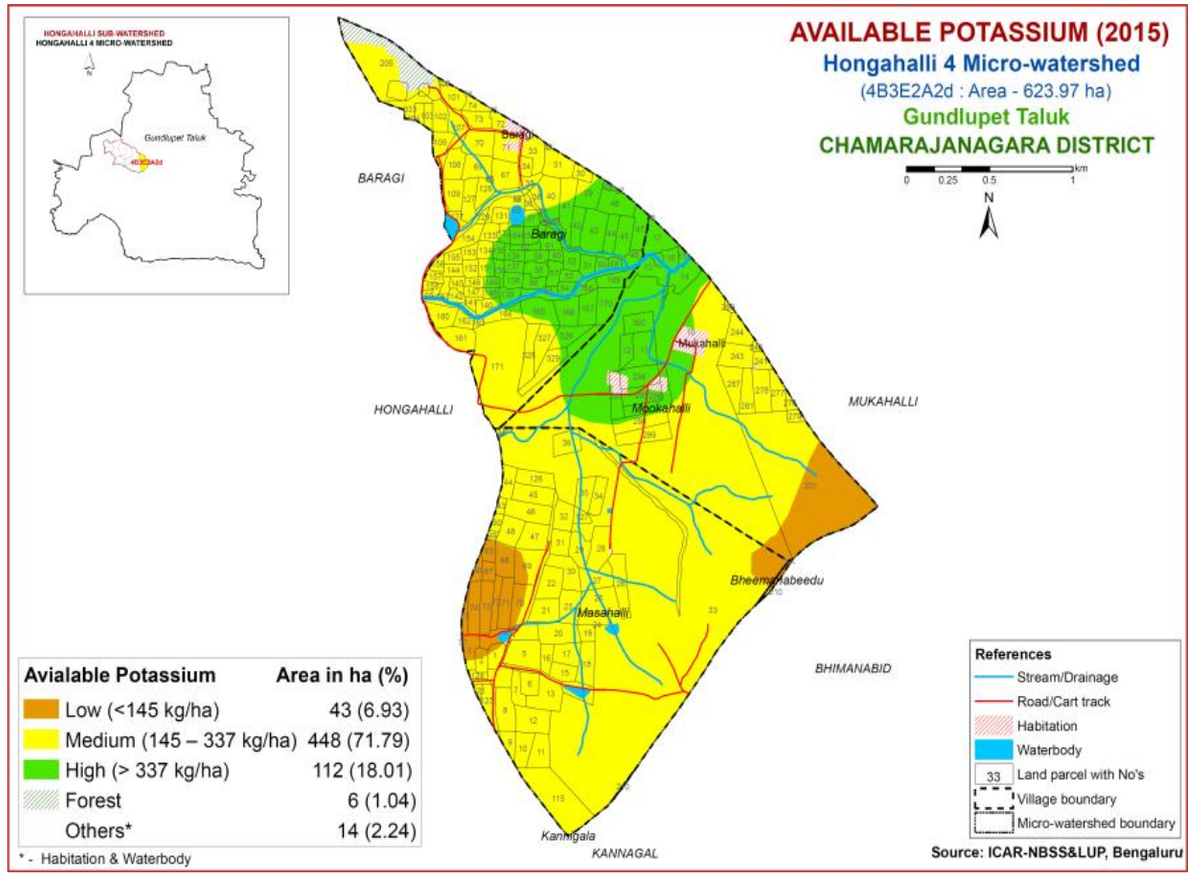

ELECTRICAL CONDUCTIVITY (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
0 0.25 0.5 1 km
N
Salinity (EC) | Area in ha.(%)
Non saline (<2 dsm-1) | 412 (63.89)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary

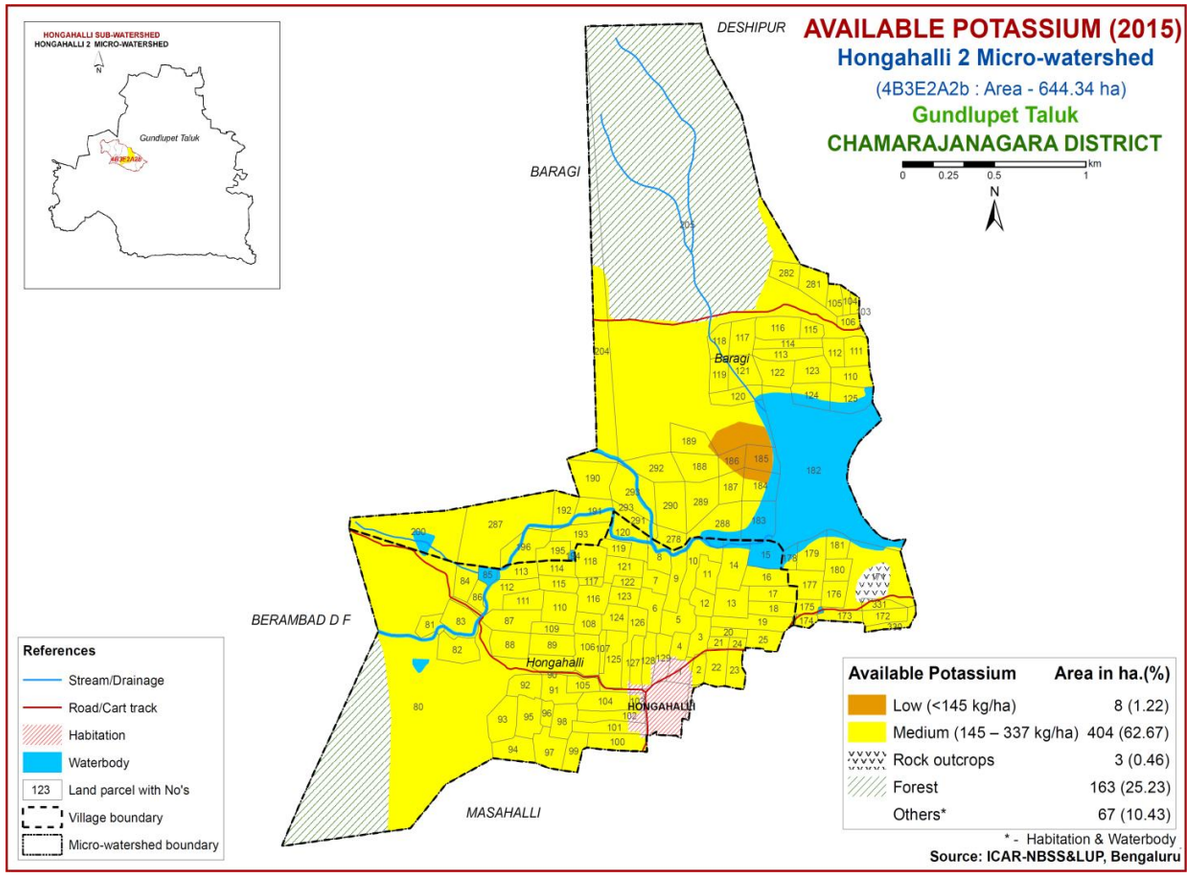

ORGANIC CARBON (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Masahalli
Bheemanabeedu
Kannigala
0 0.25 0.5 1 km
N
Organic Carbon (OC) | Area in ha (%)
Low (< 0.5 %) | 92 (14.72)
Medium (0.5 – 0.75 %) | 386 (62.06)
High (> 0.75 %) | 124 (19.93)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

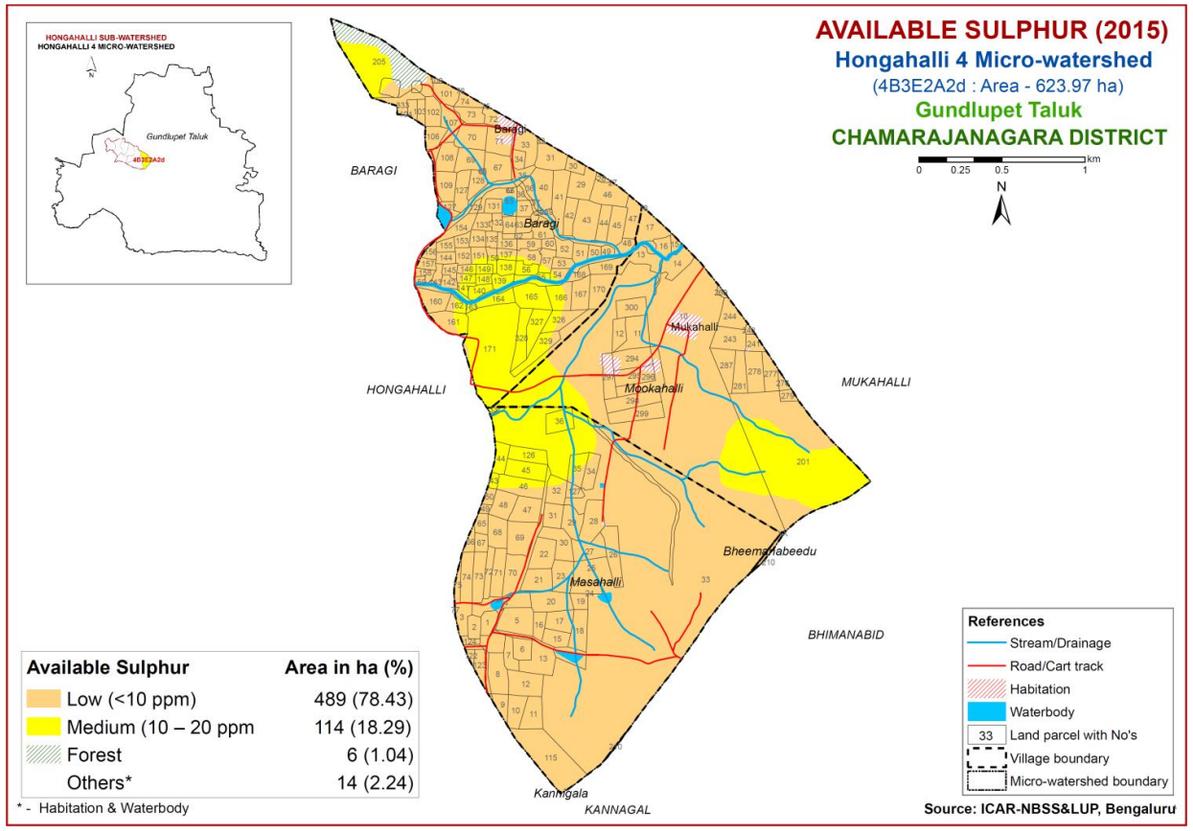

AVAILABLE CARBON (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
0 0.25 0.5 1 km
N
Available Carbon (OC) | Area in ha.(%)
Low (< 0.5 %) | 375 (58.20)
Medium (0.5 – 0.75 %) | 37 (5.68)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary

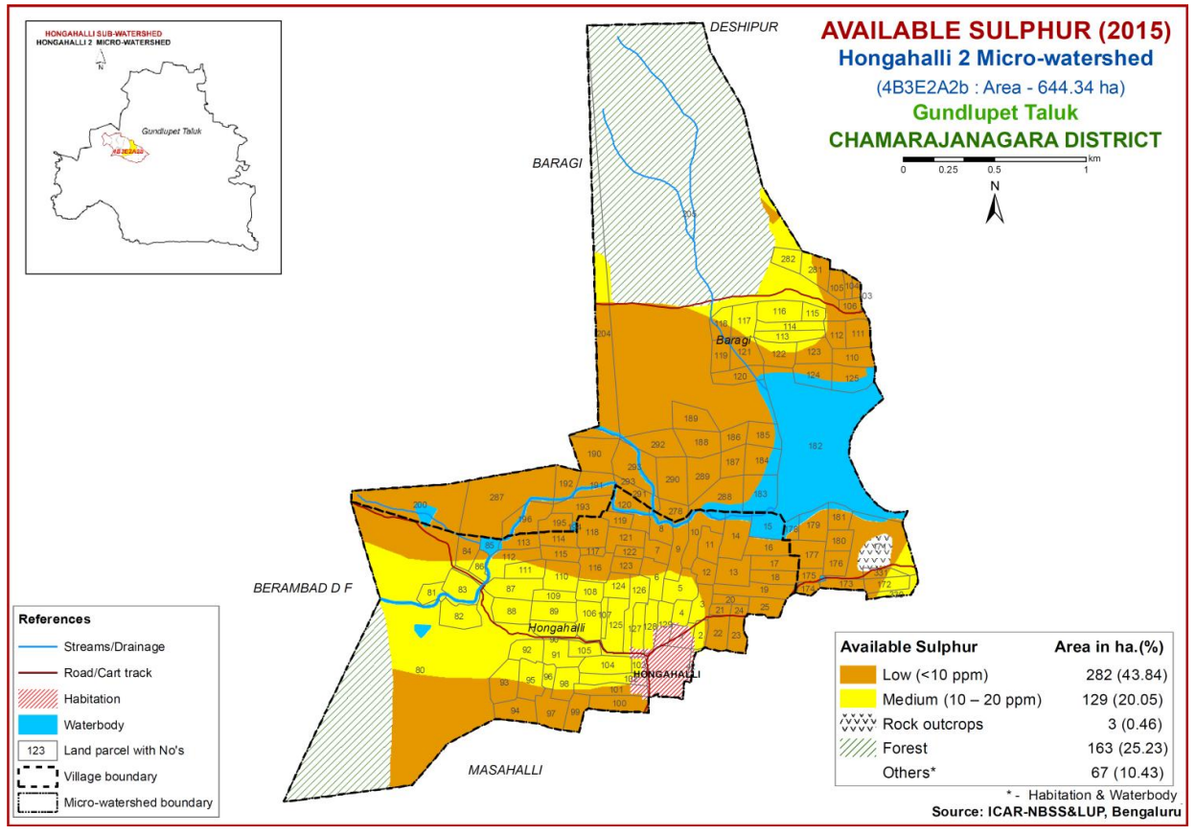

AVAILABLE PHOSPHORUS (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Masahalli
Bheemanabeedu
Kanngala
Available Phosphorus | Area in ha (%)
Medium (23 – 57 kg/ha) | 452 (72.51)
High (> 57 kg/ha) | 151 (24.21)
Forest | 6 (1.04)
Others | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

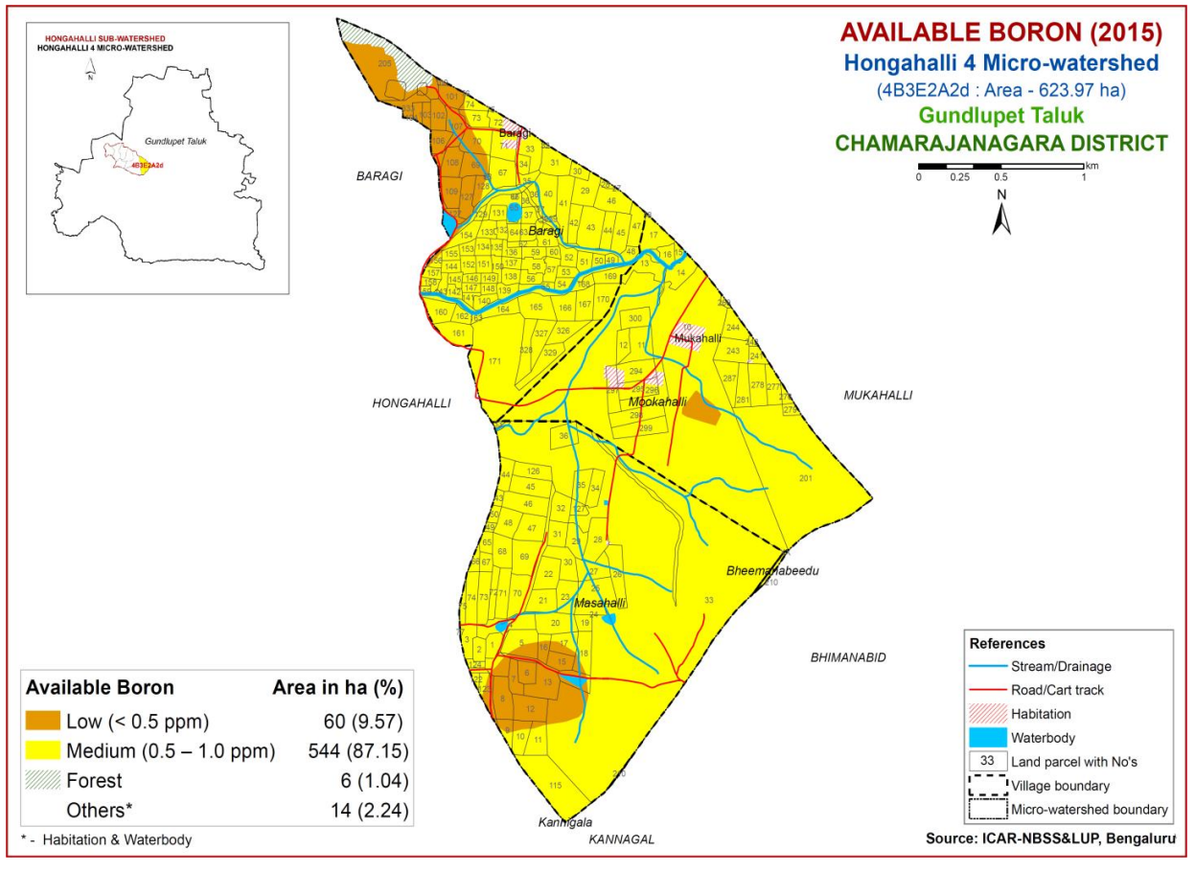

AVAILABLE PHOSPHORUS (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Phosphorus | Area in ha.(%)
Medium (23 – 57 kg/ha) | 261 (40.50)
High (> 57 kg/ha) | 151 (23.39)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

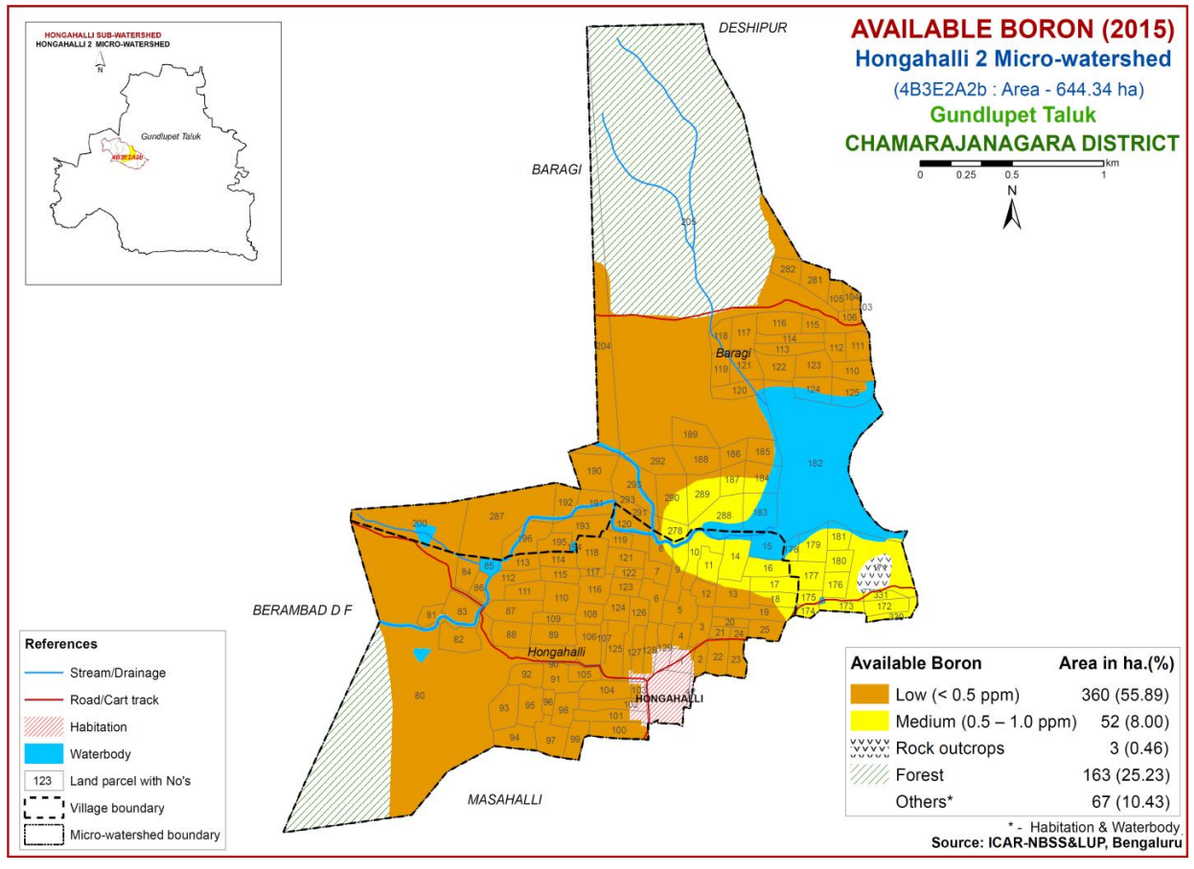

AVAILABLE POTASSIUM (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Masahalli
Bheemanabeedu
Kanngala
Avialable Potassium | Area in ha (%)
Low (<145 kg/ha) | 43 (6.93)
Medium (145 – 337 kg/ha) | 448 (71.79)
High (> 337 kg/ha) | 112 (18.01)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

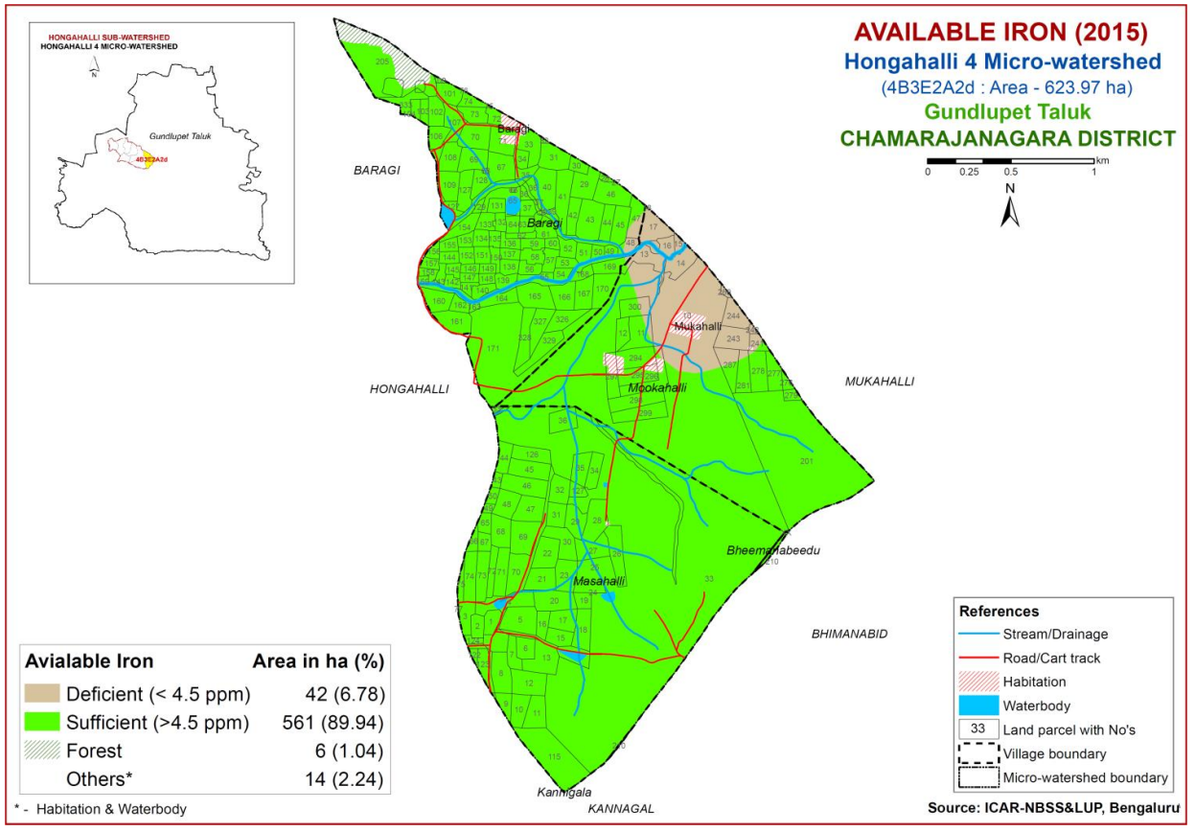

AVAILABLE POTASSIUM (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Potassium | Area in ha.(%)
Low (<145 kg/ha) | 8 (1.22)
Medium (145 – 337 kg/ha) | 404 (62.67)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

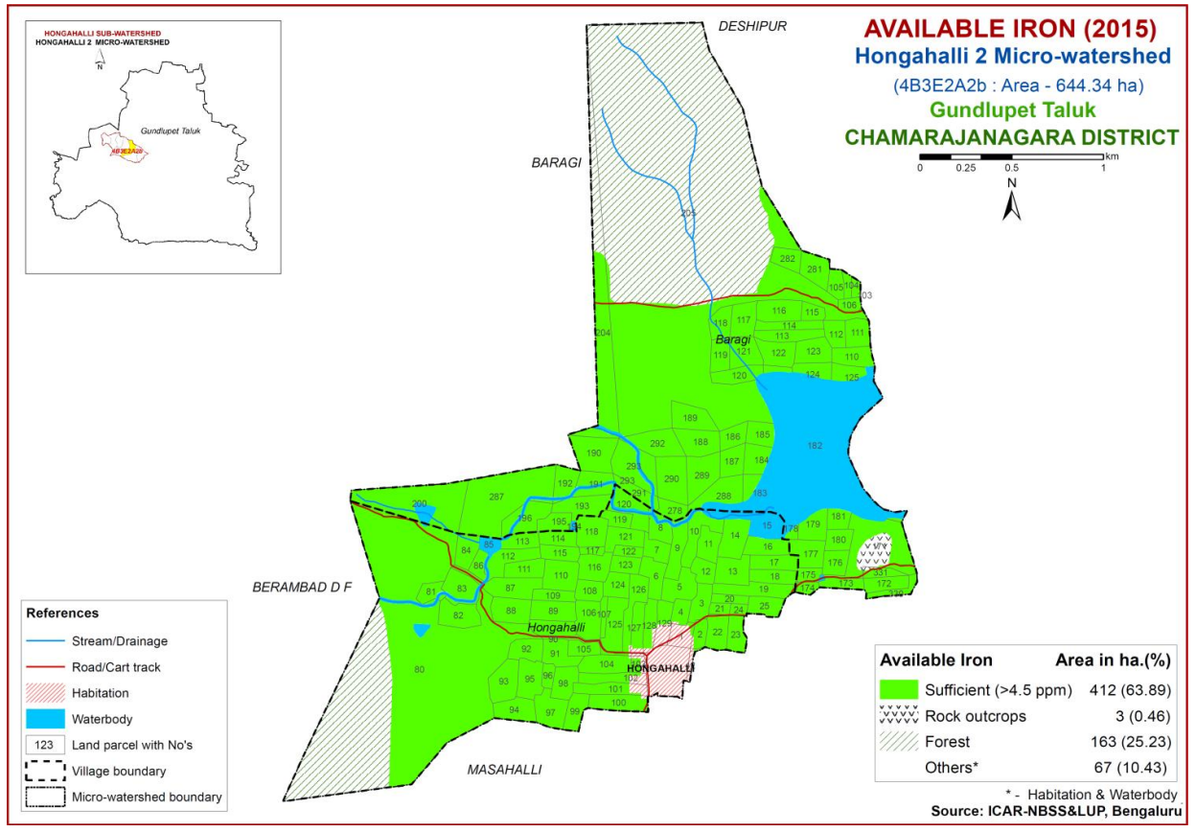

AVAILABLE SULPHUR (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Available Sulphur | Area in ha (%)
Low (<10 ppm) | 489 (78.43)
Medium (10 – 20 ppm | 114 (18.29)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

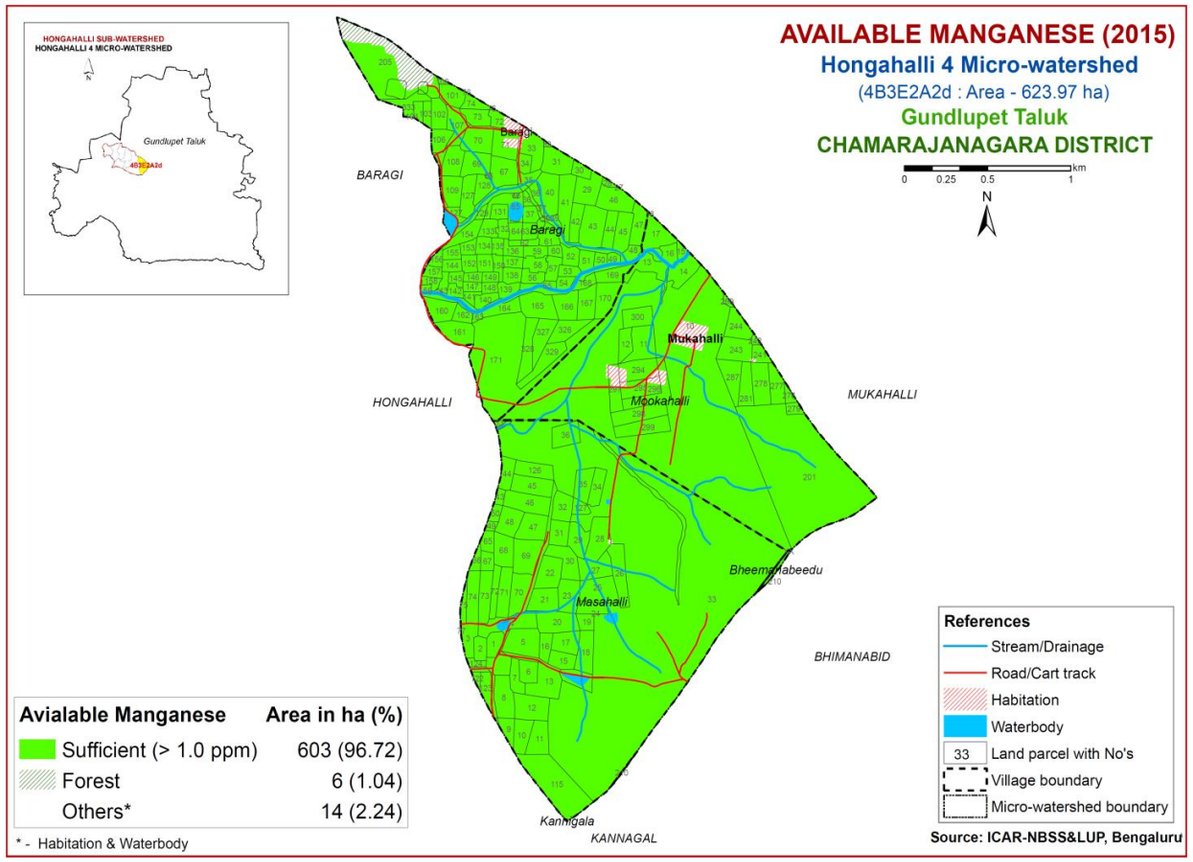

AVAILABLE SULPHUR (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Sulphur | Area in ha.(%)
Low (<10 ppm) | 282 (43.84)
Medium (10 – 20 ppm) | 129 (20.05)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Streams/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary

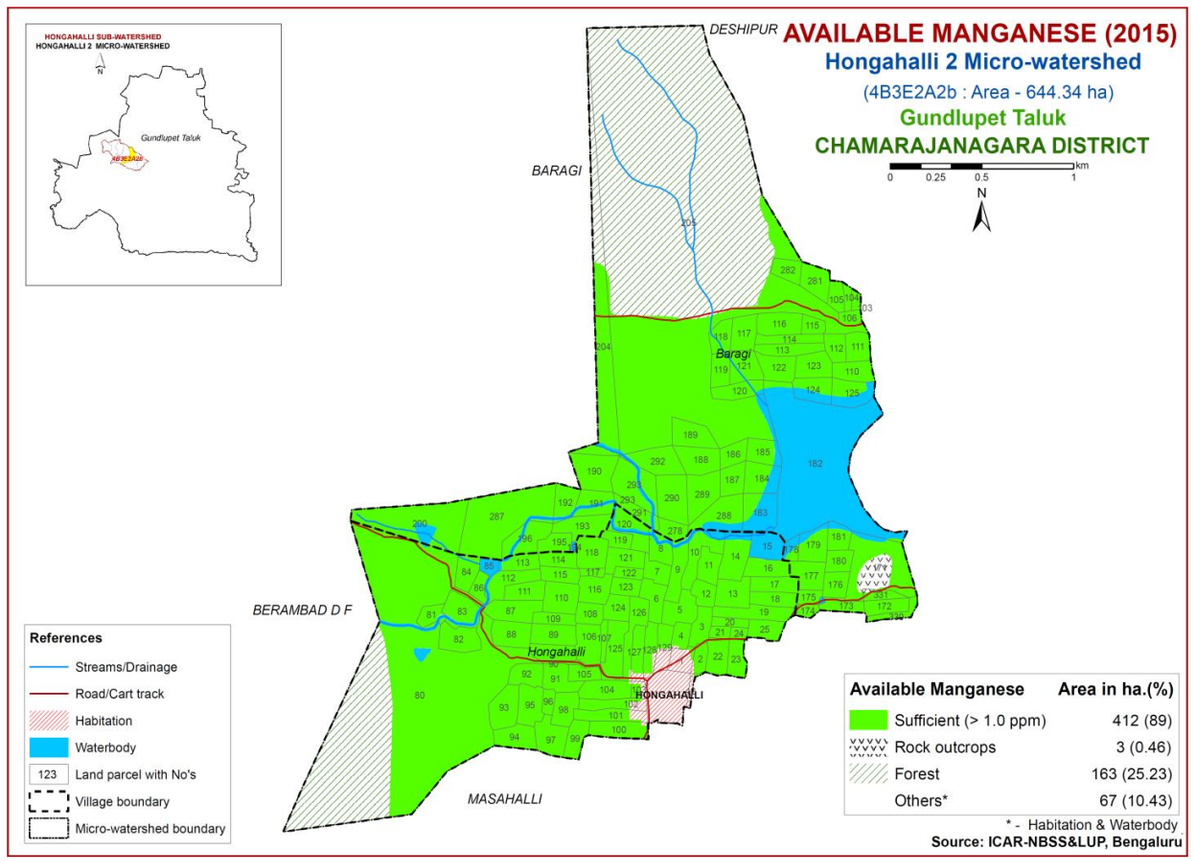

AVAILABLE BORON (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Available Boron | Area in ha (%)
Low (< 0.5 ppm) | 60 (9.57)
Medium (0.5 – 1.0 ppm) | 544 (87.15)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

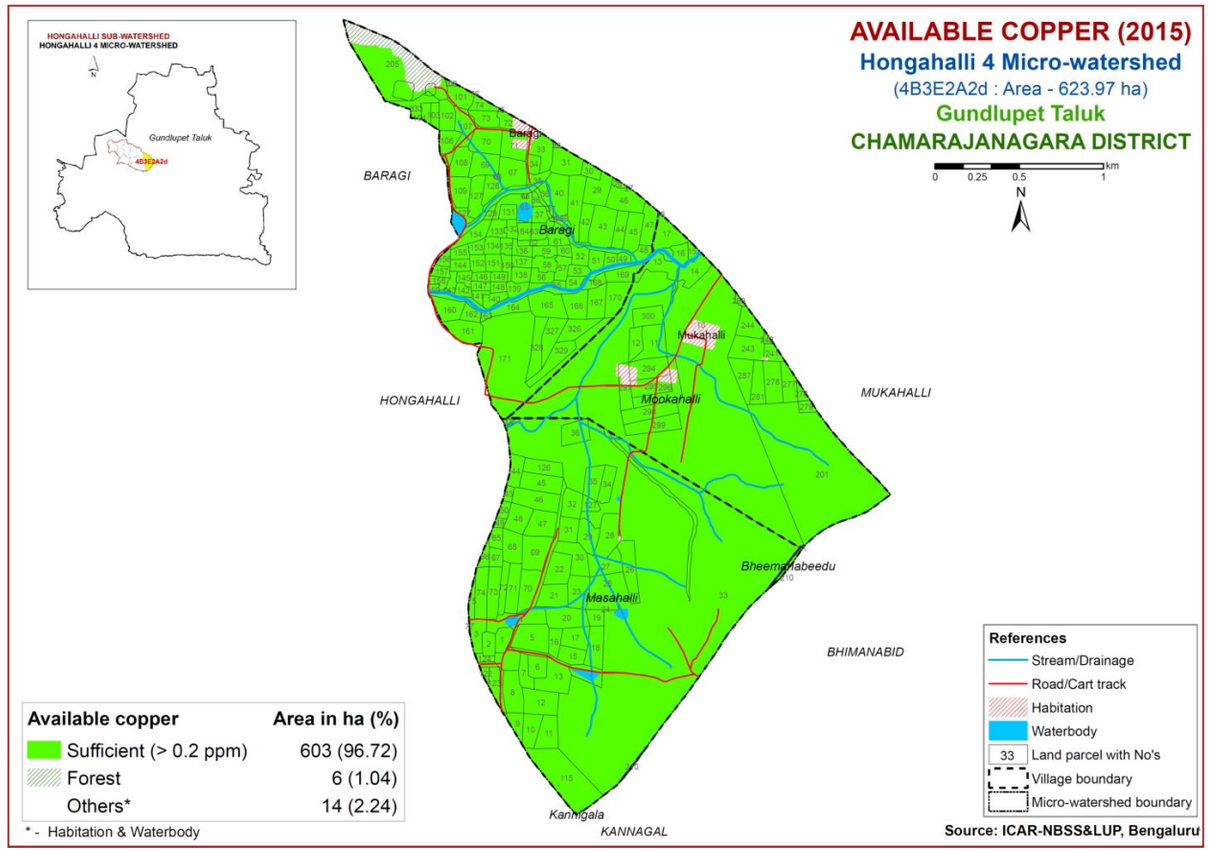

AVAILABLE BORON (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Boron | Area in ha.(%)
Low (< 0.5 ppm) | 360 (55.89)
Medium (0.5 – 1.0 ppm) | 52 (8.00)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary

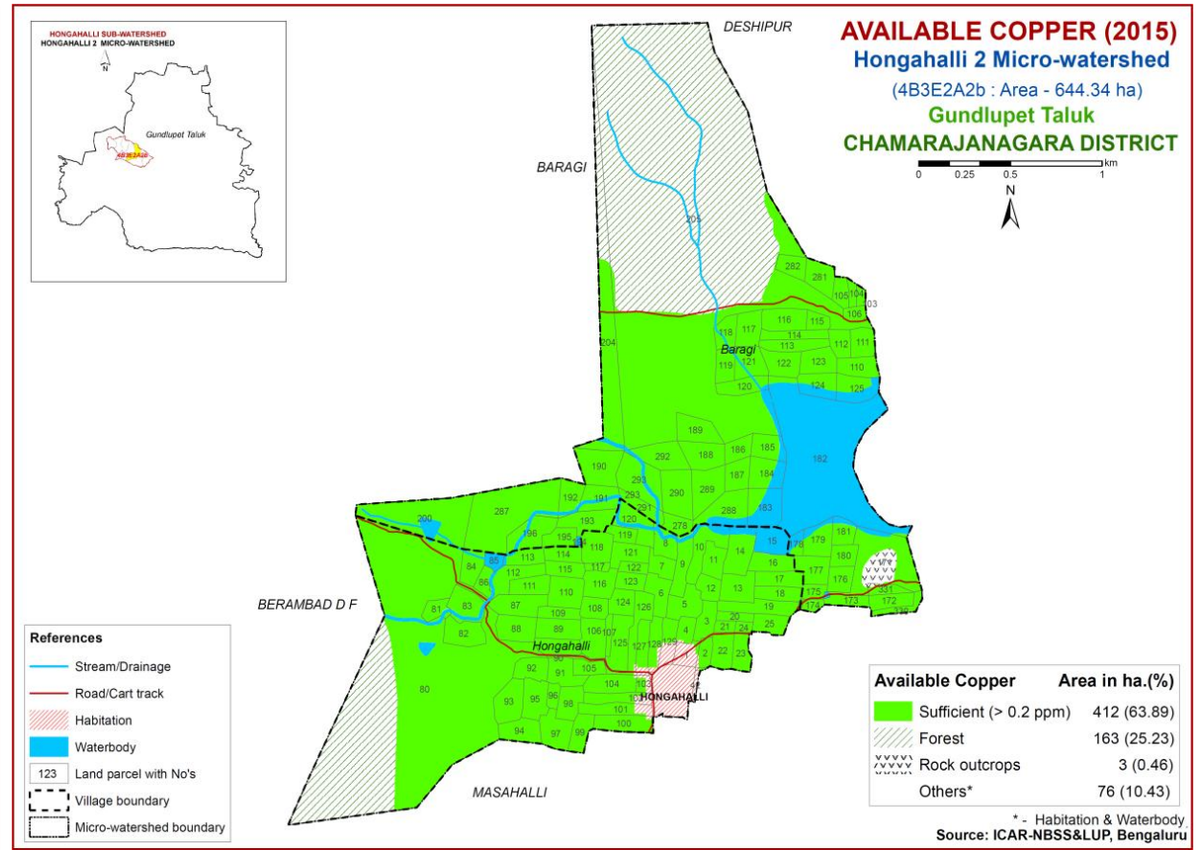

AVAILABLE IRON (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Avialable Iron | Area in ha (%)
Deficient (< 4.5 ppm) | 42 (6.78)
Sufficient (>4.5 ppm) | 561 (89.94)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

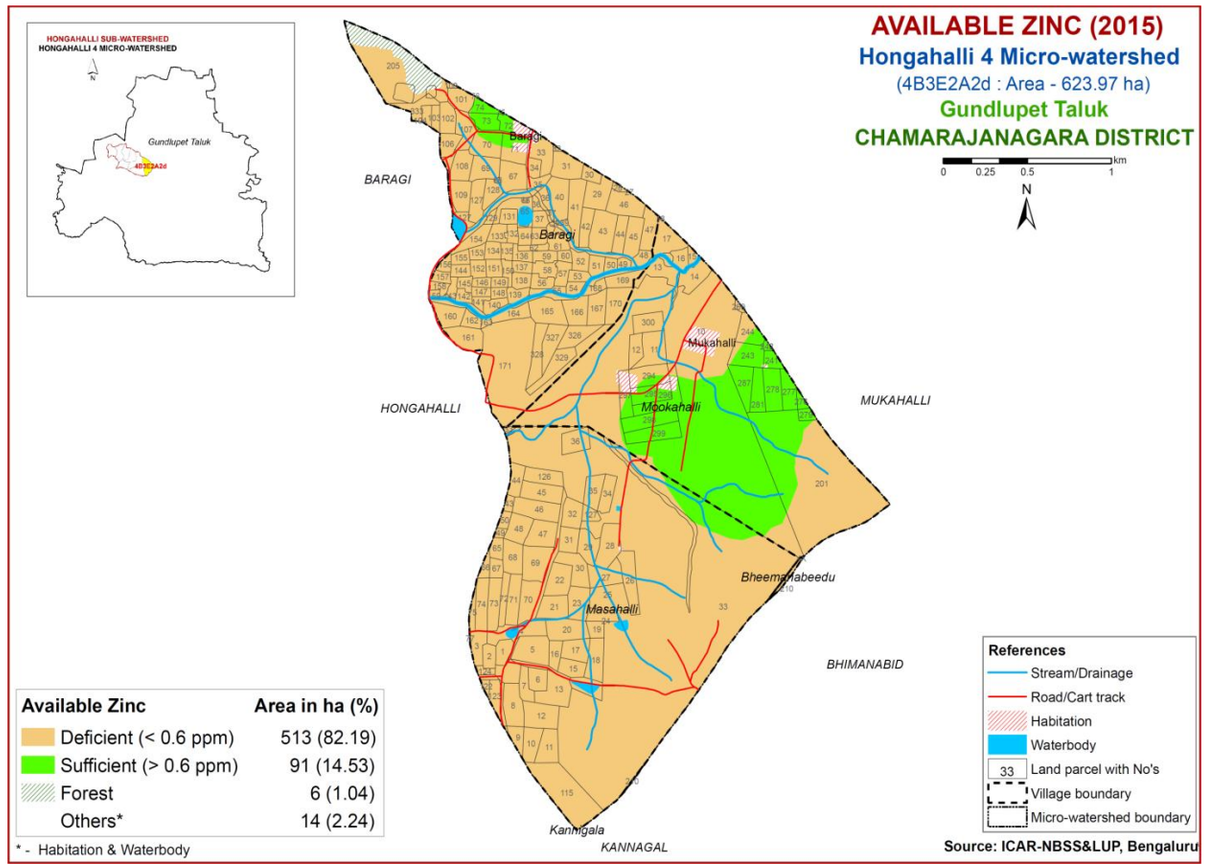

AVAILABLE IRON (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Iron | Area in ha.(%)
Sufficient (>4.5 ppm) | 412 (63.89)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

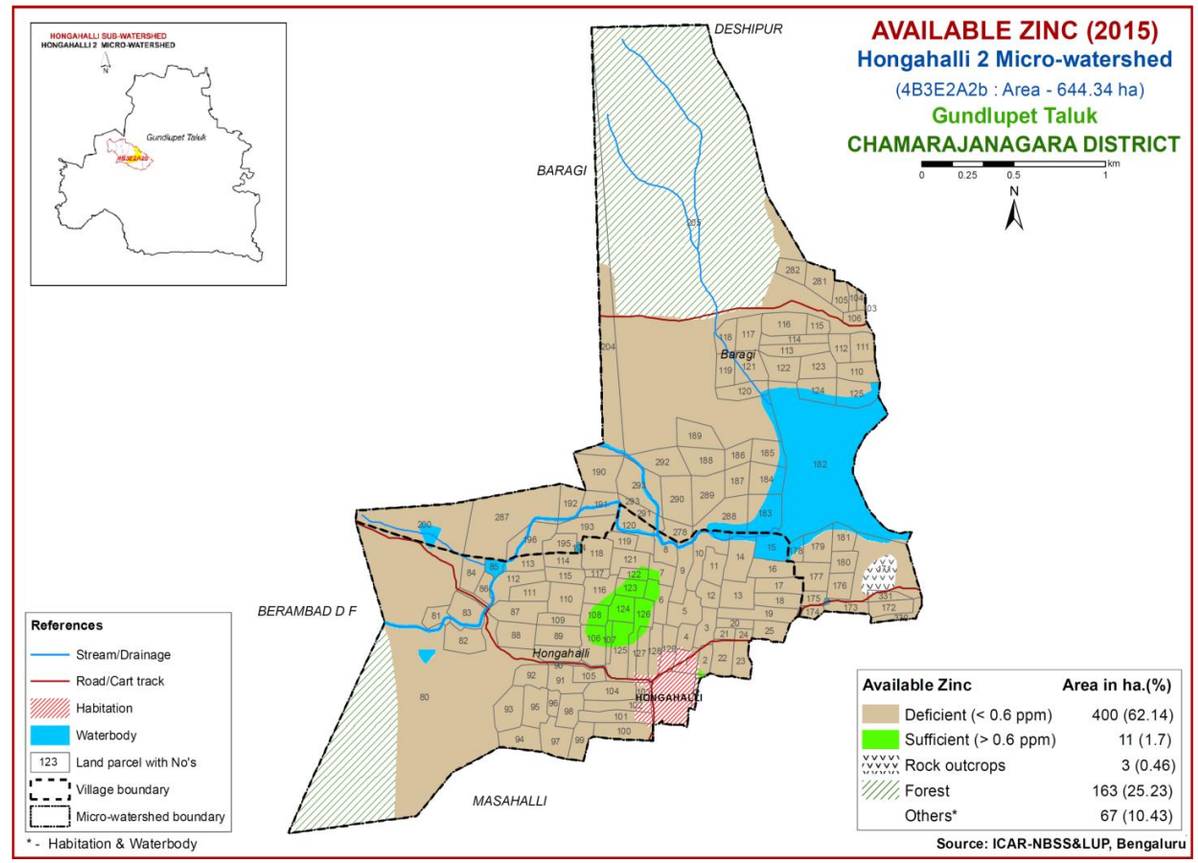

AVAILABLE MANGANESE (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Avialable Manganese | Area in ha (%)
Sufficient (> 1.0 ppm) | 603 (96.72)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

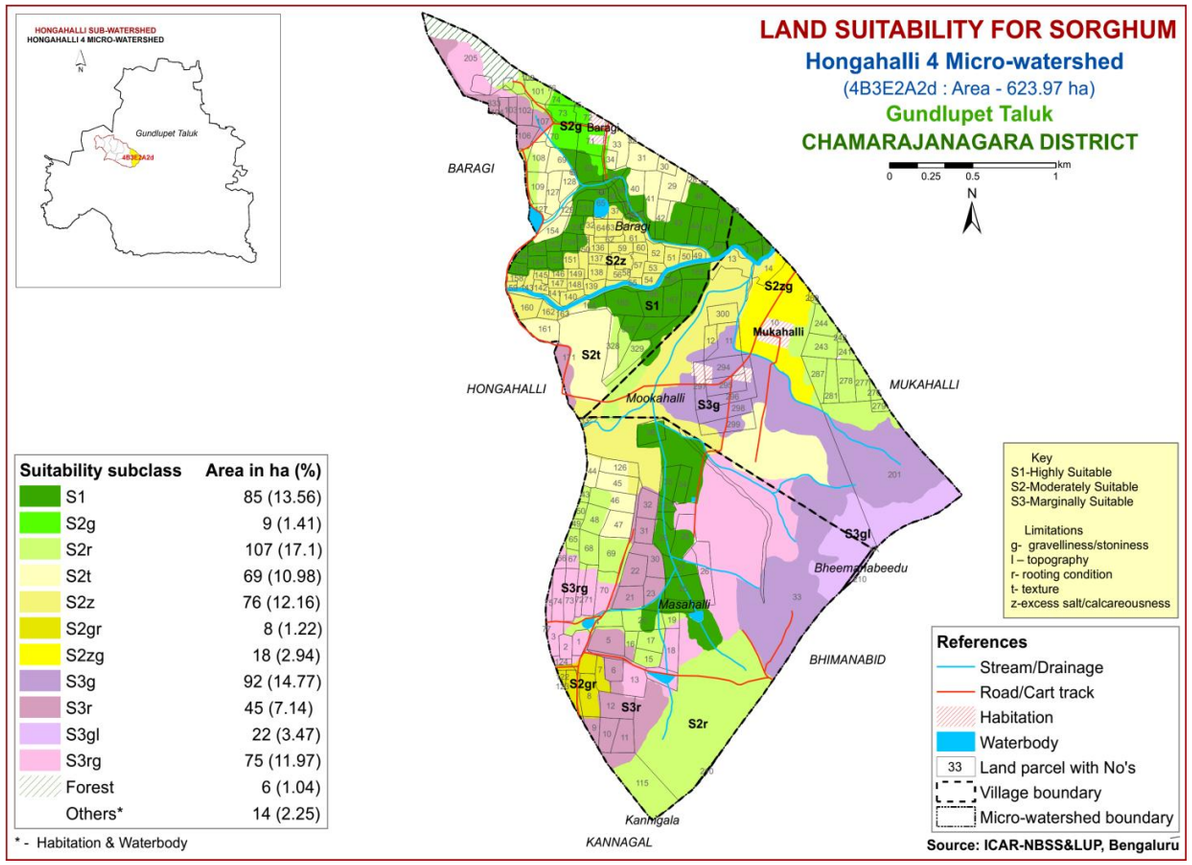

AVAILABLE MANGANESE (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Manganese | Area in ha.(%)
Sufficient (> 1.0 ppm) | 412 (89)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Streams/Drainage
Road/Cart track
Habitation
Waterbody
Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE COPPER (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Available copper | Area in ha (%)
Sufficient (> 0.2 ppm) | 603 (96.72)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

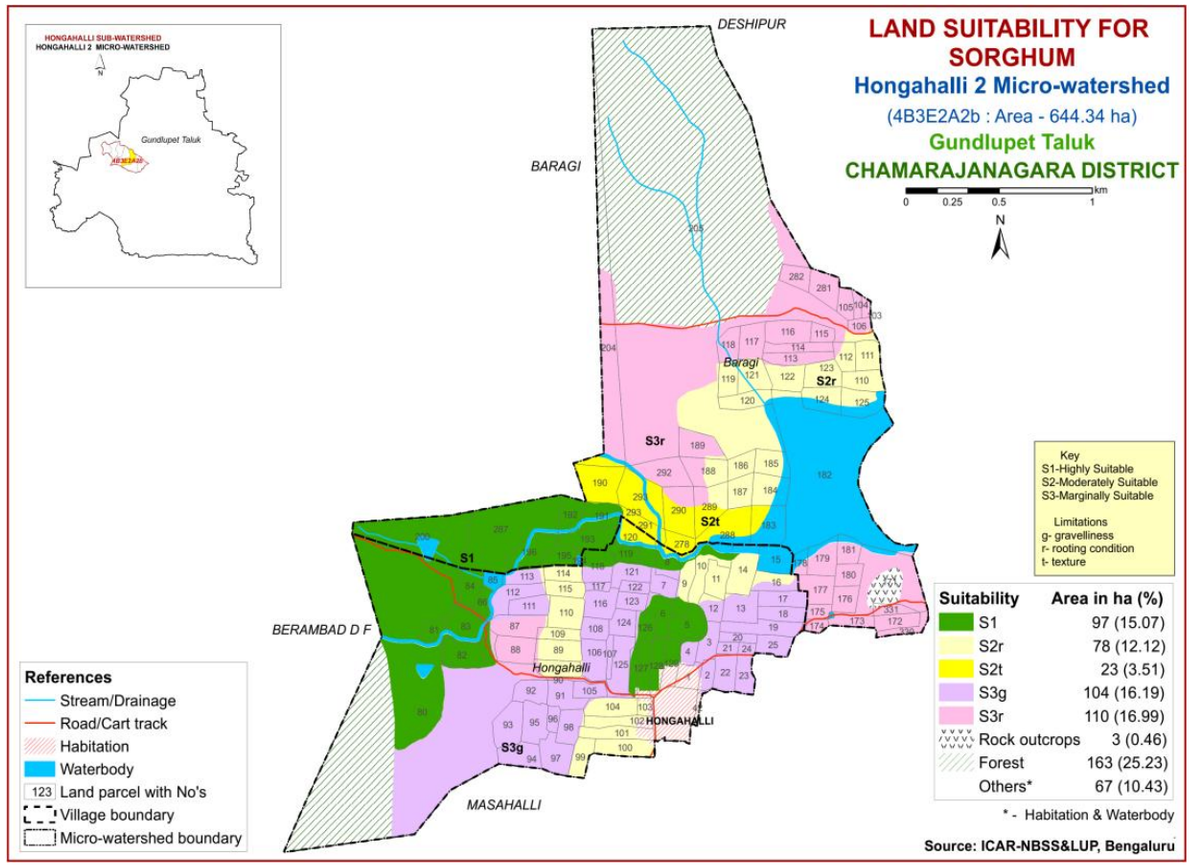

AVAILABLE COPPER (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Copper | Area in ha.(%)
Sufficient (> 0.2 ppm) | 412 (63.89)
Forest | 163 (25.23)
Rock outcrops | 3 (0.46)
Others* | 76 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary


AVAILABLE ZINC (2015)
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mukahalli
Mookahalli
Bheemanabeedu
Masahalli
Kannigala
Available Zinc | Area in ha (%)
Deficient (< 0.6 ppm) | 513 (82.19)
Sufficient (> 0.6 ppm) | 91 (14.53)
Forest | 6 (1.04)
Others* | 14 (2.24)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

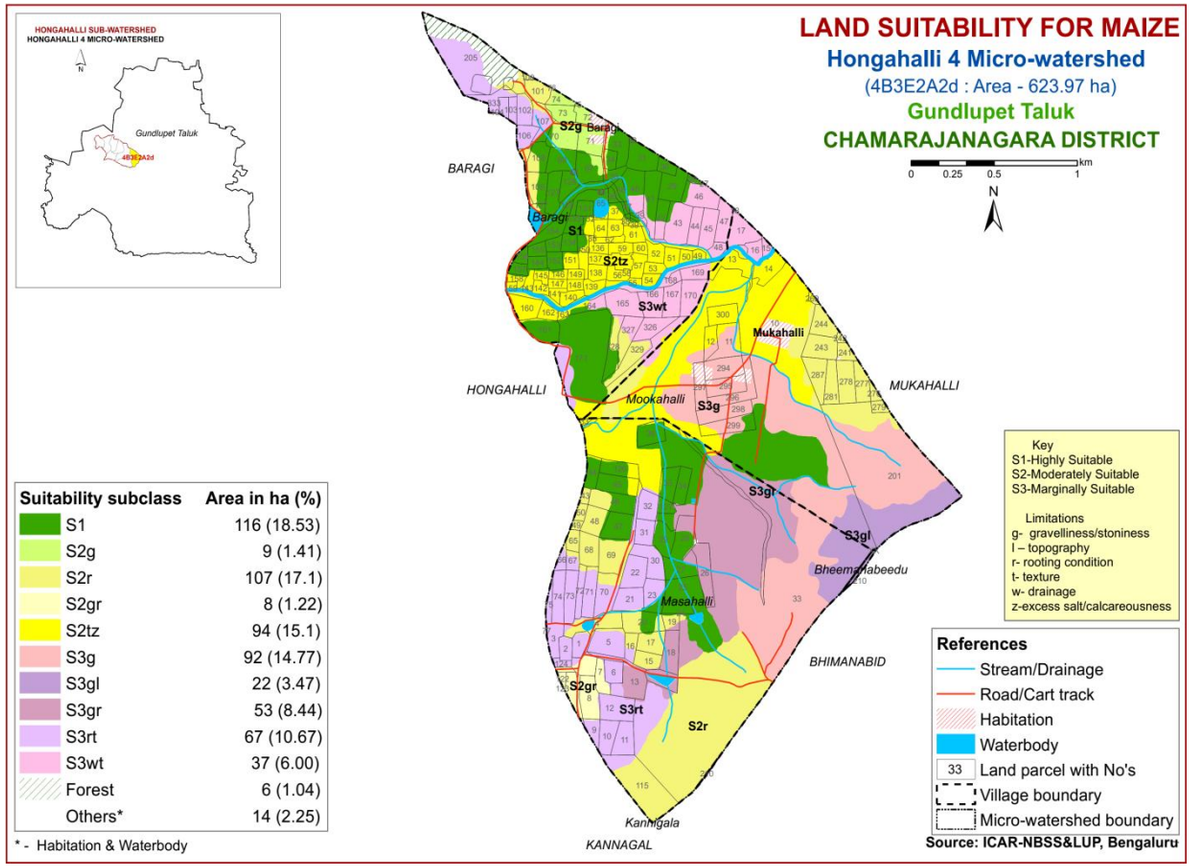

AVAILABLE ZINC (2015)
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
MASAHALLI
Baragi
Hongahalli
HONGAHALLI
Available Zinc | Area in ha.(%)
Deficient (< 0.6 ppm) | 400 (62.14)
Sufficient (> 0.6 ppm) | 11 (1.7)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary



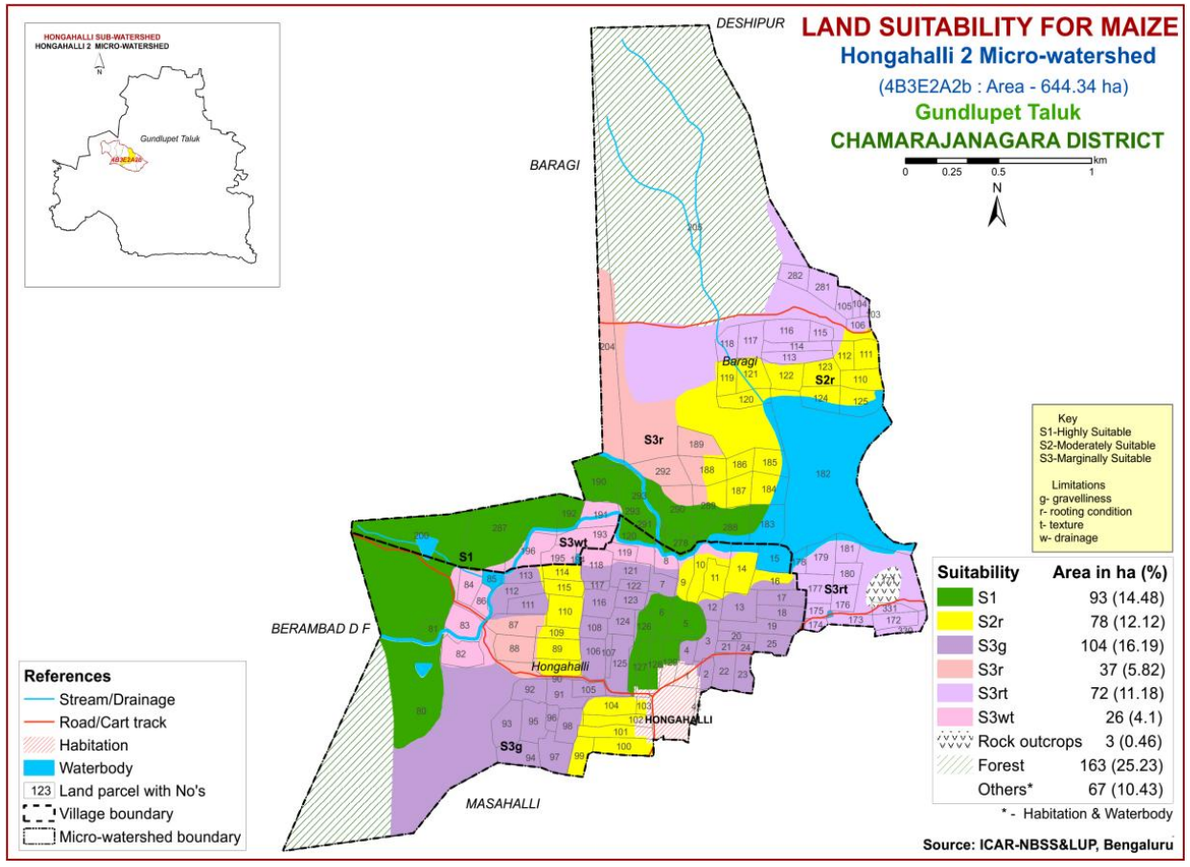
Suitability subclass	Area in ha (%)
S1	85 (13.56)
S2g	9 (1.41)
S2r	107 (17.1)
S2t	69 (10.98)
S2z	76 (12.16)
S2gr	8 (1.22)
S2zg	18 (2.94)
S3g	92 (14.77)
S3r	45 (7.14)
S3gl	22 (3.47)
S3rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)



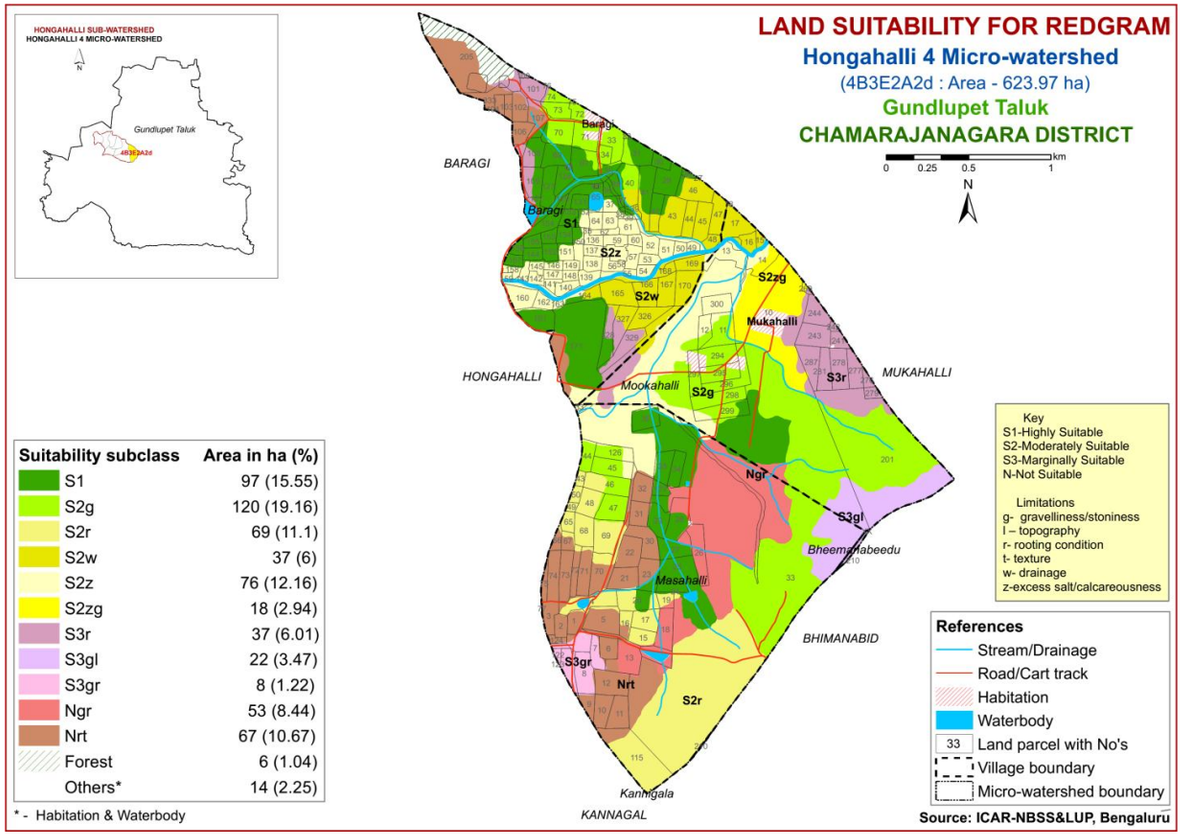
Suitability	Area in ha (%)
S1	97 (15.07)
S2r	78 (12.12)
S2t	23 (3.51)
S3g	104 (16.19)
S3r	110 (16.99)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)



Suitability subclass	Area in ha (%)
S1	116 (18.53)
S2g	9 (1.41)
S2r	107 (17.1)
S2gr	8 (1.22)
S2tz	94 (15.1)
S3g	92 (14.77)
S3gl	22 (3.47)
S3gr	53 (8.44)
S3rt	67 (10.67)
S3wt	37 (6.00)
Forest	6 (1.04)
Others*	14 (2.25)

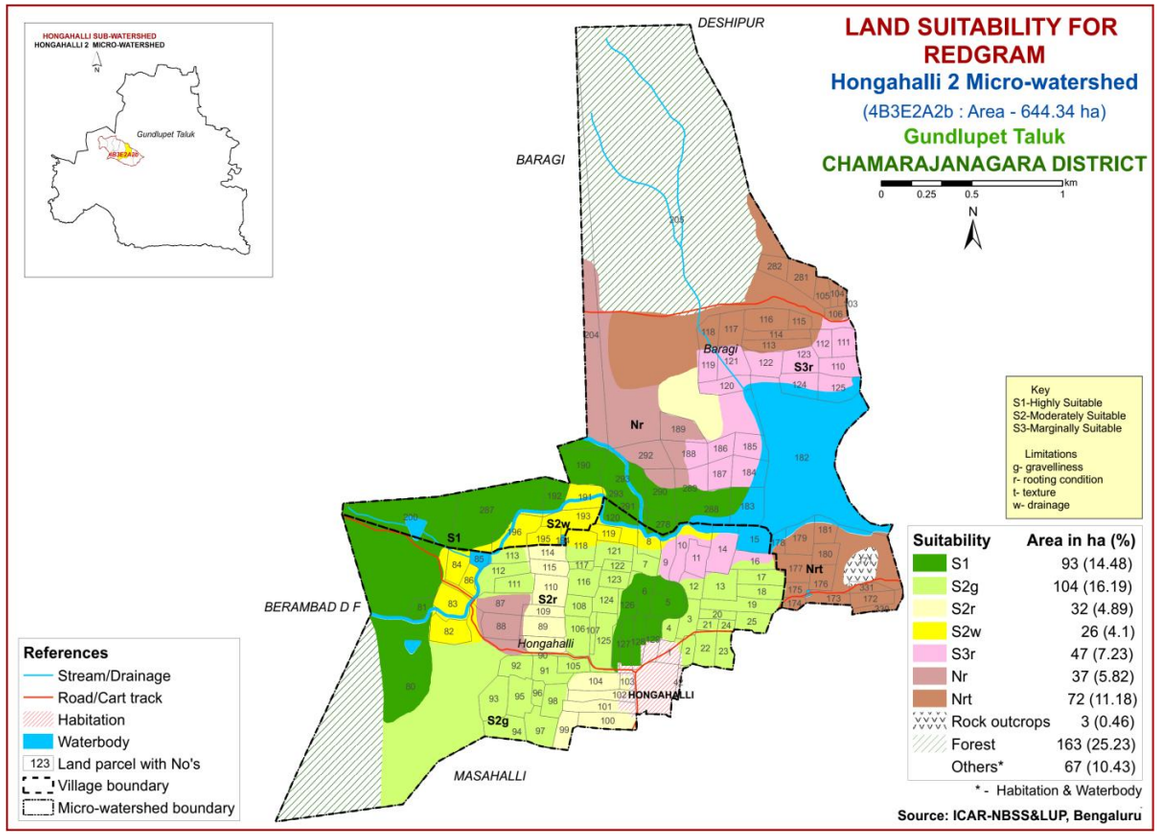


Suitability	Area in ha (%)
S1	93 (14.48)
S2r	78 (12.12)
S3g	104 (16.19)
S3r	37 (5.82)
S3rt	72 (11.18)
S3wt	26 (4.1)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)



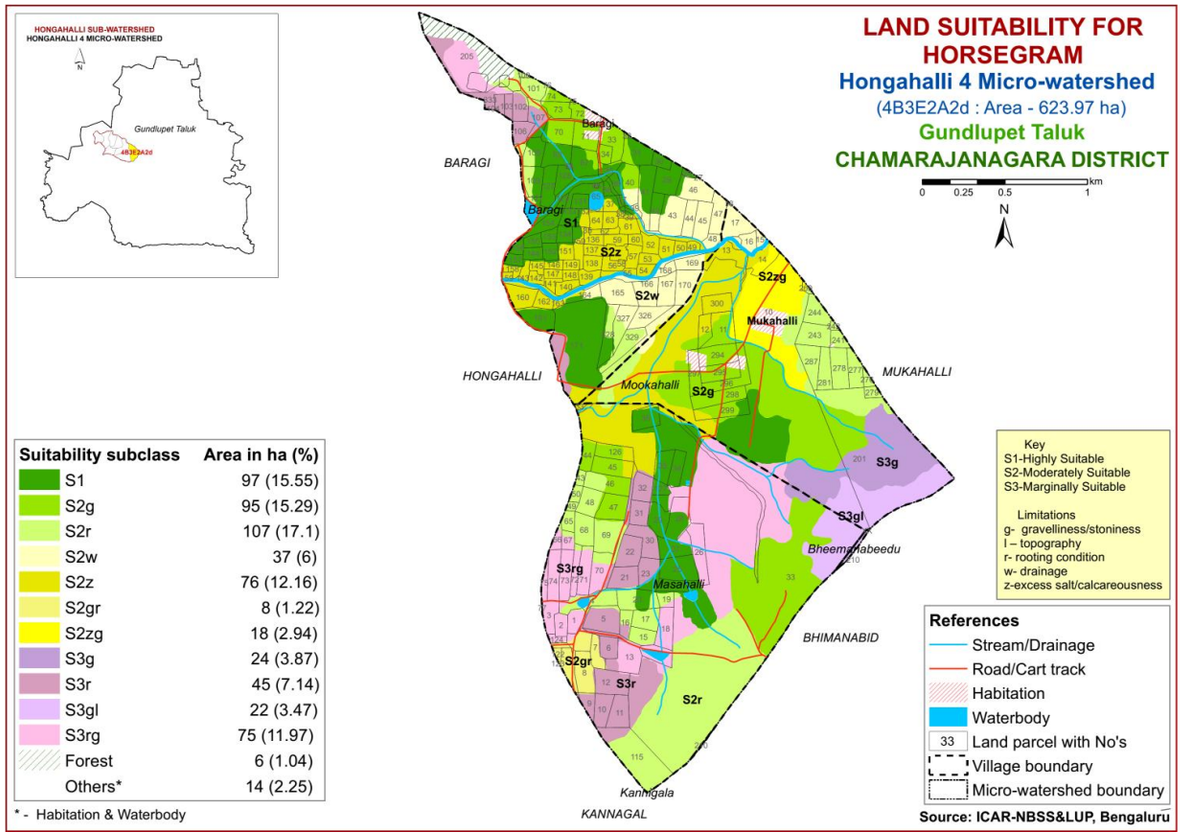
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	120 (19.16)
S2r	69 (11.1)
S2w	37 (6)
S2z	76 (12.16)
S2zg	18 (2.94)
S3r	37 (6.01)
S3gl	22 (3.47)
S3gr	8 (1.22)
Ngr	53 (8.44)
Nrt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



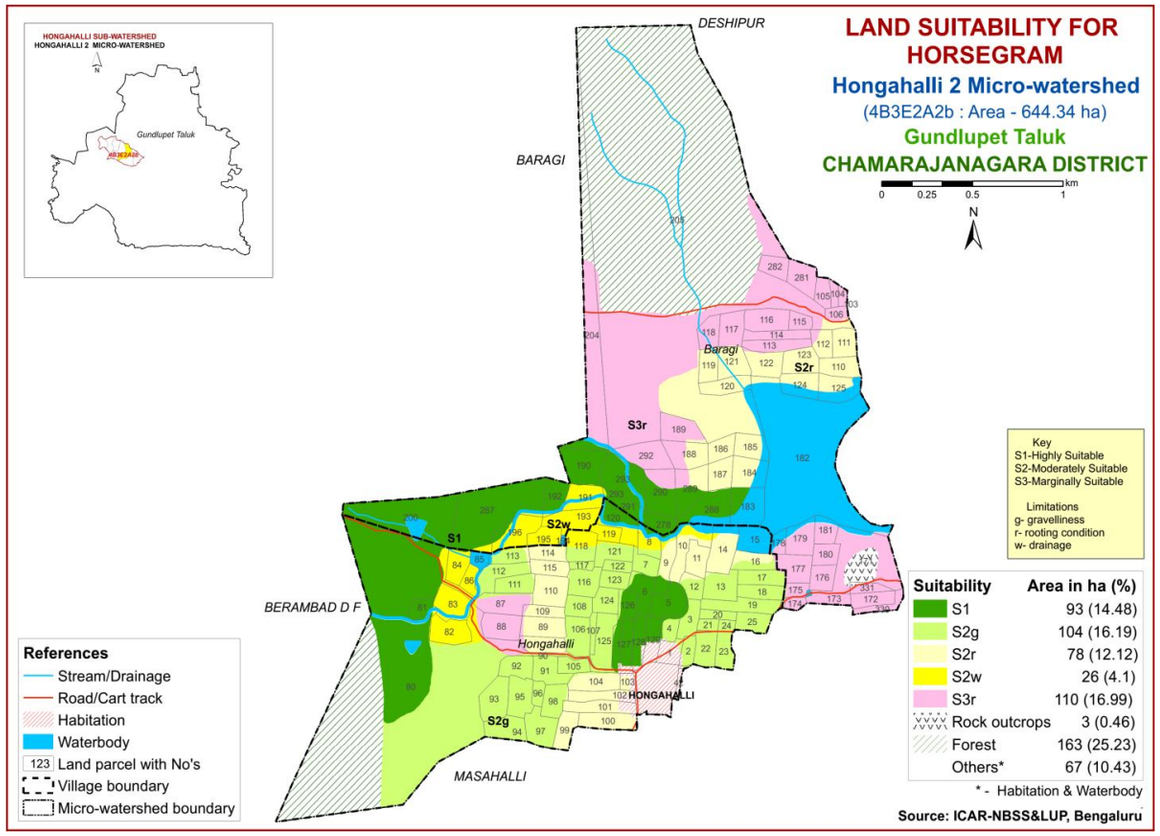
Suitability	Area in ha (%)
S1	93 (14.48)
S2g	104 (16.19)
S2r	32 (4.89)
S2w	26 (4.1)
S3r	47 (7.23)
Nr	37 (5.82)
Nrt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



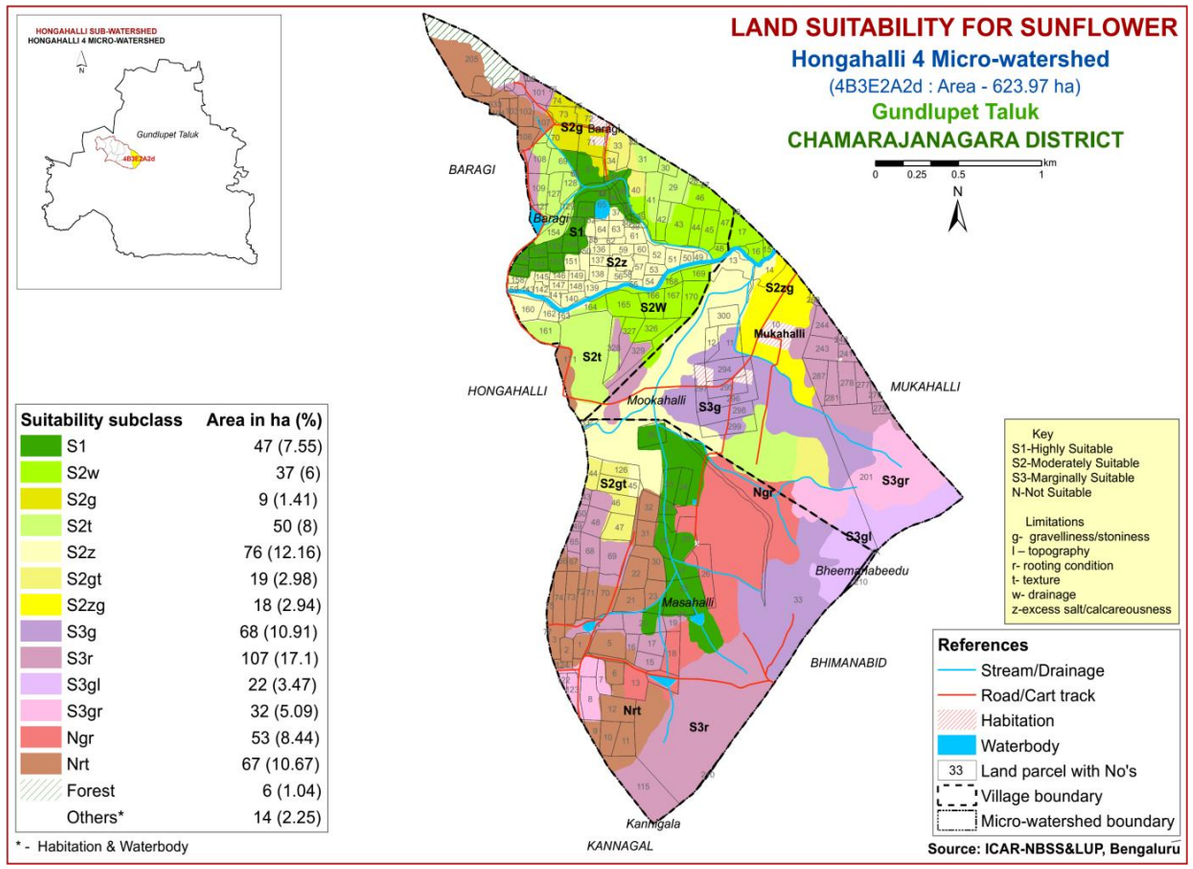
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	95 (15.29)
S2r	107 (17.1)
S2w	37 (6)
S2z	76 (12.16)
S2gr	8 (1.22)
S2zg	18 (2.94)
S3g	24 (3.87)
S3r	45 (7.14)
S3gl	22 (3.47)
S3rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



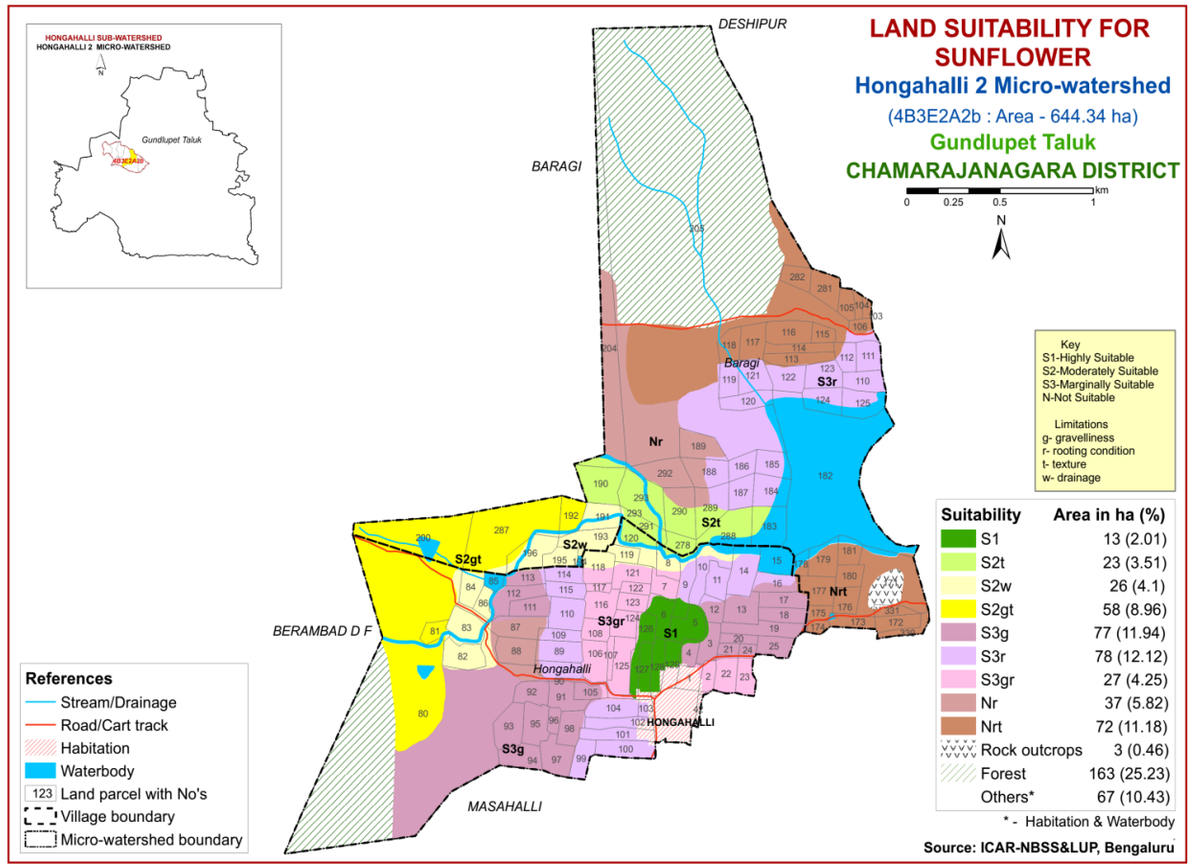
Suitability	Area in ha (%)
S1	93 (14.48)
S2g	104 (16.19)
S2r	78 (12.12)
S2w	26 (4.1)
S3r	110 (16.99)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



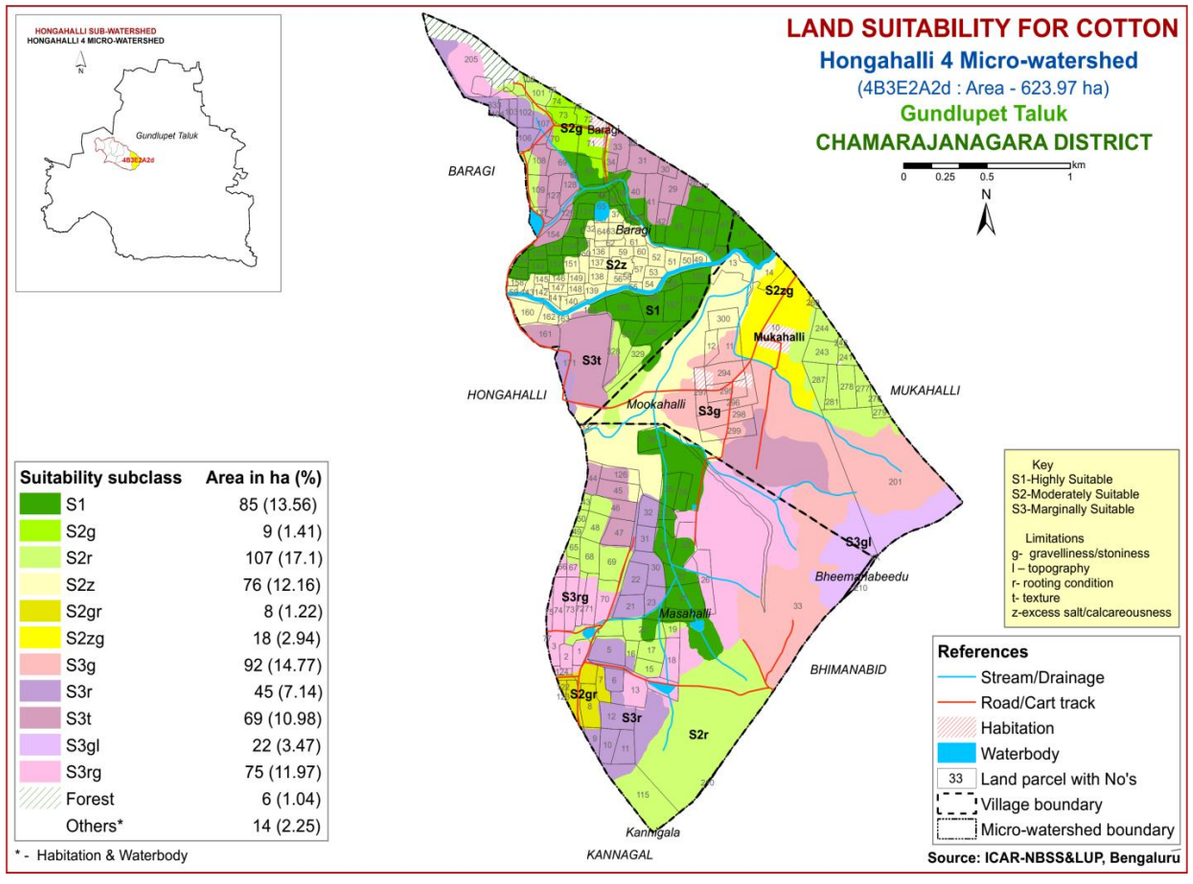
Suitability subclass	Area in ha (%)
S1	47 (7.55)
S2w	37 (6)
S2g	9 (1.41)
S2t	50 (8)
S2z	76 (12.16)
S2gt	19 (2.98)
S2zg	18 (2.94)
S3g	68 (10.91)
S3r	107 (17.1)
S3gl	22 (3.47)
S3gr	32 (5.09)
Ngr	53 (8.44)
Nrt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



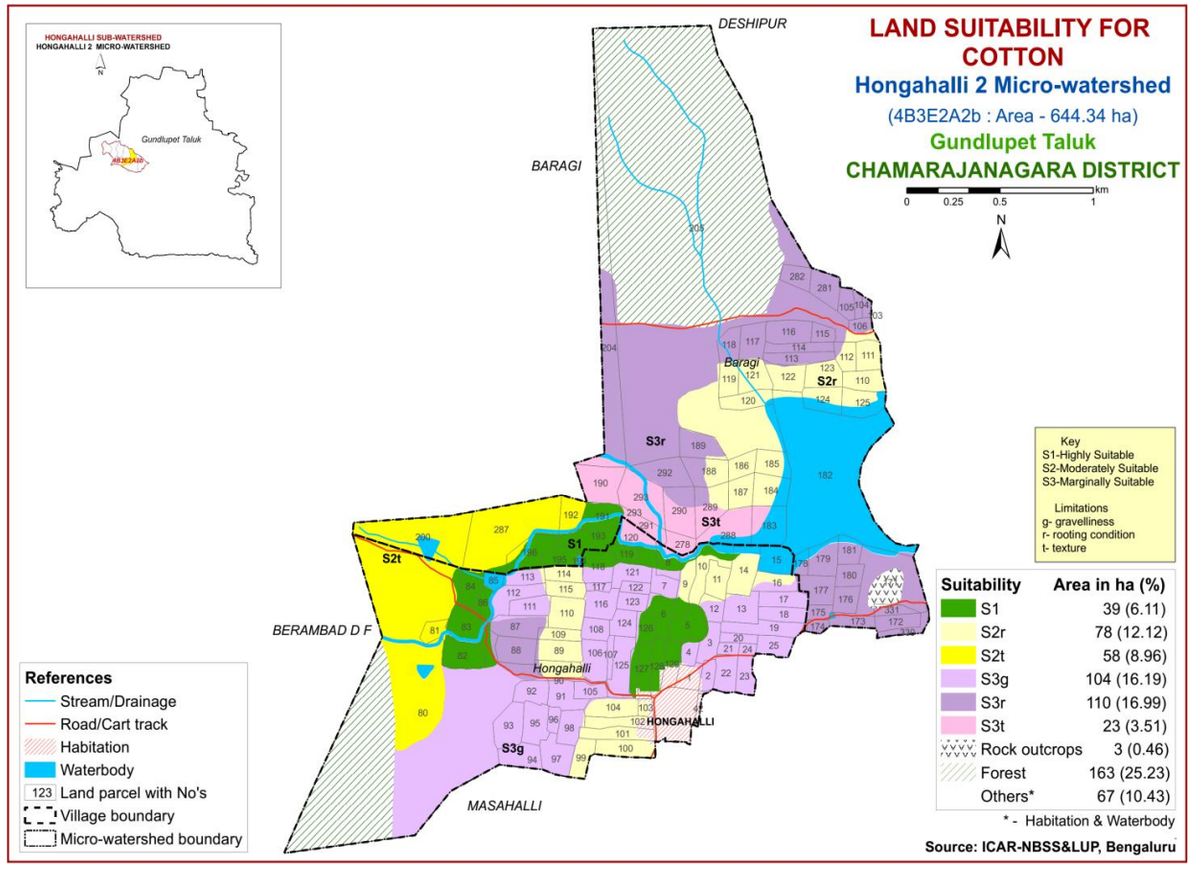
Suitability	Area in ha (%)
S1	13 (2.01)
S2t	23 (3.51)
S2w	26 (4.1)
S2gt	58 (8.96)
S3g	77 (11.94)
S3r	78 (12.12)
S3gr	27 (4.25)
Nr	37 (5.82)
Nrt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



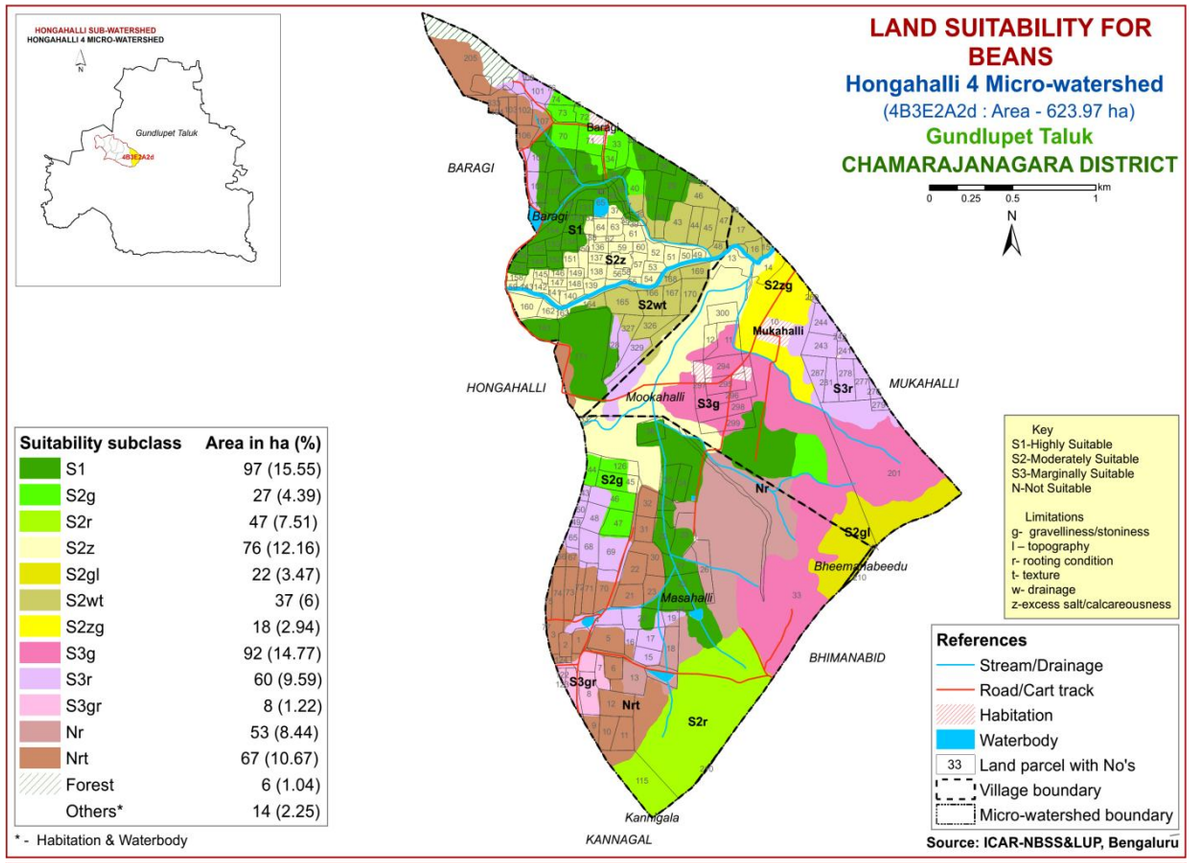
Suitability subclass	Area in ha (%)
S1	85 (13.56)
S2g	9 (1.41)
S2r	107 (17.1)
S2z	76 (12.16)
S2gr	8 (1.22)
S2zg	18 (2.94)
S3g	92 (14.77)
S3r	45 (7.14)
S3t	69 (10.98)
S3gl	22 (3.47)
S3rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



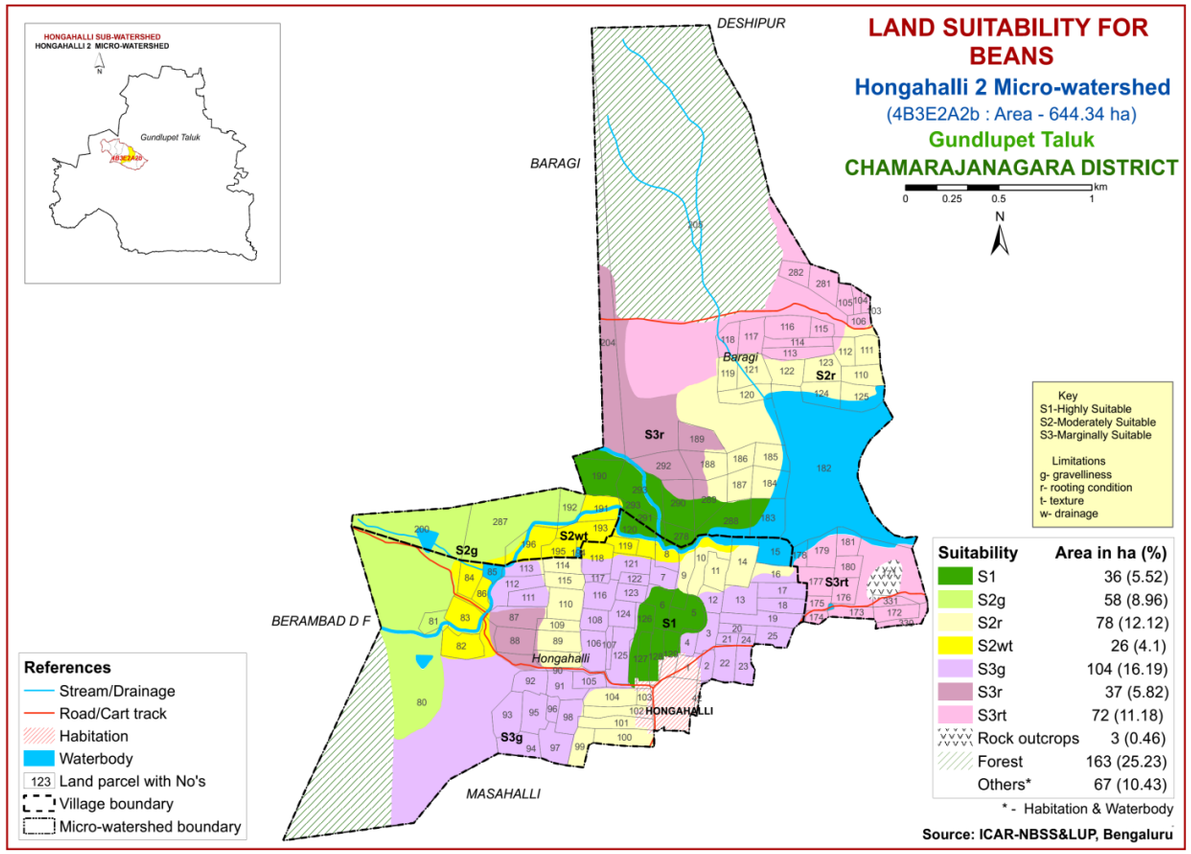
Suitability	Area in ha (%)
S1	39 (6.11)
S2r	78 (12.12)
S2t	58 (8.96)
S3g	104 (16.19)
S3r	110 (16.99)
S3t	23 (3.51)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



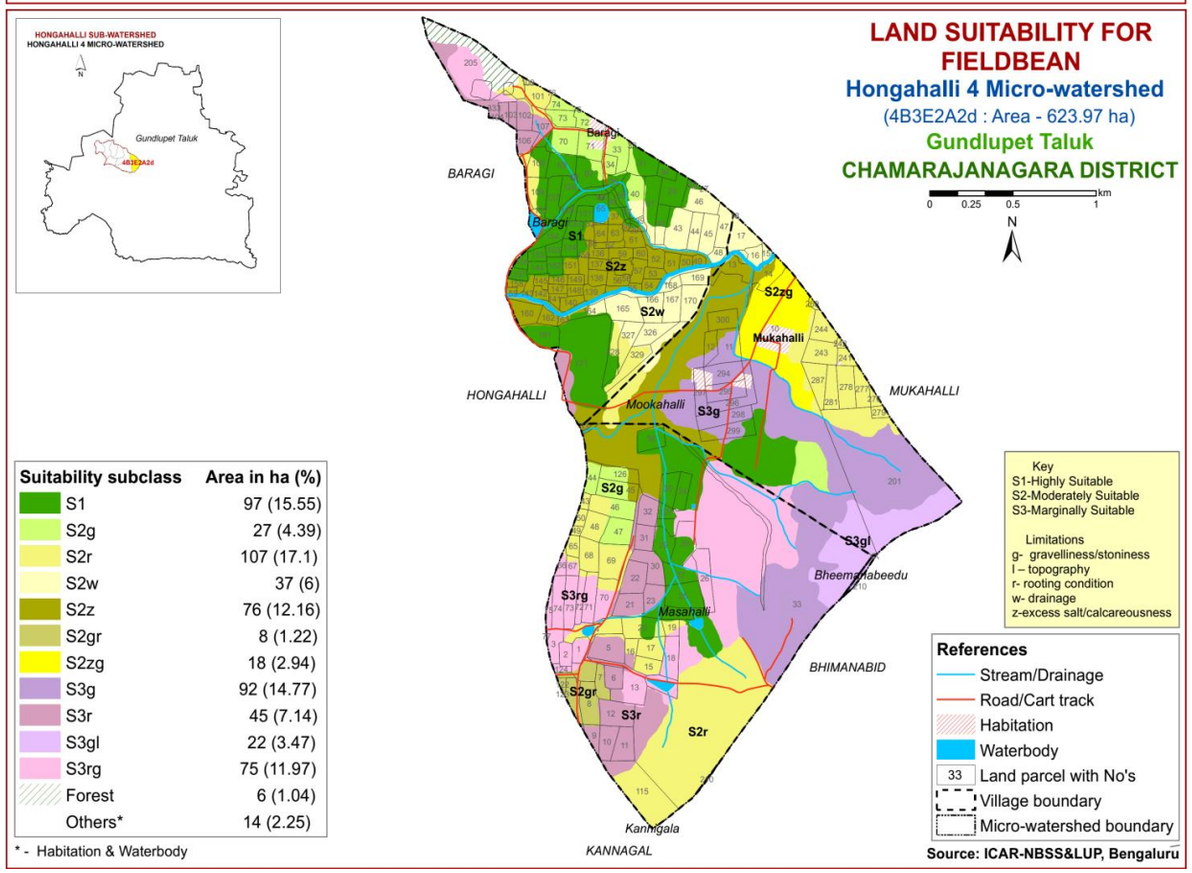
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	47 (7.51)
S2z	76 (12.16)
S2gl	22 (3.47)
S2wt	37 (6)
S2zg	18 (2.94)
S3g	92 (14.77)
S3r	60 (9.59)
S3gr	8 (1.22)
Nr	53 (8.44)
Nrt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



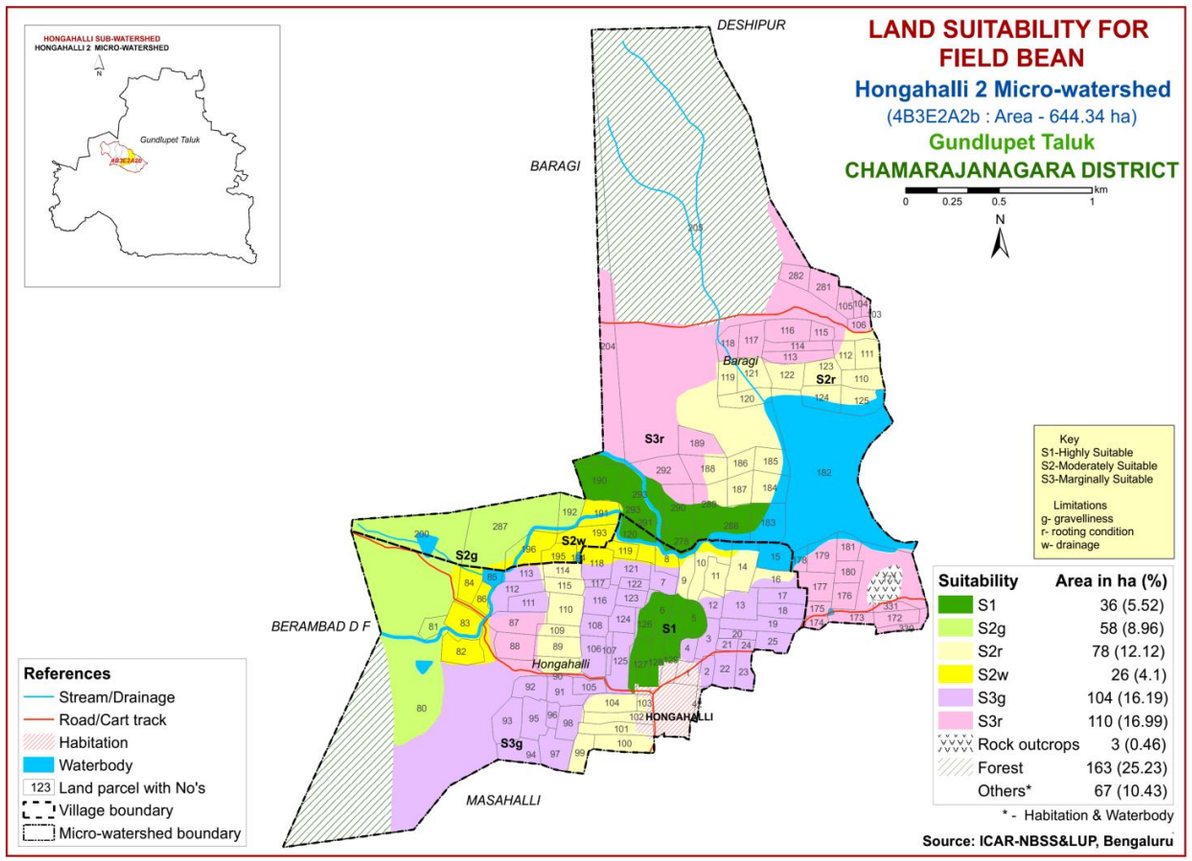
Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2r	78 (12.12)
S2wt	26 (4.1)
S3g	104 (16.19)
S3r	37 (5.82)
S3rt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



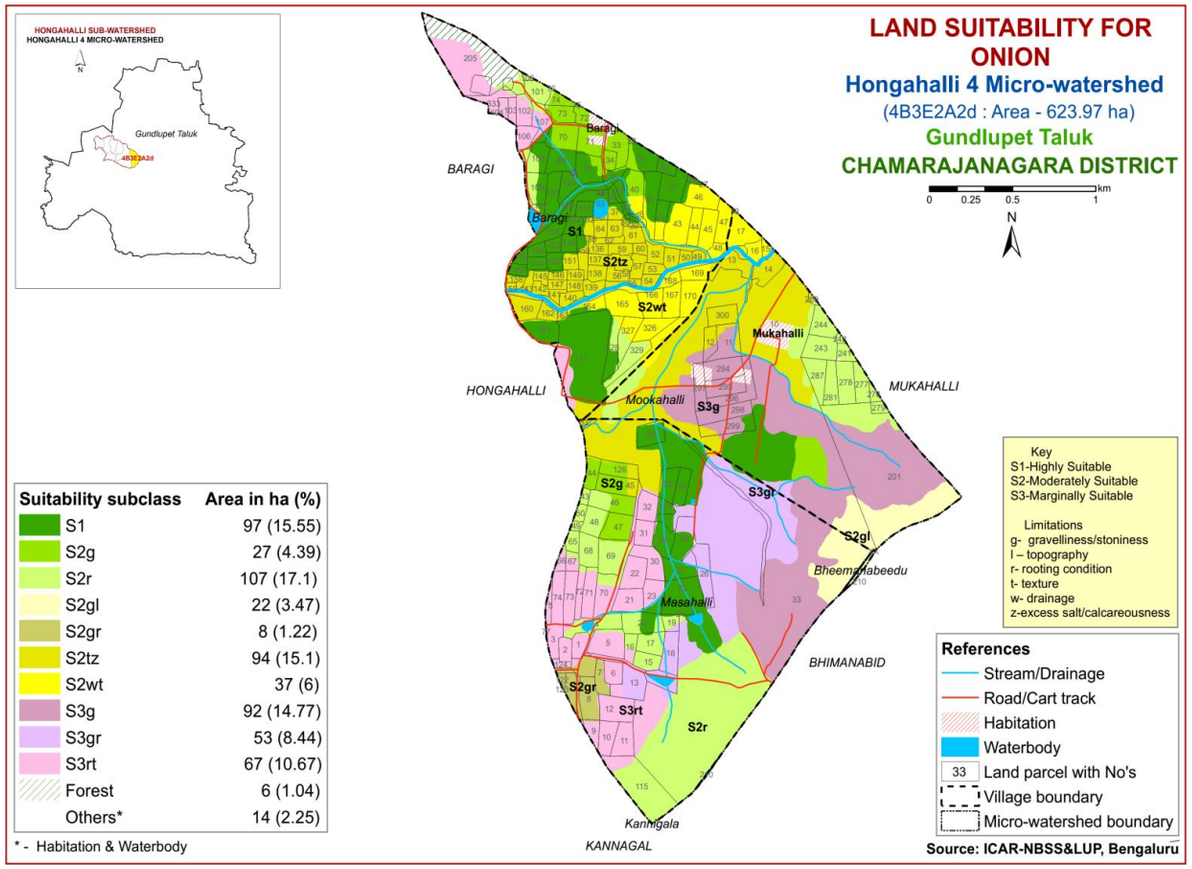
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	107 (17.1)
S2w	37 (6)
S2z	76 (12.16)
S2gr	8 (1.22)
S2zg	18 (2.94)
S3g	92 (14.77)
S3r	45 (7.14)
S3gl	22 (3.47)
S3rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2r	78 (12.12)
S2w	26 (4.1)
S3g	104 (16.19)
S3r	110 (16.99)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody


LAND SUITABILITY FOR ONION
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
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BARAGI
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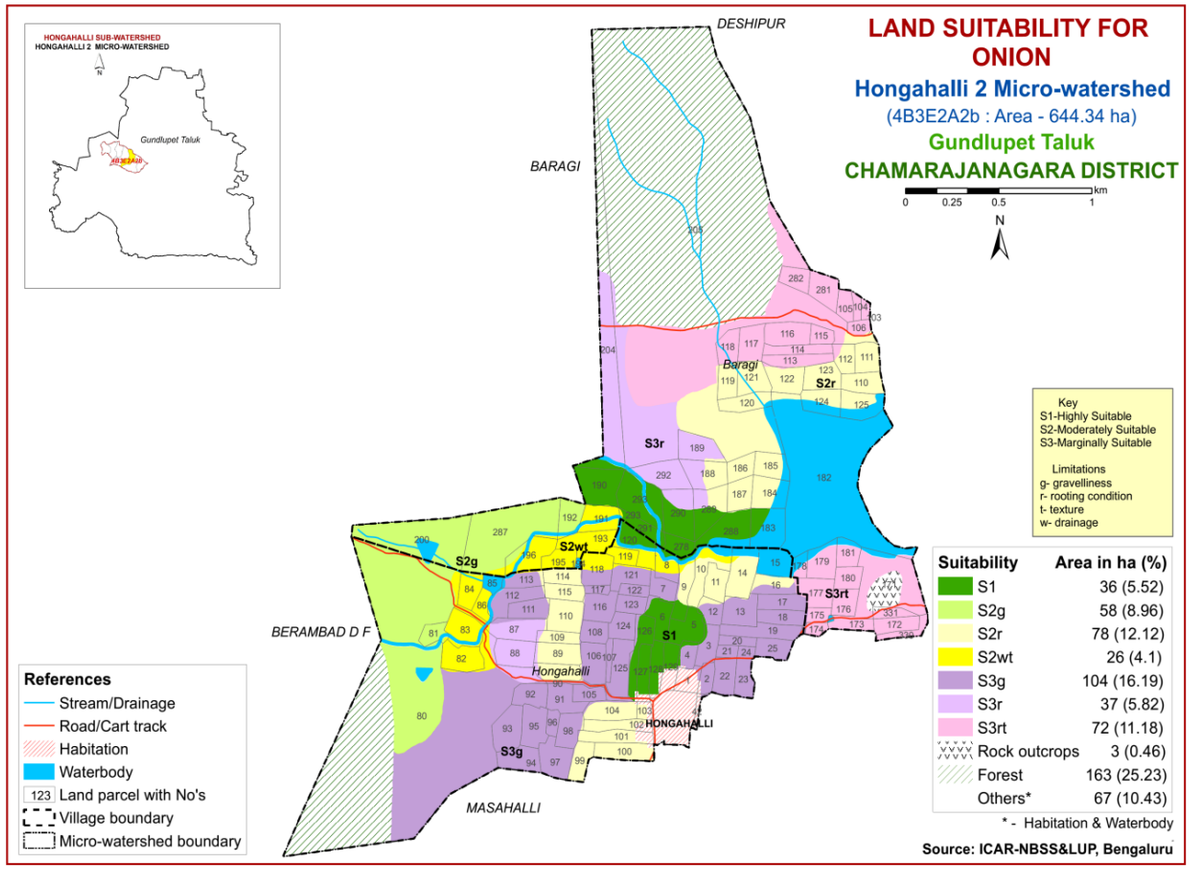
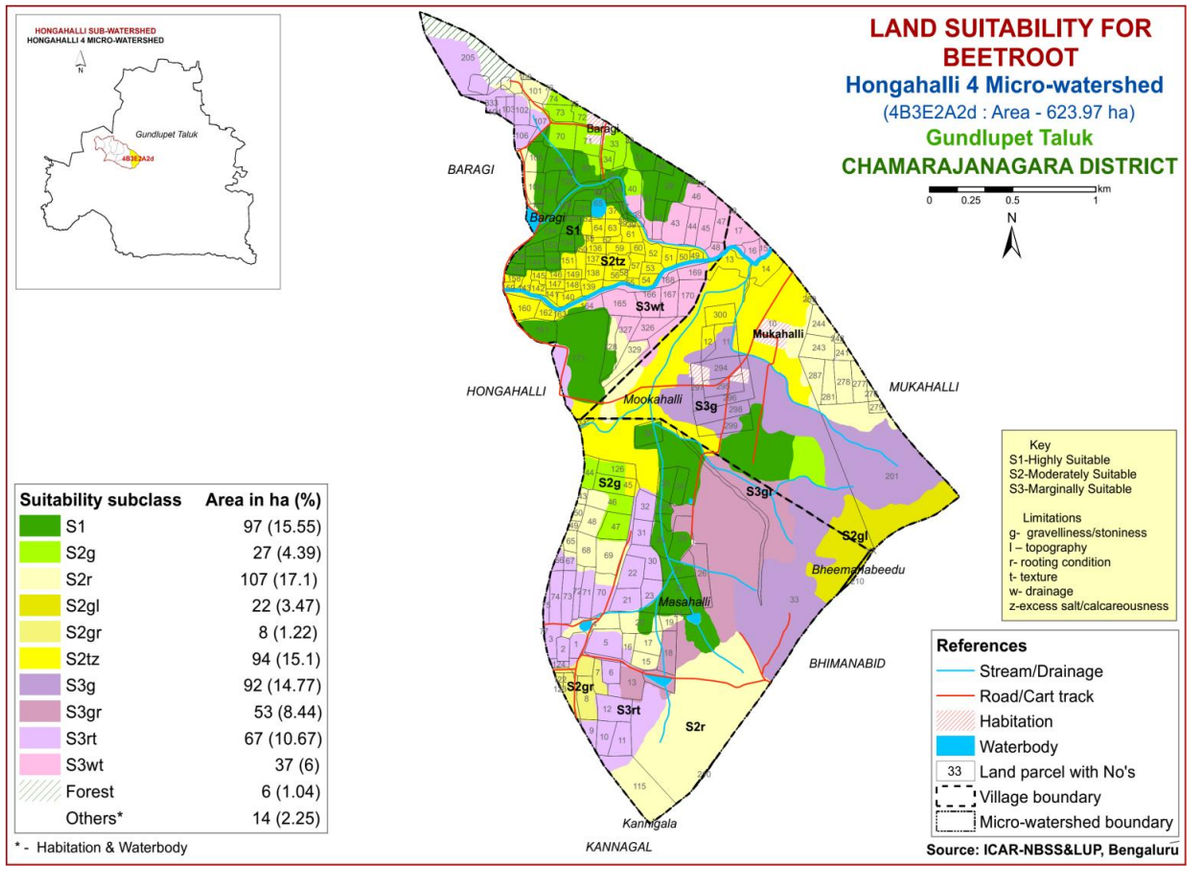
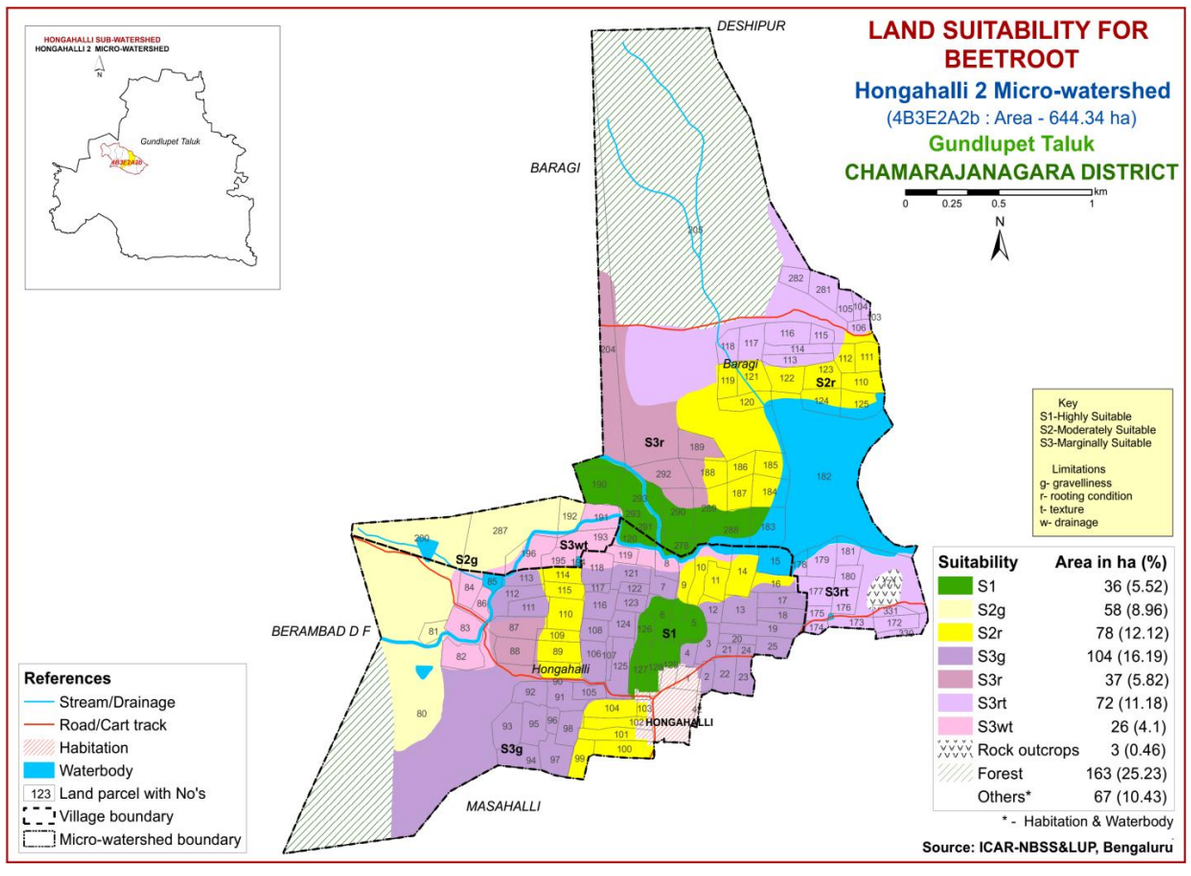
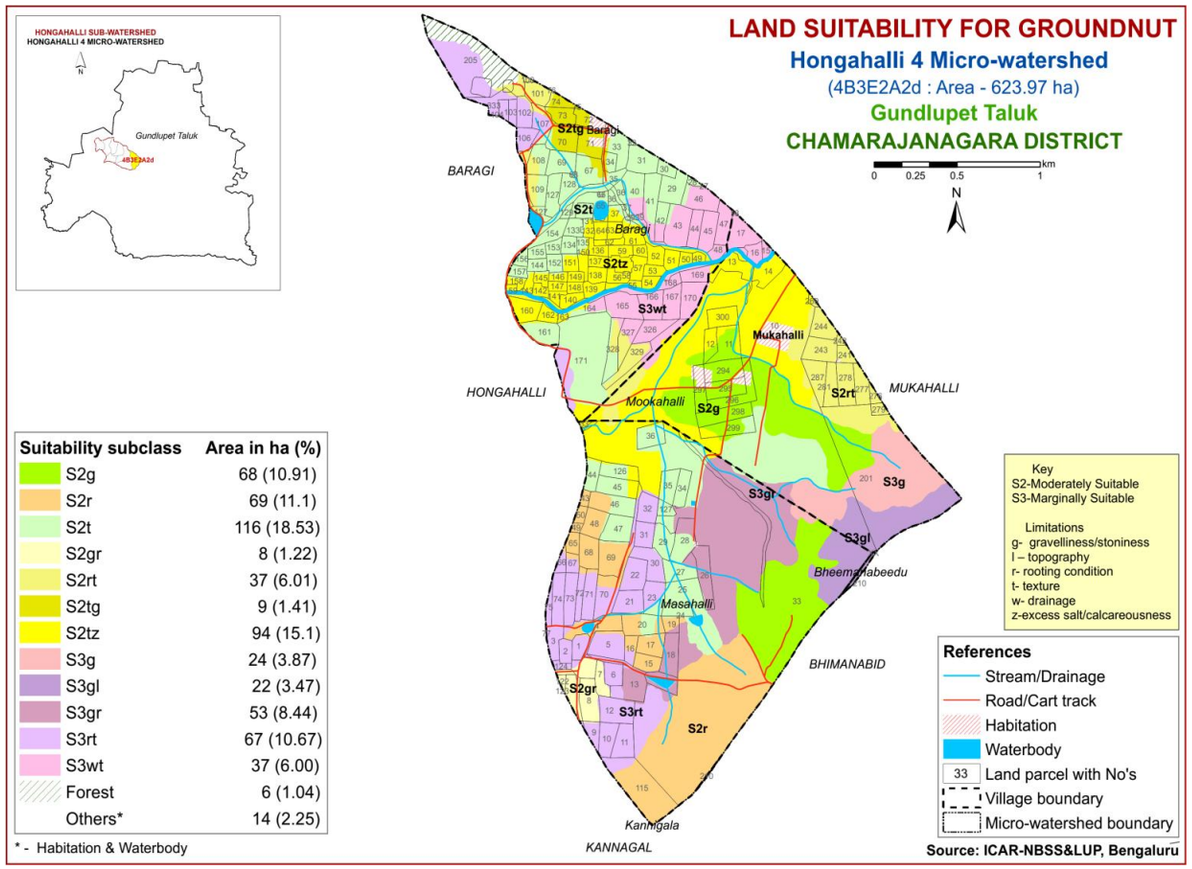
KANNAGAL
Baragi
Mookahalli
Mukahalli
Bheemanabeedu
Masahalli
Kannigala
S1
S2tz
S2wt
S3g
S2g
S3gr
S2gl
S2gr
S3rt
S2r
Suitability subclass | Area in ha (%)
S1 | 97 (15.55)
S2g | 27 (4.39)
S2r | 107 (17.1)
S2gl | 22 (3.47)
S2gr | 8 (1.22)
S2tz | 94 (15.1)
S2wt | 37 (6)
S3g | 92 (14.77)
S3gr | 53 (8.44)
S3rt | 67 (10.67)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable
Limitations
g- gravelliness/stoniness
l – topography
r- rooting condition
t- texture
w- drainage
z-excess salt/calcareousness
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


LAND SUITABILITY FOR ONION
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
HONGAHALLI
MASAHALLI
Baragi
Hongahalli
S1
S2g
S2wt
S2r
S3r
S3rt
S3g
Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable
Limitations
g- gravelliness
r- rooting condition
t- texture
w- drainage
Suitability | Area in ha (%)
S1 | 36 (5.52)
S2g | 58 (8.96)
S2r | 78 (12.12)
S2wt | 26 (4.1)
S3g | 104 (16.19)
S3r | 37 (5.82)
S3rt | 72 (11.18)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

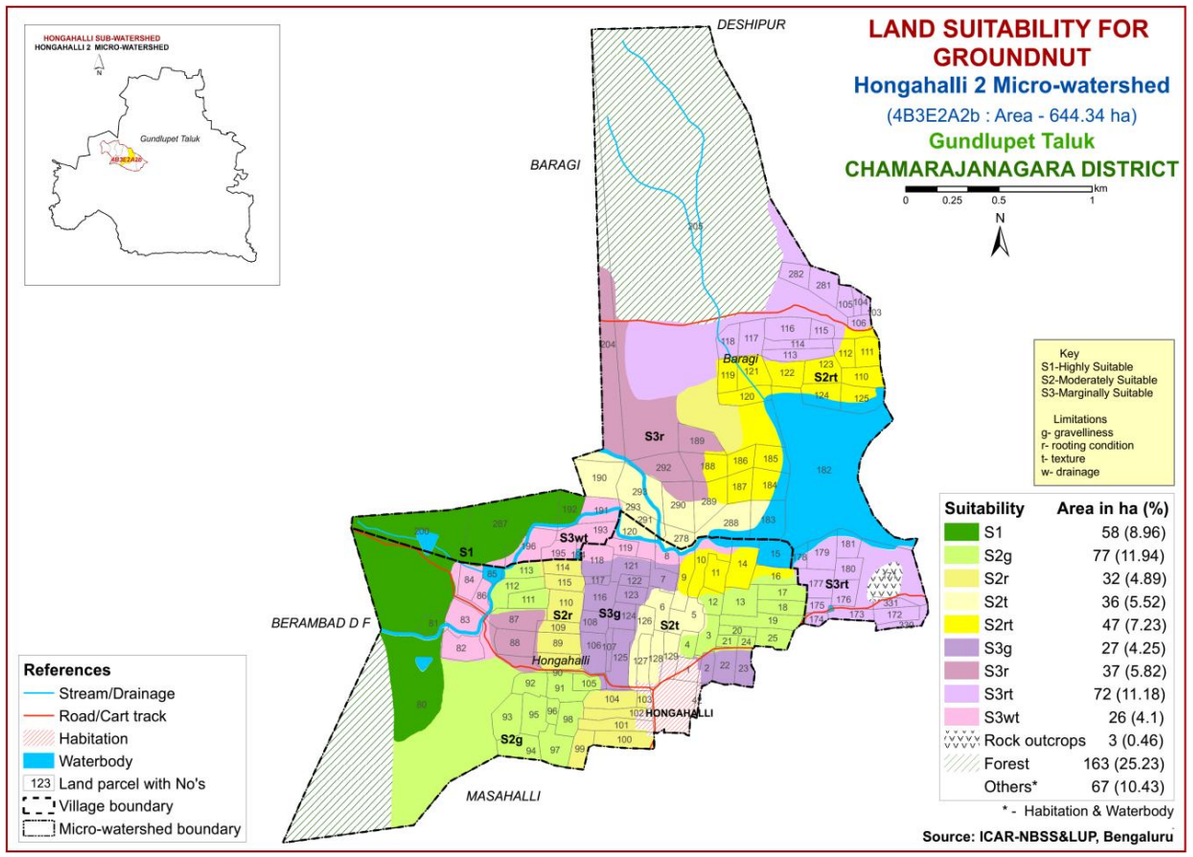

LAND SUITABILITY FOR BEETROOT
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
BARAGI
HONGAHALLI
MUKAHALLI
BHIMANABID
KANNAGAL
Baragi
Mookahalli
Mukahalli
Bheemanabeedu
Masahalli
Kannigala
S1
S2tz
S3wt
S3g
S2g
S3gr
S2gl
S2gr
S3rt
S2r
Suitability subclass | Area in ha (%)
S1 | 97 (15.55)
S2g | 27 (4.39)
S2r | 107 (17.1)
S2gl | 22 (3.47)
S2gr | 8 (1.22)
S2tz | 94 (15.1)
S3g | 92 (14.77)
S3gr | 53 (8.44)
S3rt | 67 (10.67)
S3wt | 37 (6)
Forest | 6 (1.04)
Others* | 14 (2.25)
* - Habitation & Waterbody
Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable
Limitations
g- gravelliness/stoniness
l – topography
r- rooting condition
t- texture
w- drainage
z-excess salt/calcareousness
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


LAND SUITABILITY FOR BEETROOT
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
DESHIPUR
BARAGI
BERAMBAD D F
HONGAHALLI
MASAHALLI
Baragi
Hongahalli
S1
S2g
S3wt
S2r
S3r
S3rt
S3g
Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable
Limitations
g- gravelliness
r- rooting condition
t- texture
w- drainage
Suitability | Area in ha (%)
S1 | 36 (5.52)
S2g | 58 (8.96)
S2r | 78 (12.12)
S3g | 104 (16.19)
S3r | 37 (5.82)
S3rt | 72 (11.18)
S3wt | 26 (4.1)
Rock outcrops | 3 (0.46)
Forest | 163 (25.23)
Others* | 67 (10.43)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
123 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru



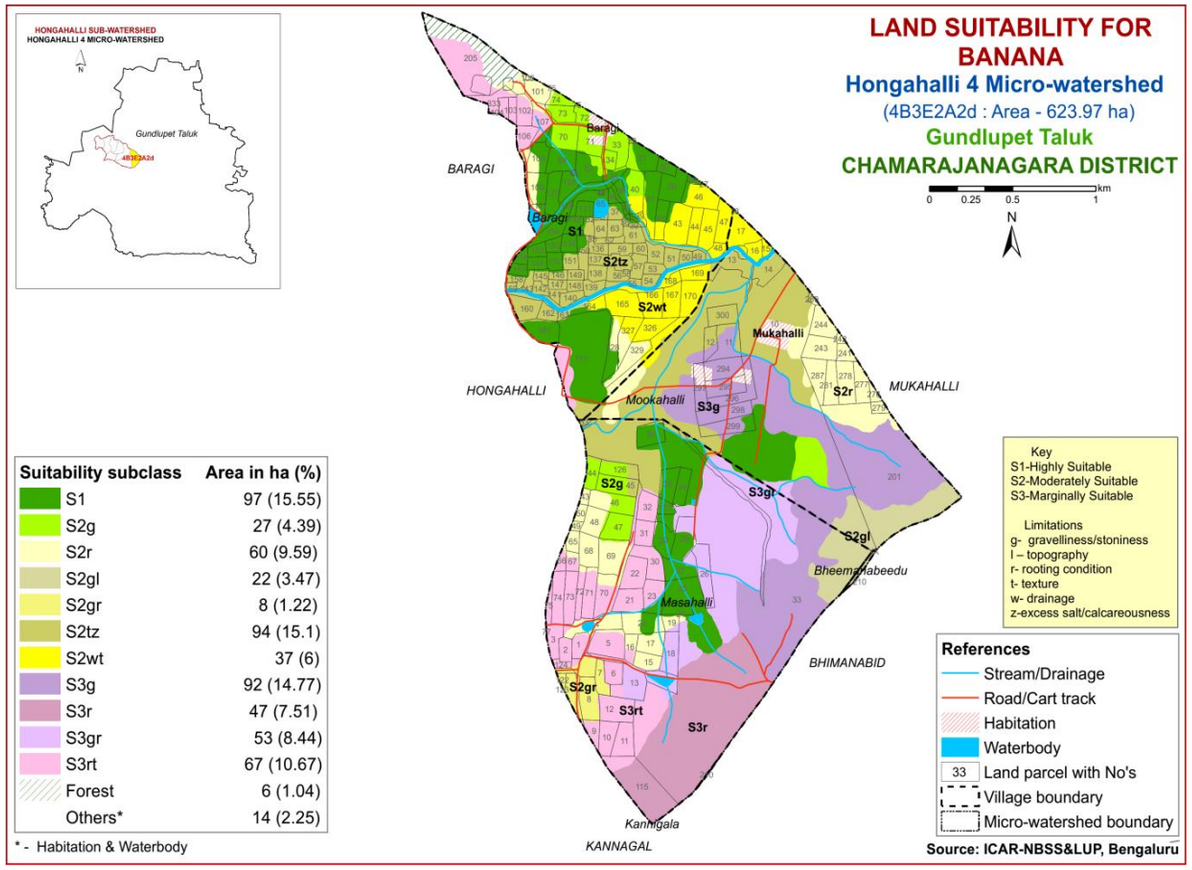
Suitability subclass	Area in ha (%)
S2g	68 (10.91)
S2r	69 (11.1)
S2t	116 (18.53)
S2gr	8 (1.22)
S2rt	37 (6.01)
S2tg	9 (1.41)
S2tz	94 (15.1)
S3g	24 (3.87)
S3gl	22 (3.47)
S3gr	53 (8.44)
S3rt	67 (10.67)
S3wt	37 (6.00)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



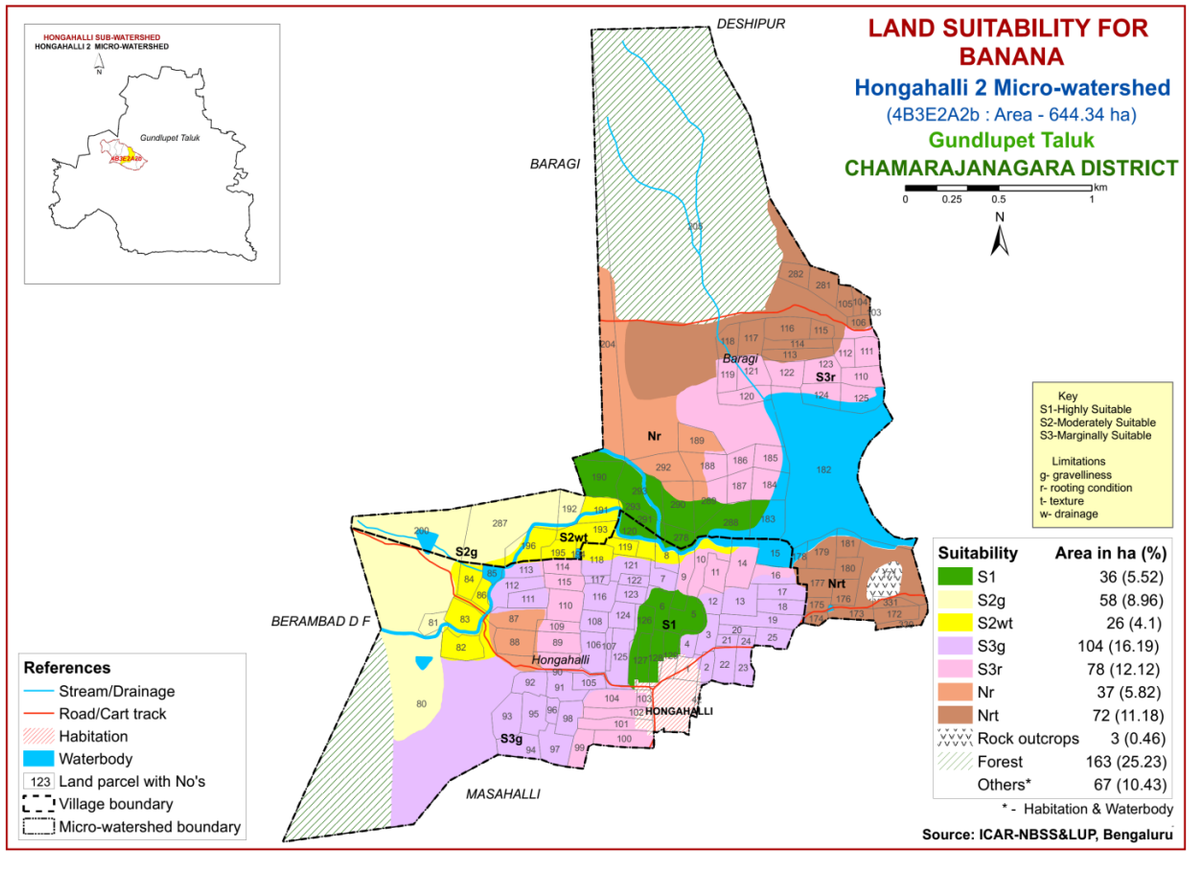
Suitability	Area in ha (%)
S1	58 (8.96)
S2g	77 (11.94)
S2r	32 (4.89)
S2t	36 (5.52)
S2rt	47 (7.23)
S3g	27 (4.25)
S3r	37 (5.82)
S3rt	72 (11.18)
S3wt	26 (4.1)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



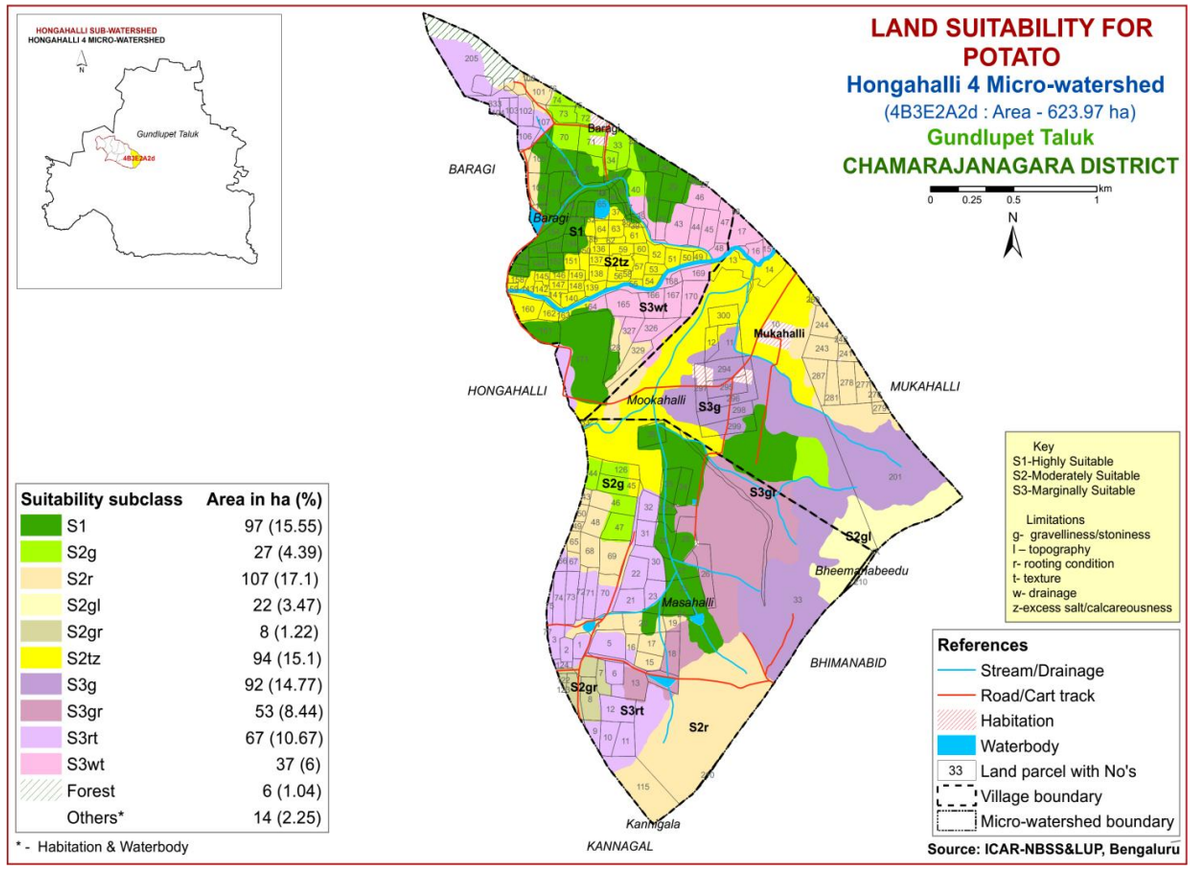
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	60 (9.59)
S2gl	22 (3.47)
S2gr	8 (1.22)
S2tz	94 (15.1)
S2wt	37 (6)
S3g	92 (14.77)
S3r	47 (7.51)
S3gr	53 (8.44)
S3rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



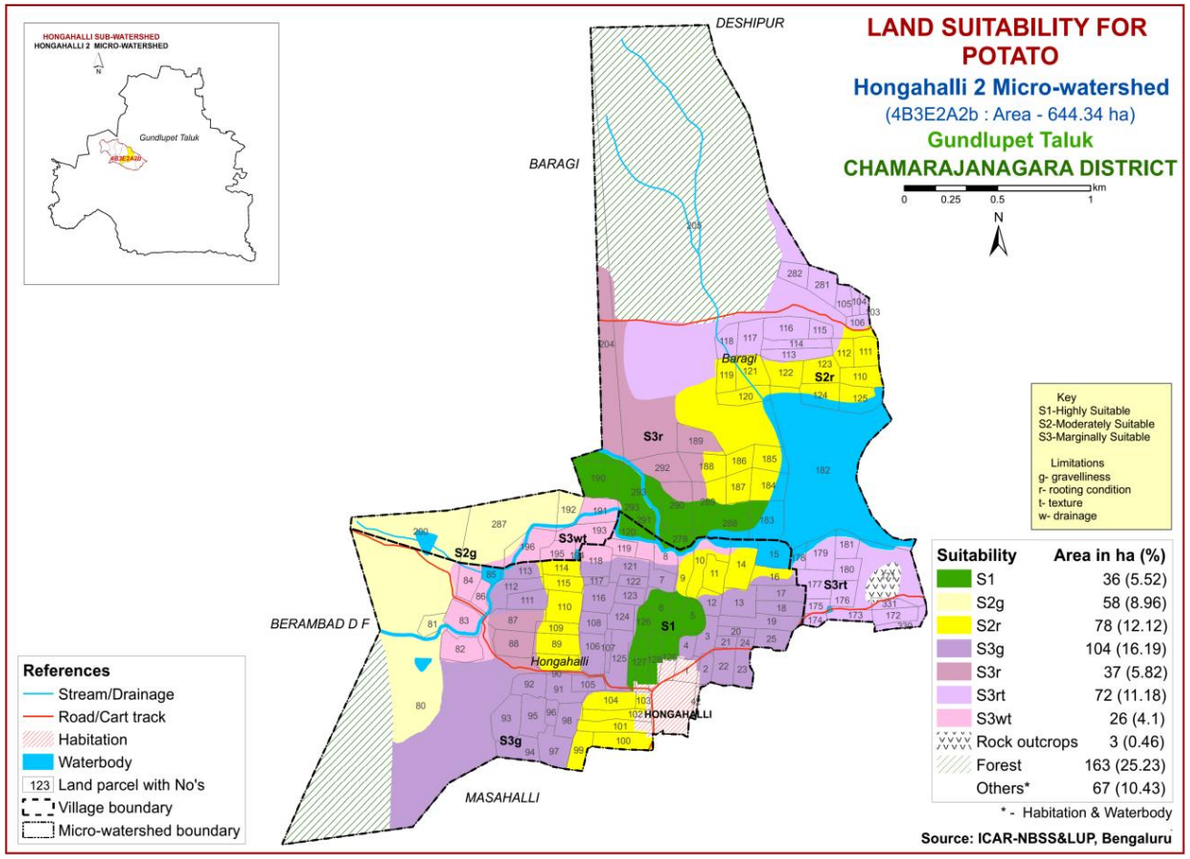
Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2wt	26 (4.1)
S3g	104 (16.19)
S3r	78 (12.12)
Nr	37 (5.82)
Nrt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



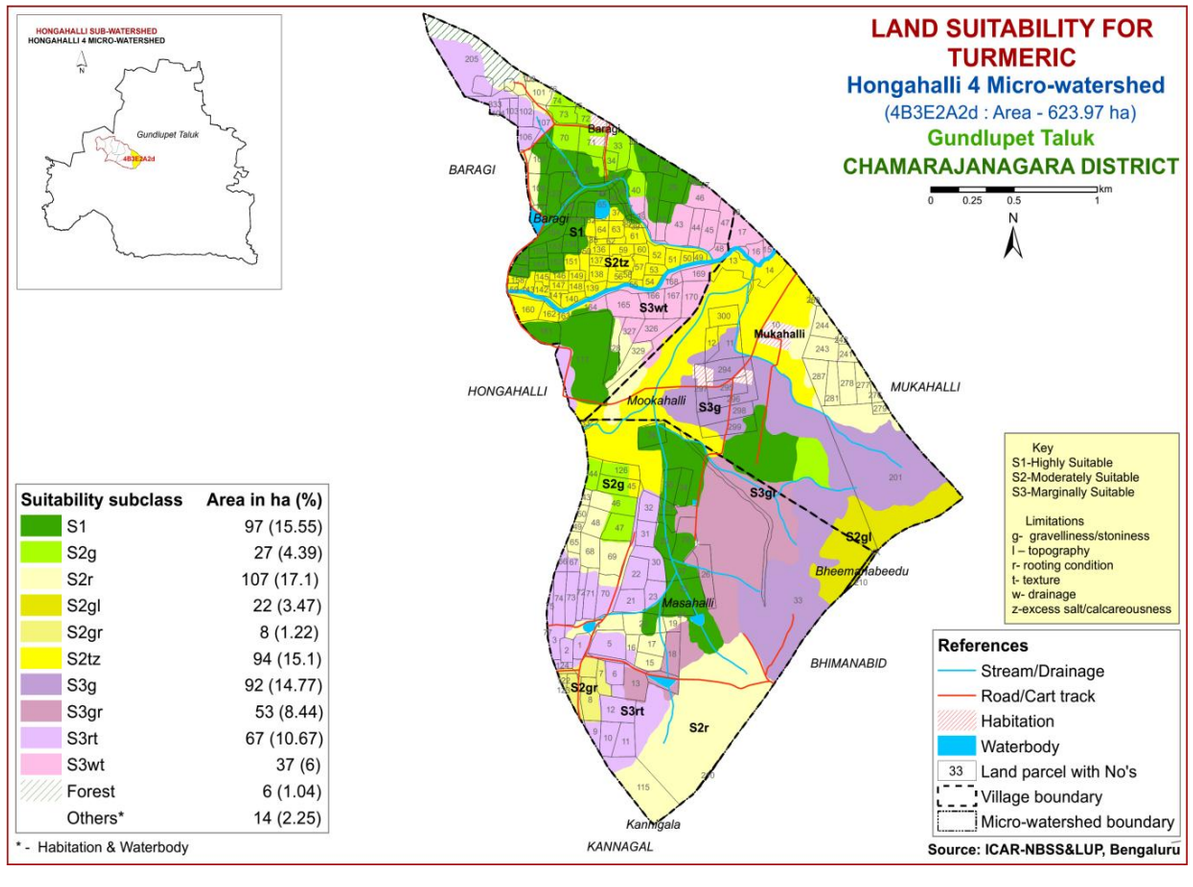
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	107 (17.1)
S2gl	22 (3.47)
S2gr	8 (1.22)
S2tz	94 (15.1)
S3g	92 (14.77)
S3gr	53 (8.44)
S3rt	67 (10.67)
S3wt	37 (6)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



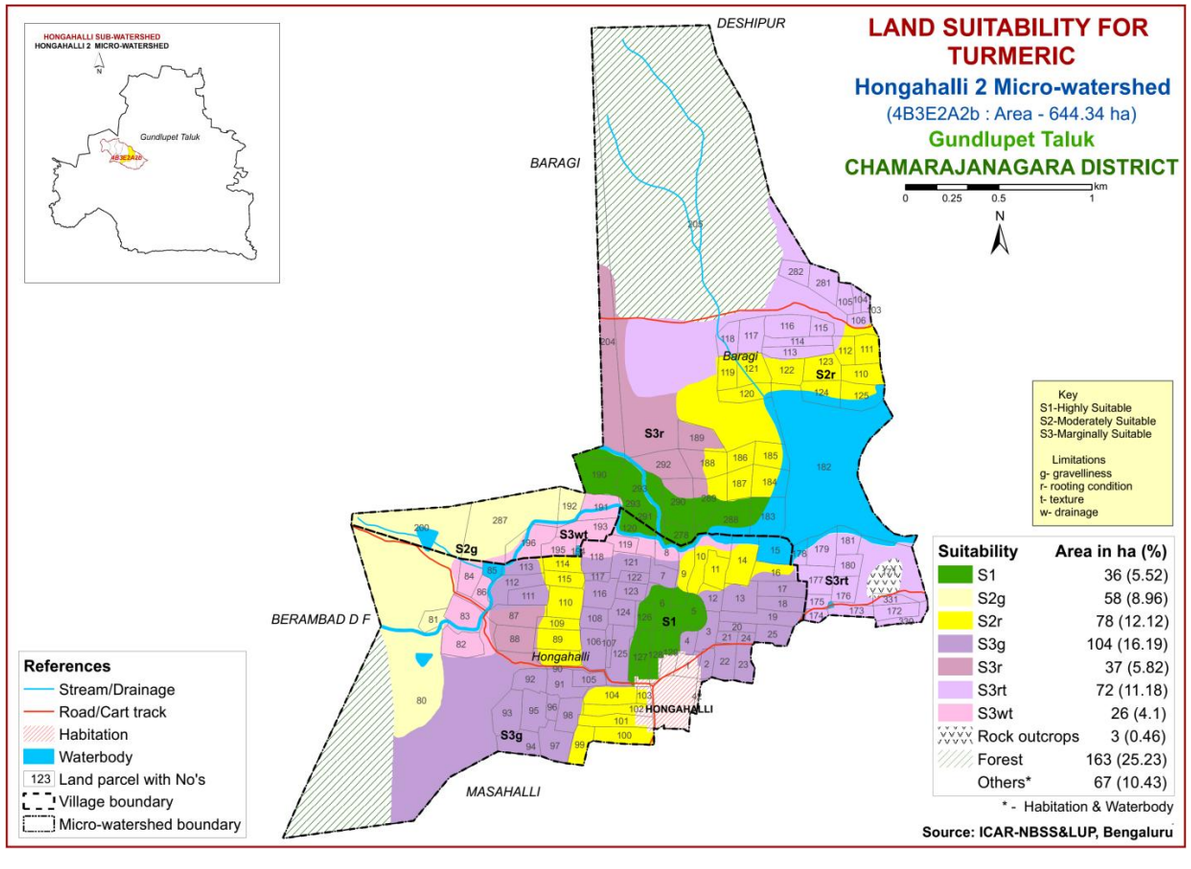
Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2r	78 (12.12)
S3g	104 (16.19)
S3r	37 (5.82)
S3rt	72 (11.18)
S3wt	26 (4.1)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



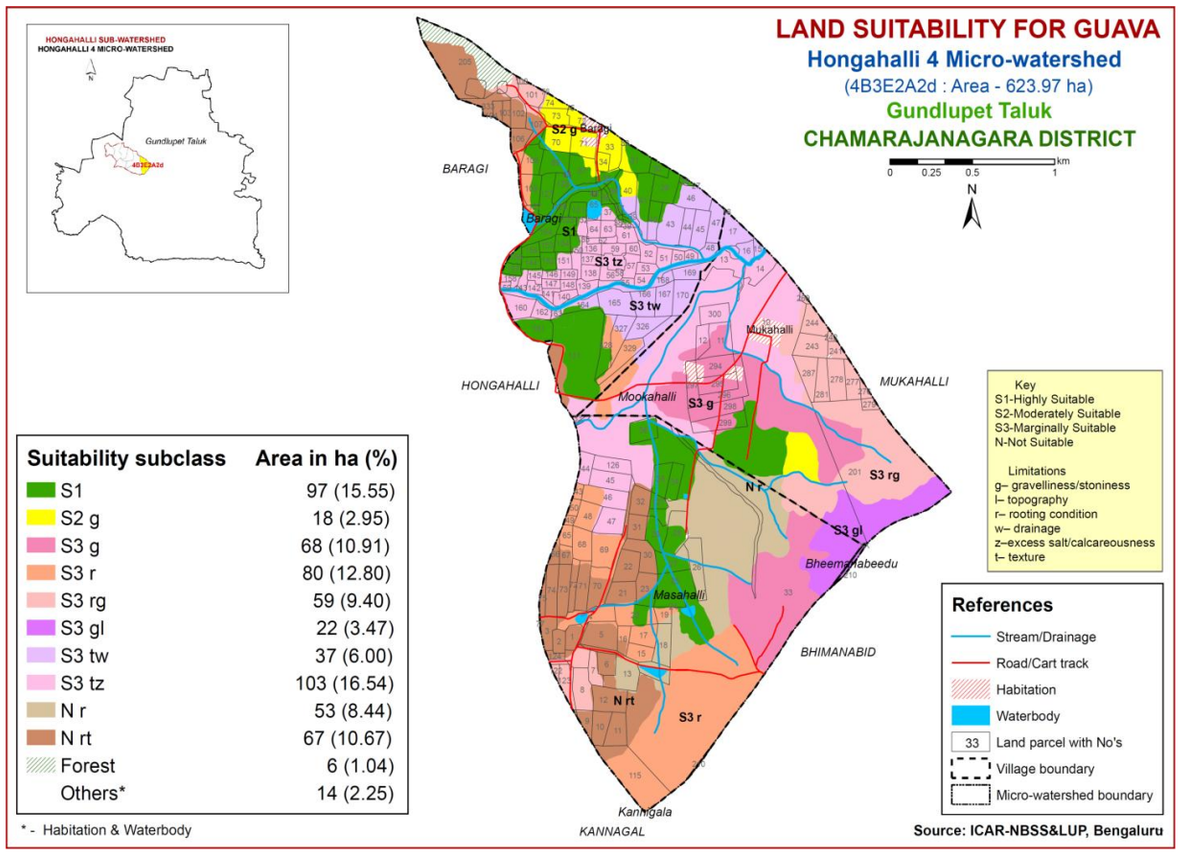
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	107 (17.1)
S2gl	22 (3.47)
S2gr	8 (1.22)
S2tz	94 (15.1)
S3g	92 (14.77)
S3gr	53 (8.44)
S3rt	67 (10.67)
S3wt	37 (6)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



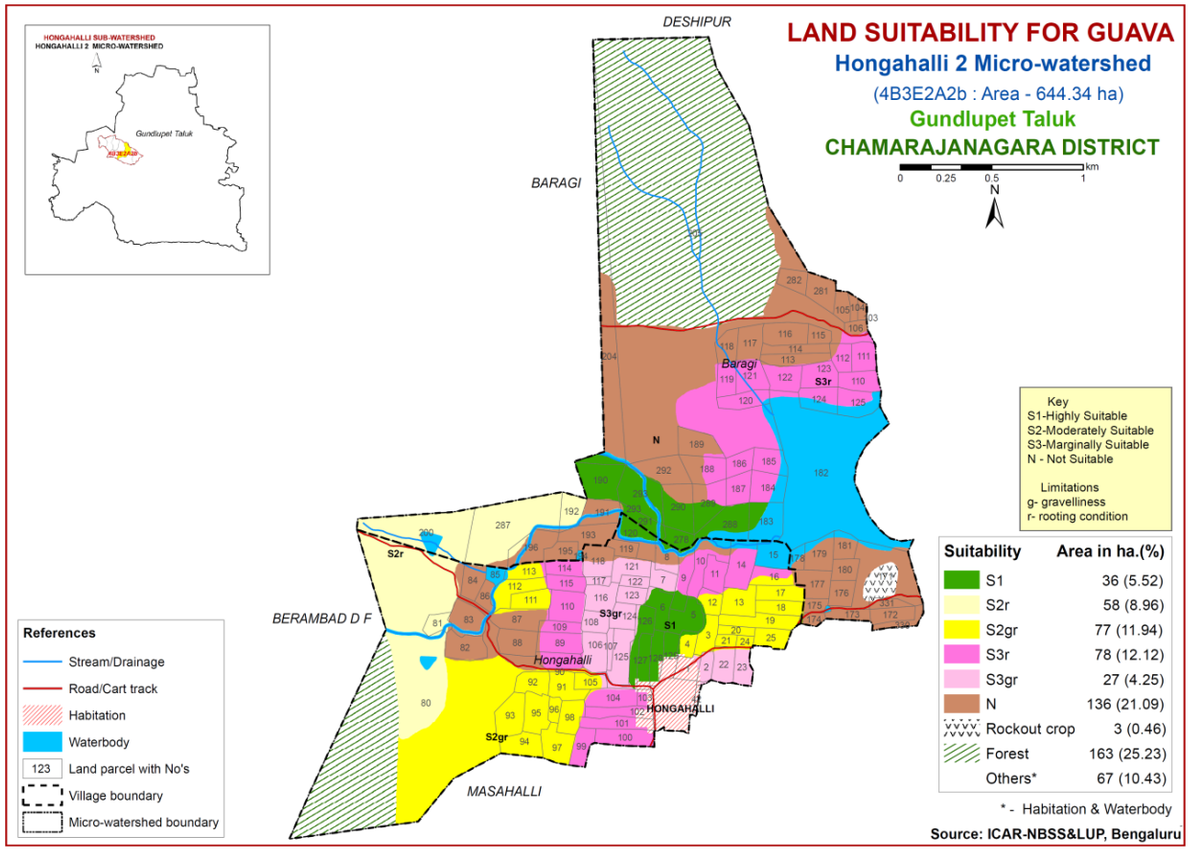
Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2r	78 (12.12)
S3g	104 (16.19)
S3r	37 (5.82)
S3rt	72 (11.18)
S3wt	26 (4.1)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



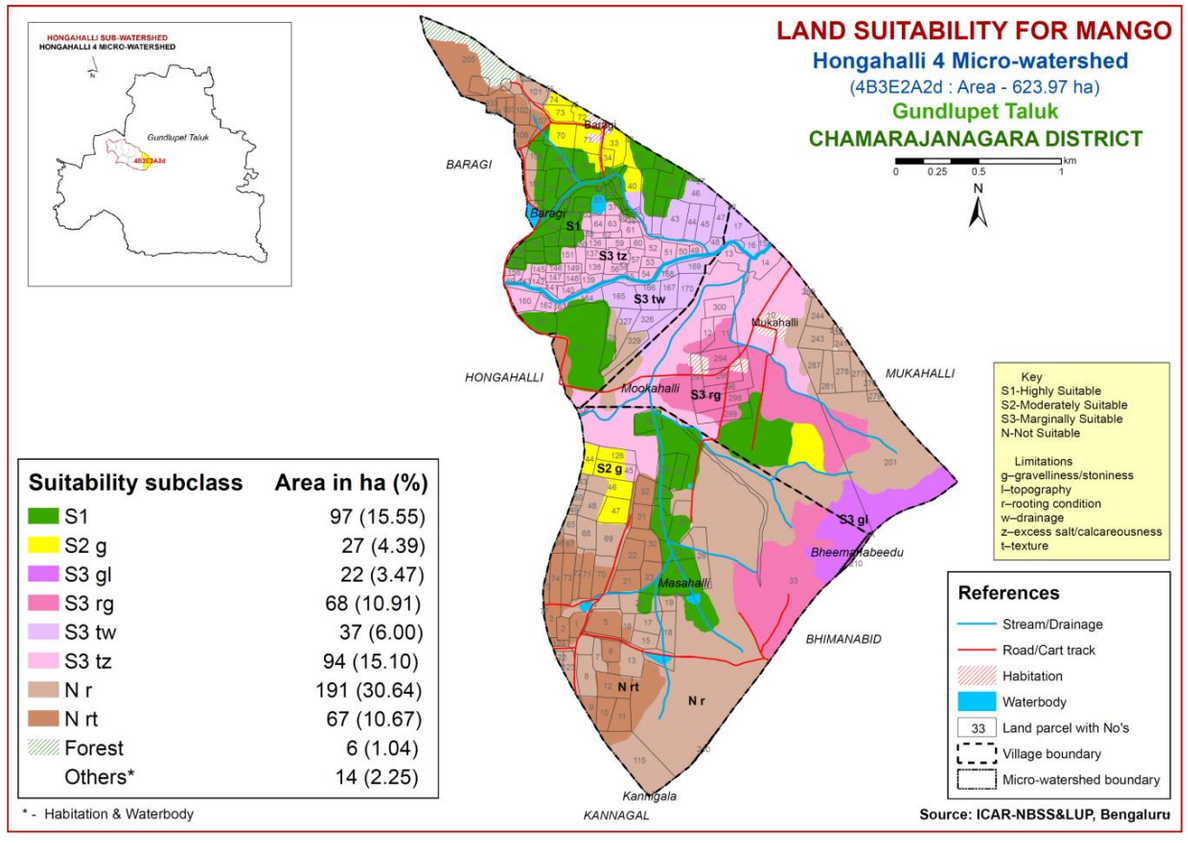
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	18 (2.95)
S3 g	68 (10.91)
S3 r	80 (12.80)
S3 rg	59 (9.40)
S3 gl	22 (3.47)
S3 tw	37 (6.00)
S3 tz	103 (16.54)
N r	53 (8.44)
N rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



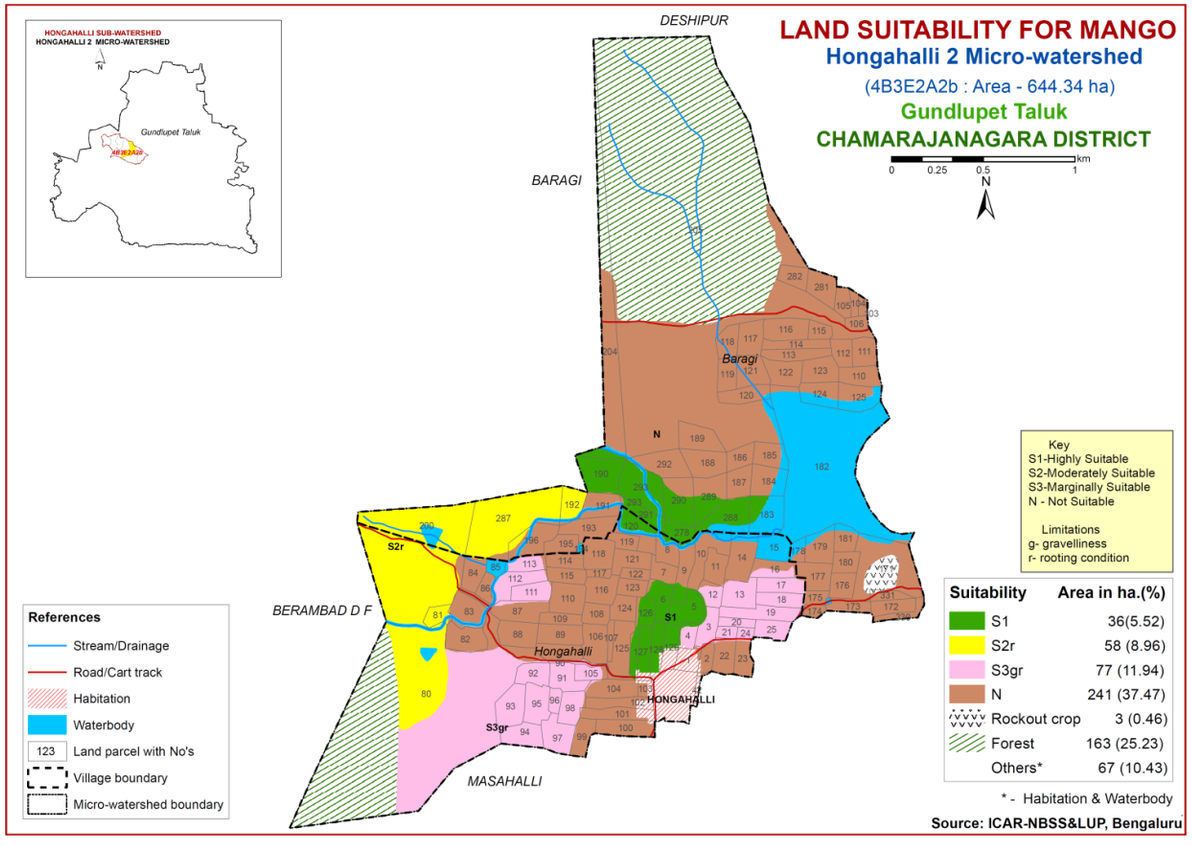
Suitability	Area in ha.(%)
S1	36 (5.52)
S2r	58 (8.96)
S2gr	77 (11.94)
S3r	78 (12.12)
S3gr	27 (4.25)
N	136 (21.09)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



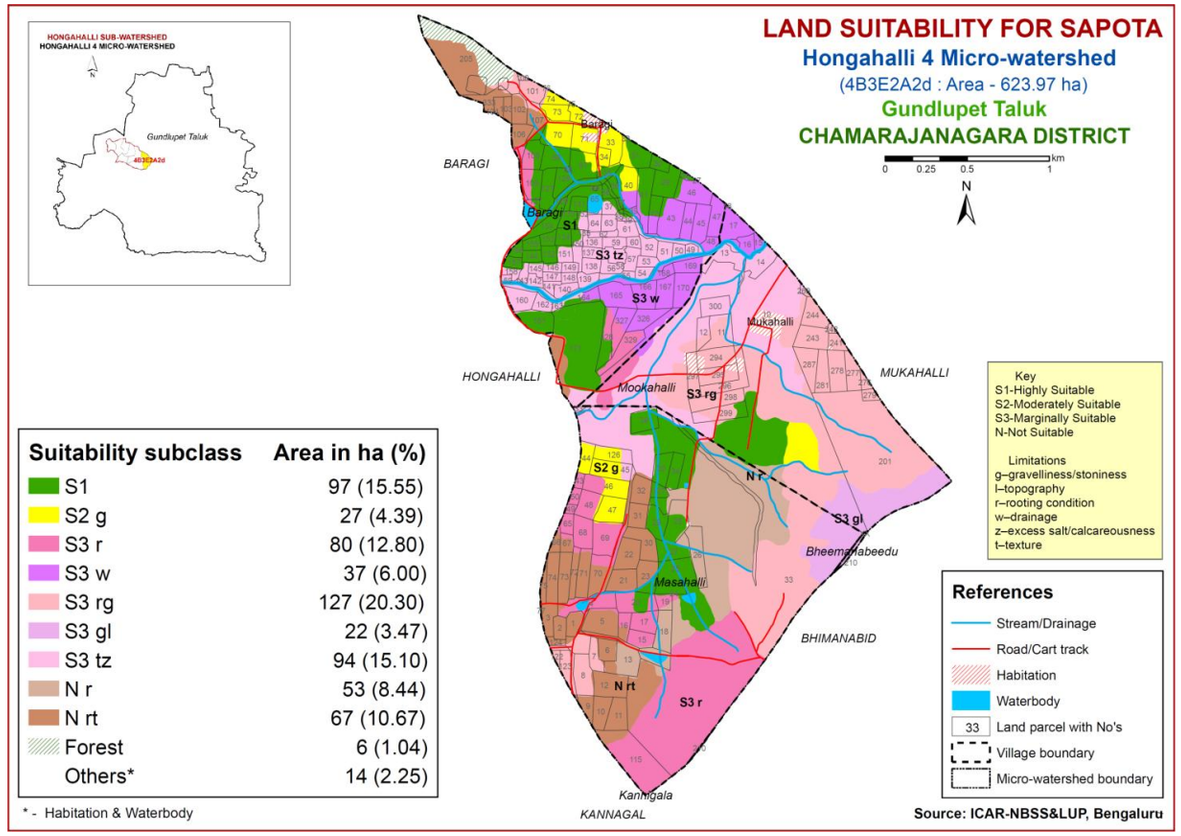
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S3 gl	22 (3.47)
S3 rg	68 (10.91)
S3 tw	37 (6.00)
S3 tz	94 (15.10)
N r	191 (30.64)
N rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



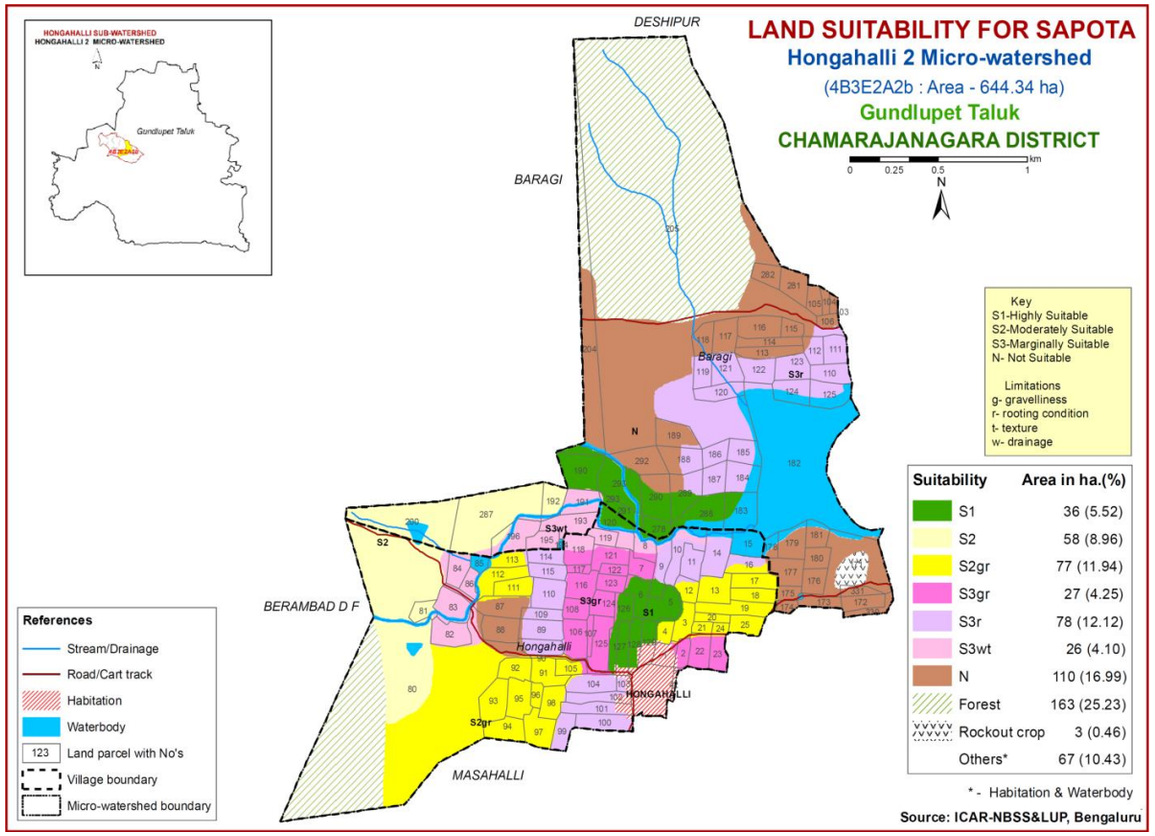
Suitability	Area in ha.(%)
S1	36(5.52)
S2r	58 (8.96)
S3gr	77 (11.94)
N	241 (37.47)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



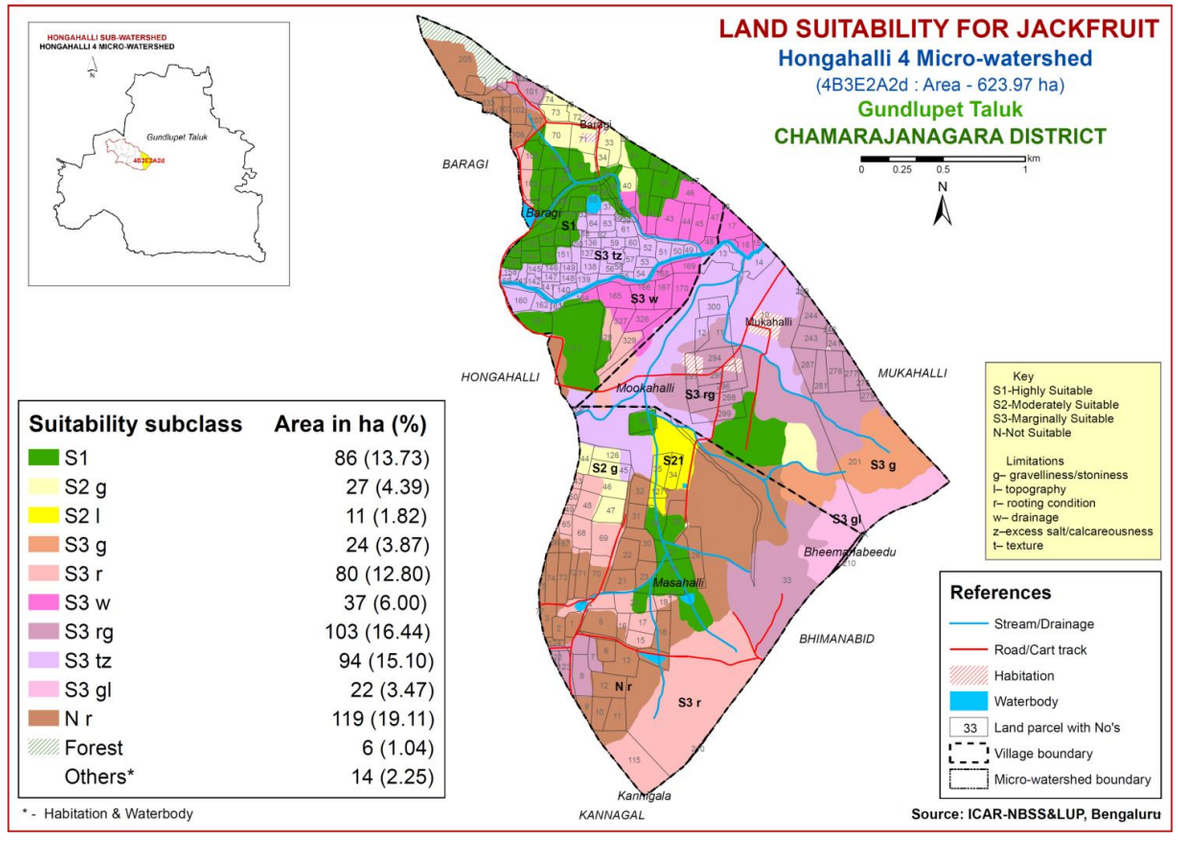
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S3 r	80 (12.80)
S3 w	37 (6.00)
S3 rg	127 (20.30)
S3 gl	22 (3.47)
S3 tz	94 (15.10)
N r	53 (8.44)
N rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



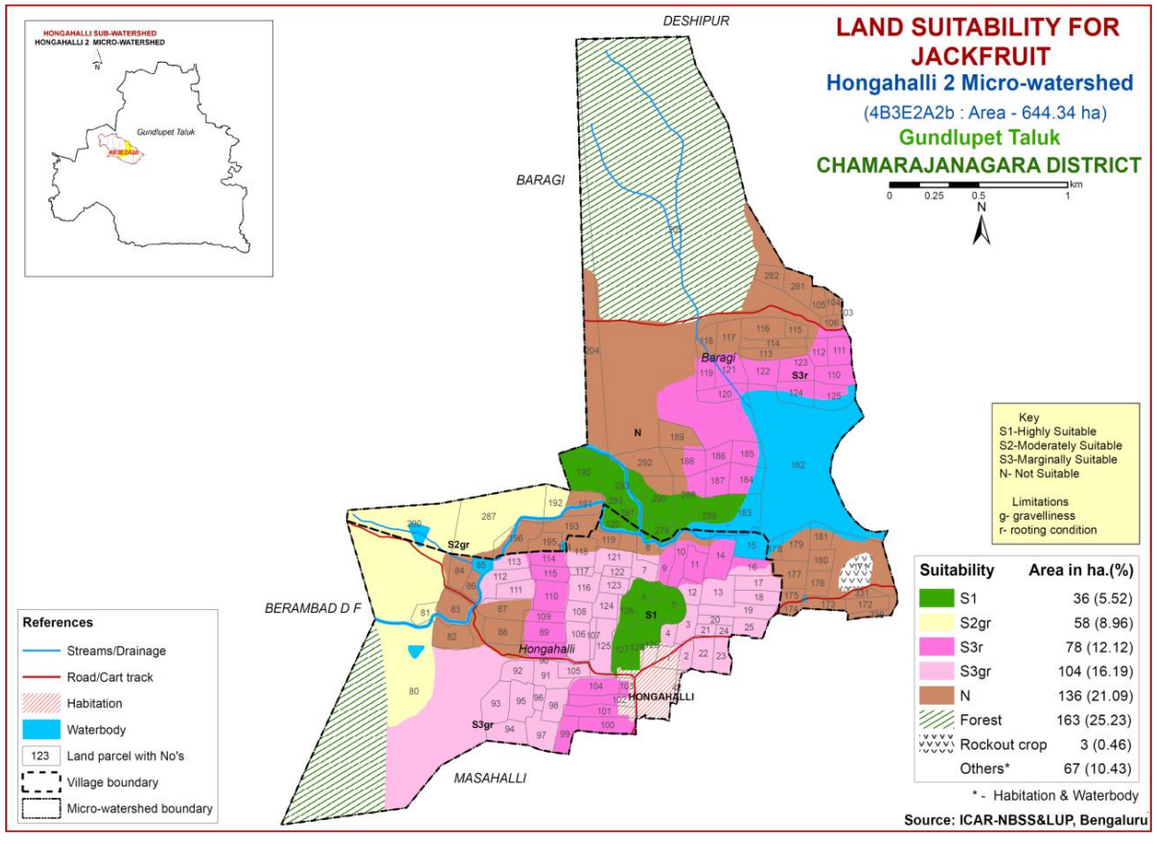
Suitability	Area in ha.(%)
S1	36 (5.52)
S2	58 (8.96)
S2gr	77 (11.94)
S3gr	27 (4.25)
S3r	78 (12.12)
S3wt	26 (4.10)
N	110 (16.99)
Forest	163 (25.23)
Rockout crop	3 (0.46)
Others*	67 (10.43)

* - Habitation & Waterbody



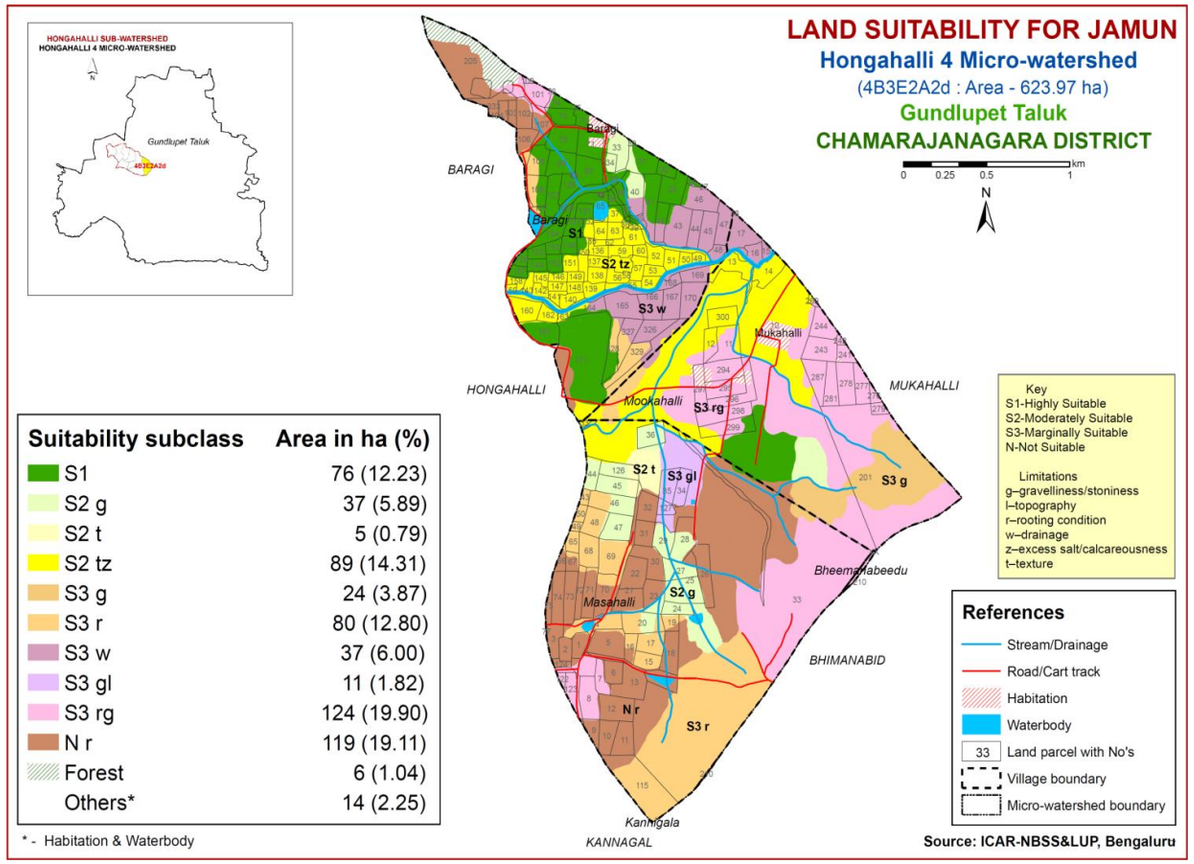
Suitability subclass	Area in ha (%)
S1	86 (13.73)
S2 g	27 (4.39)
S2 l	11 (1.82)
S3 g	24 (3.87)
S3 r	80 (12.80)
S3 w	37 (6.00)
S3 rg	103 (16.44)
S3 tz	94 (15.10)
S3 gl	22 (3.47)
N r	119 (19.11)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



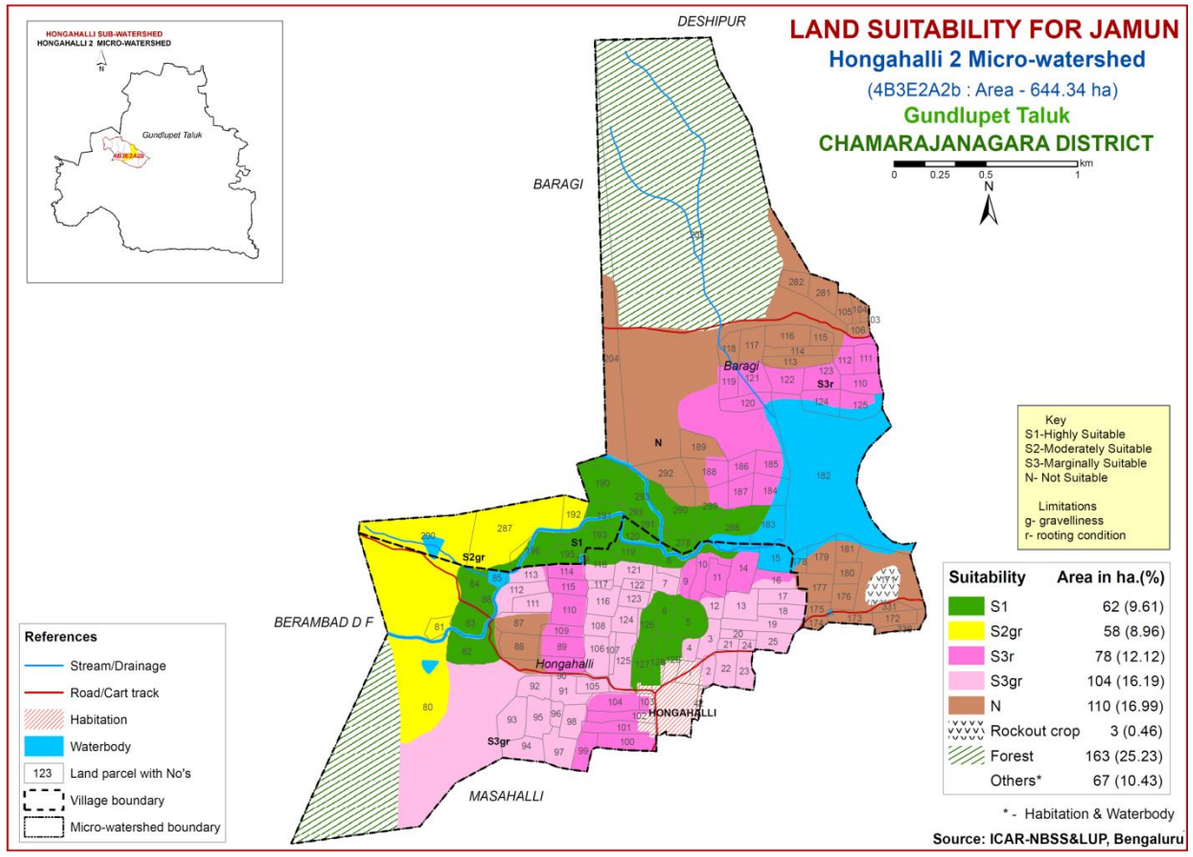
Suitability	Area in ha.(%)
S1	36 (5.52)
S2gr	58 (8.96)
S3r	78 (12.12)
S3gr	104 (16.19)
N	136 (21.09)
Forest	163 (25.23)
Rockout crop	3 (0.46)
Others*	67 (10.43)

* - Habitation & Waterbody



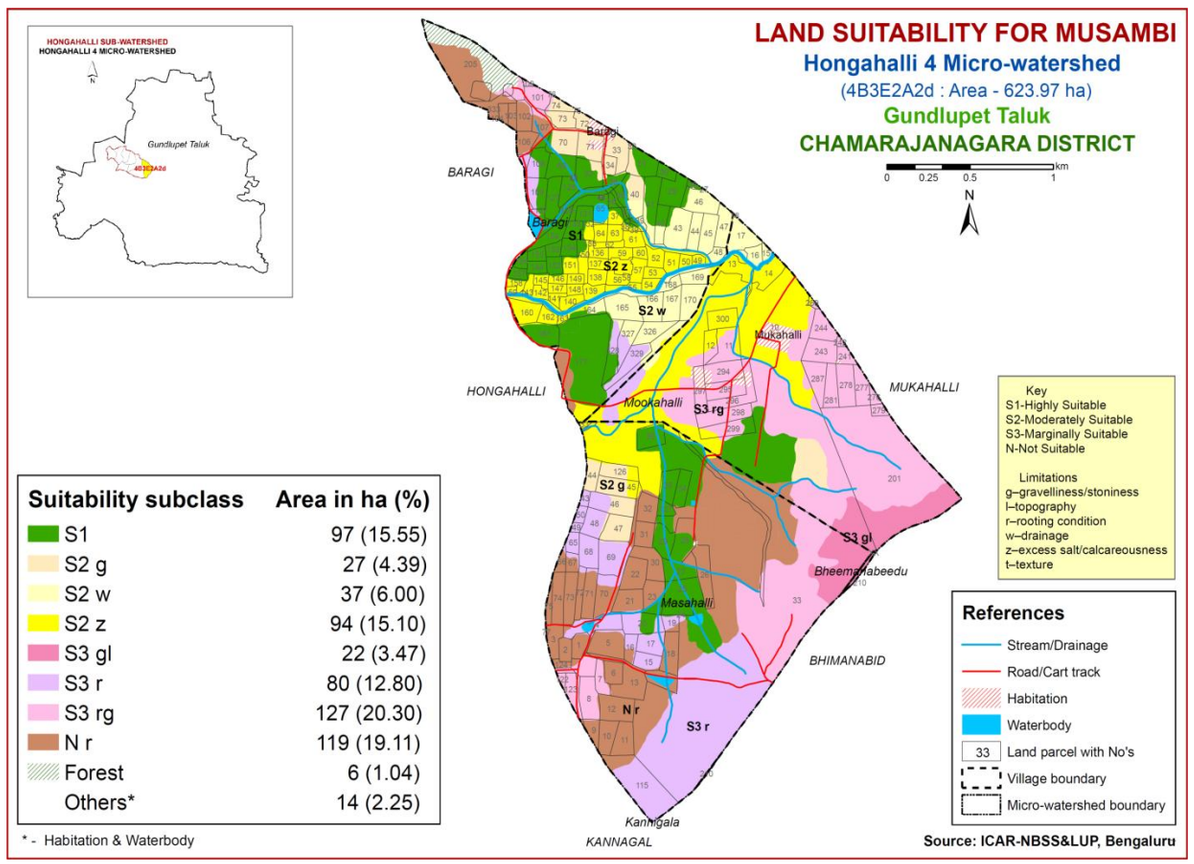
Suitability subclass	Area in ha (%)
S1	76 (12.23)
S2 g	37 (5.89)
S2 t	5 (0.79)
S2 tz	89 (14.31)
S3 g	24 (3.87)
S3 r	80 (12.80)
S3 w	37 (6.00)
S3 gl	11 (1.82)
S3 rg	124 (19.90)
N r	119 (19.11)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



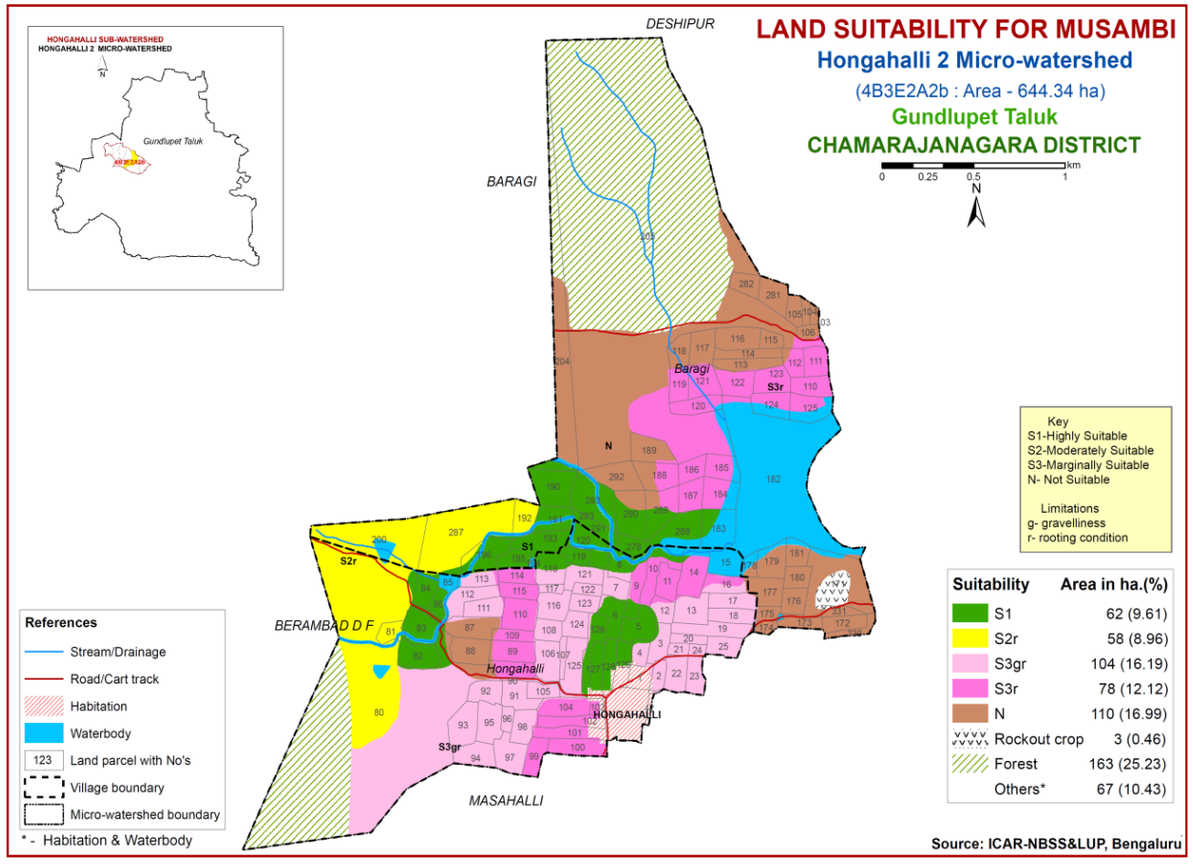
Suitability	Area in ha.(%)
S1	62 (9.61)
S2gr	58 (8.96)
S3r	78 (12.12)
S3gr	104 (16.19)
N	110 (16.99)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



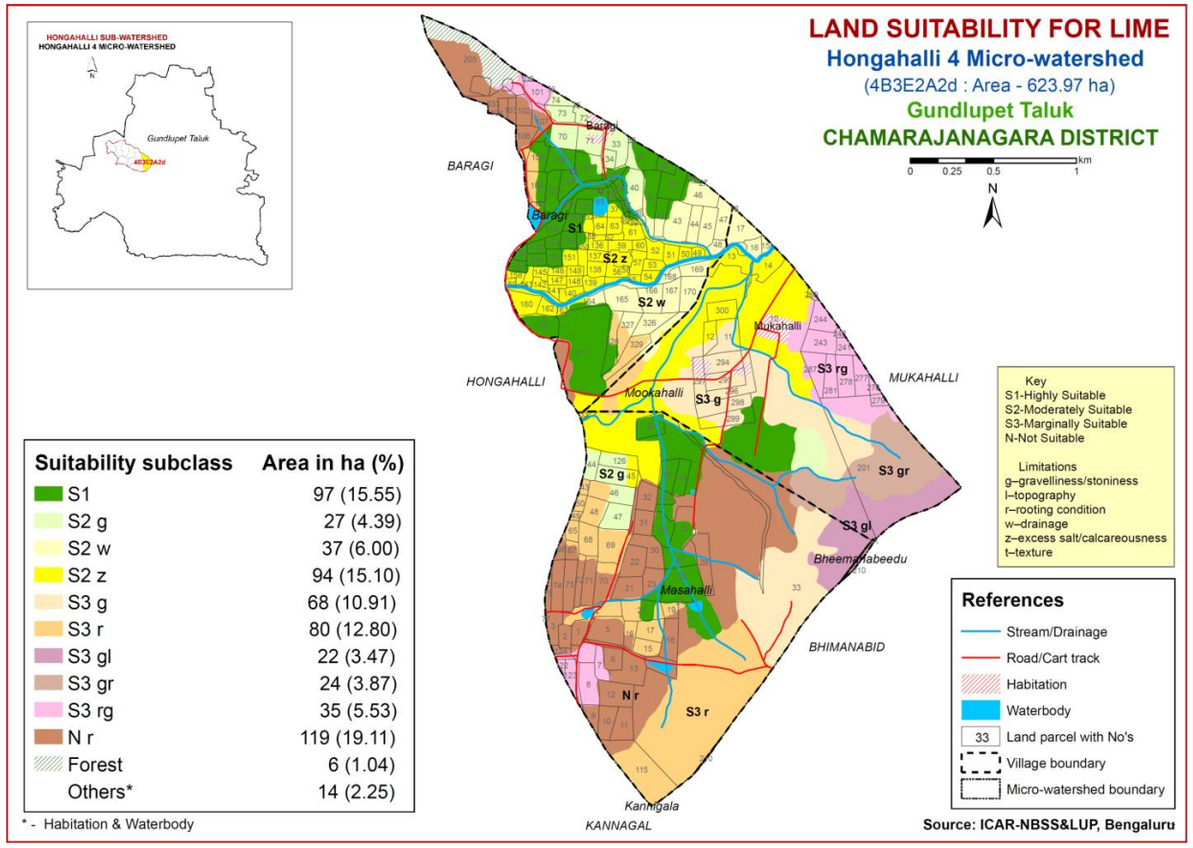
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S2 w	37 (6.00)
S2 z	94 (15.10)
S3 gl	22 (3.47)
S3 r	80 (12.80)
S3 rg	127 (20.30)
N r	119 (19.11)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



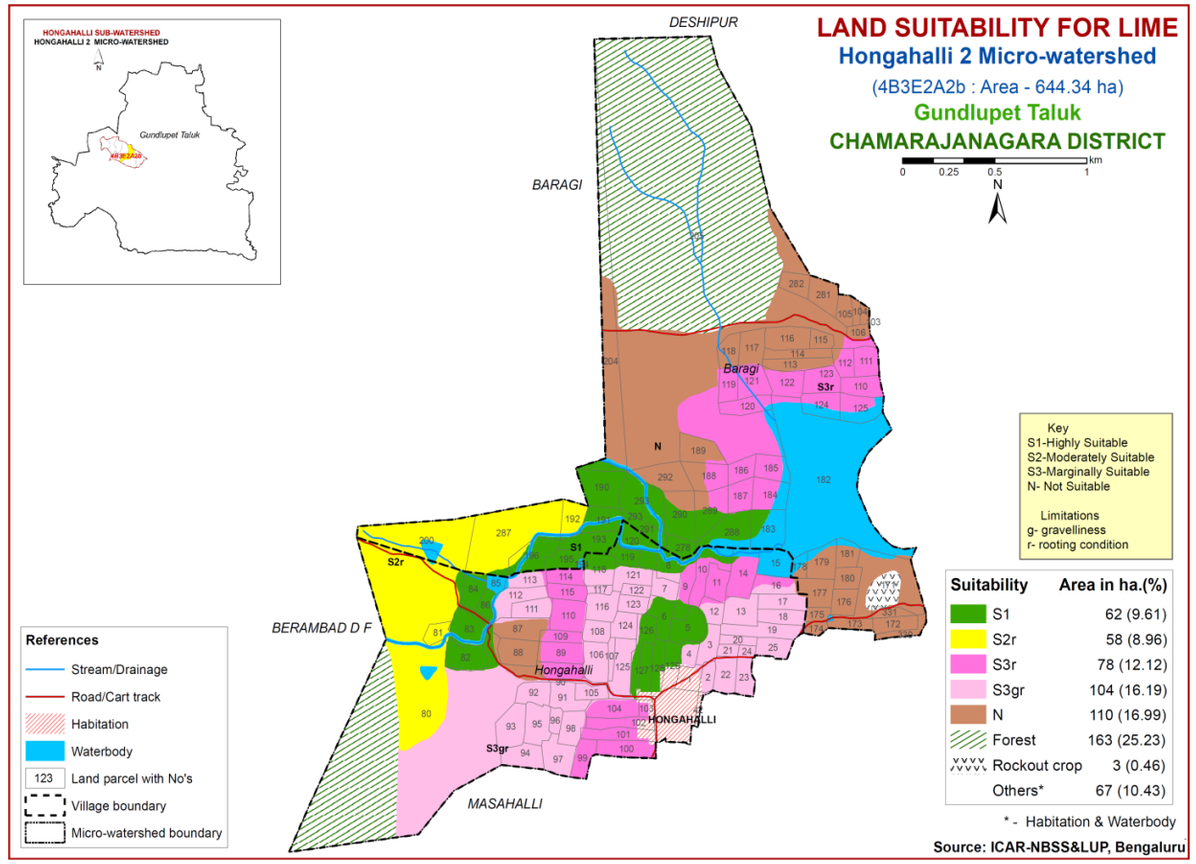
Suitability	Area in ha.(%)
S1	62 (9.61)
S2r	58 (8.96)
S3gr	104 (16.19)
S3r	78 (12.12)
N	110 (16.99)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



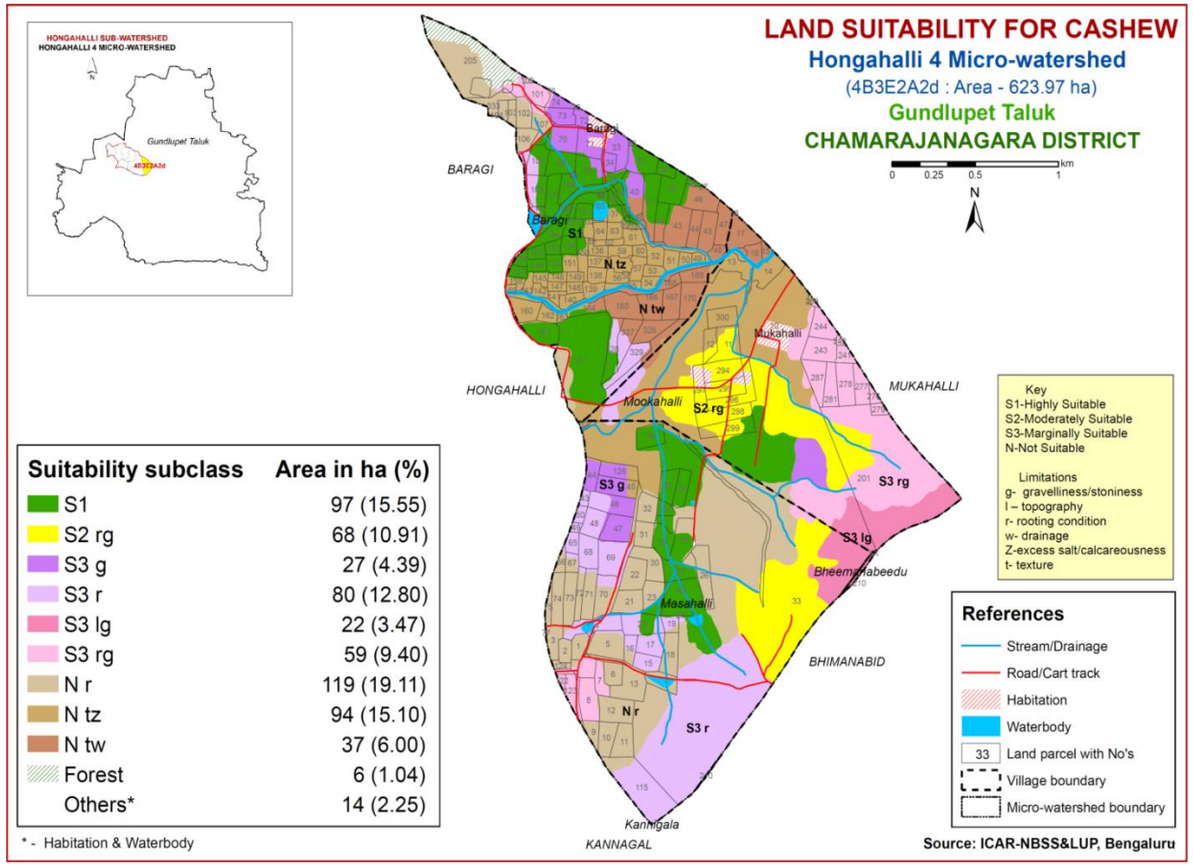
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S2 w	37 (6.00)
S2 z	94 (15.10)
S3 g	68 (10.91)
S3 r	80 (12.80)
S3 gl	22 (3.47)
S3 gr	24 (3.87)
S3 rg	35 (5.53)
N r	119 (19.11)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



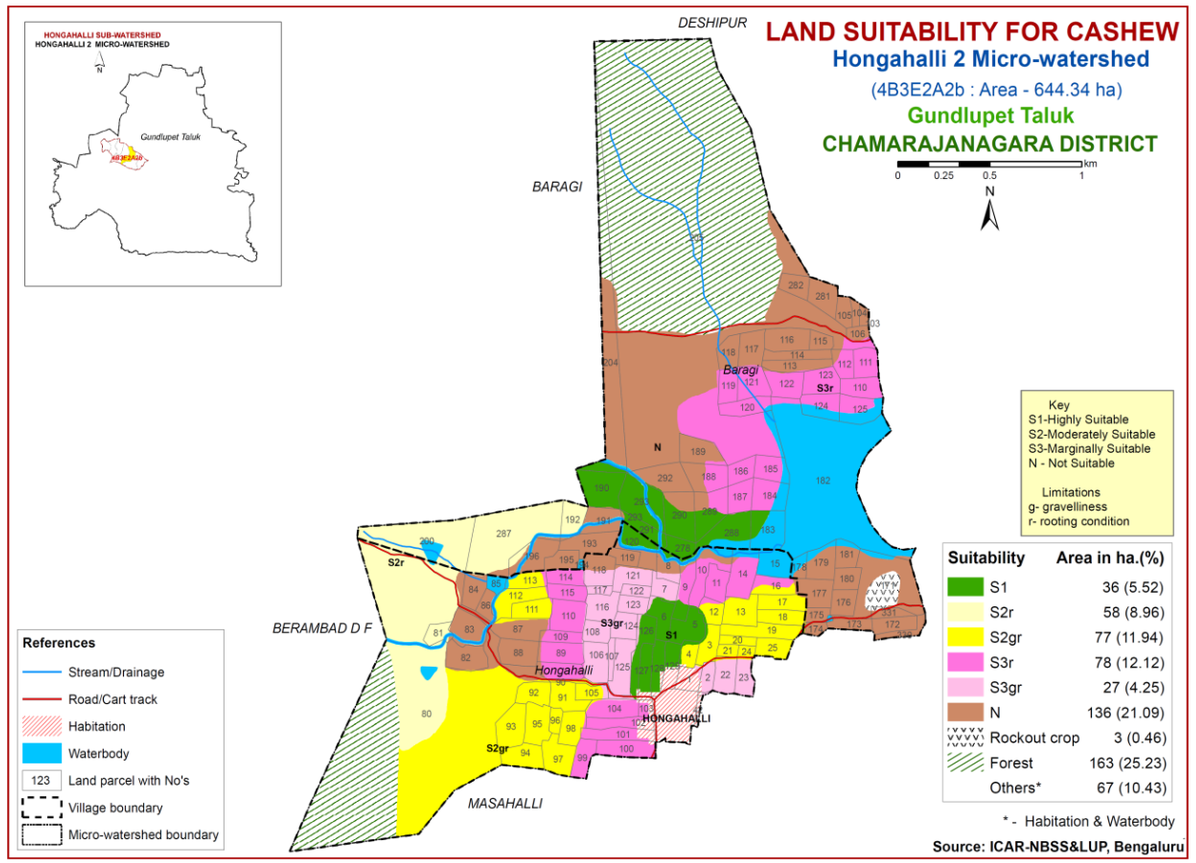
Suitability	Area in ha.(%)
S1	62 (9.61)
S2r	58 (8.96)
S3r	78 (12.12)
S3gr	104 (16.19)
N	110 (16.99)
Forest	163 (25.23)
Rockout crop	3 (0.46)
Others*	67 (10.43)

* - Habitation & Waterbody



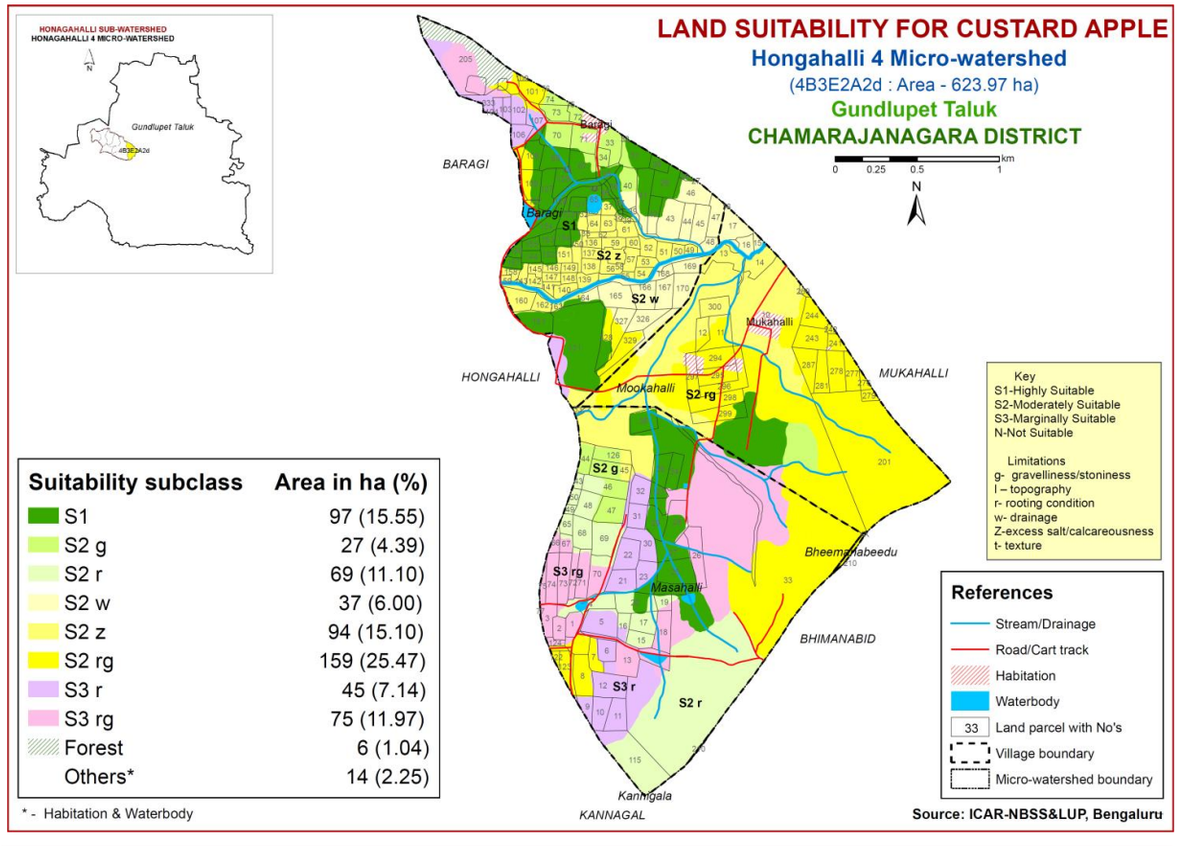
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 rg	68 (10.91)
S3 g	27 (4.39)
S3 r	80 (12.80)
S3 lg	22 (3.47)
S3 rg	59 (9.40)
N r	119 (19.11)
N tz	94 (15.10)
N tw	37 (6.00)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



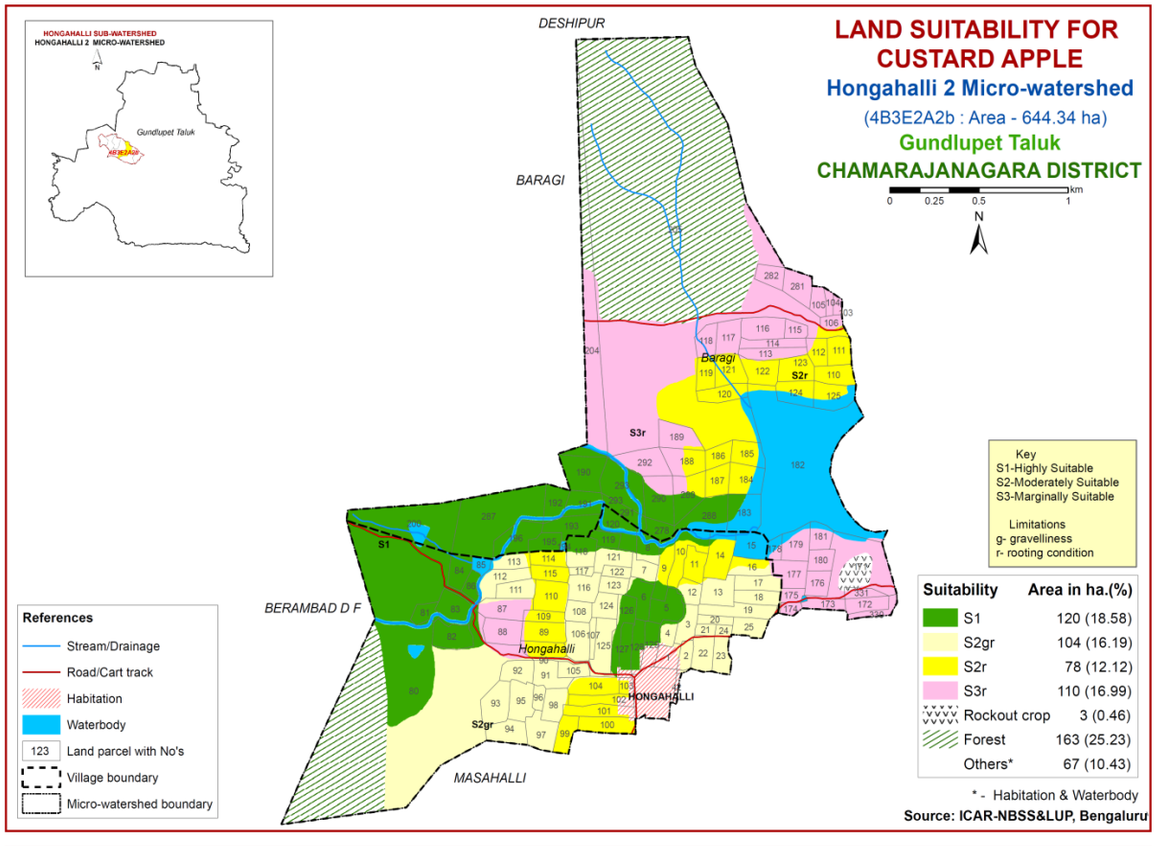
Suitability	Area in ha.(%)
S1	36 (5.52)
S2r	58 (8.96)
S2gr	77 (11.94)
S3r	78 (12.12)
S3gr	27 (4.25)
N	136 (21.09)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



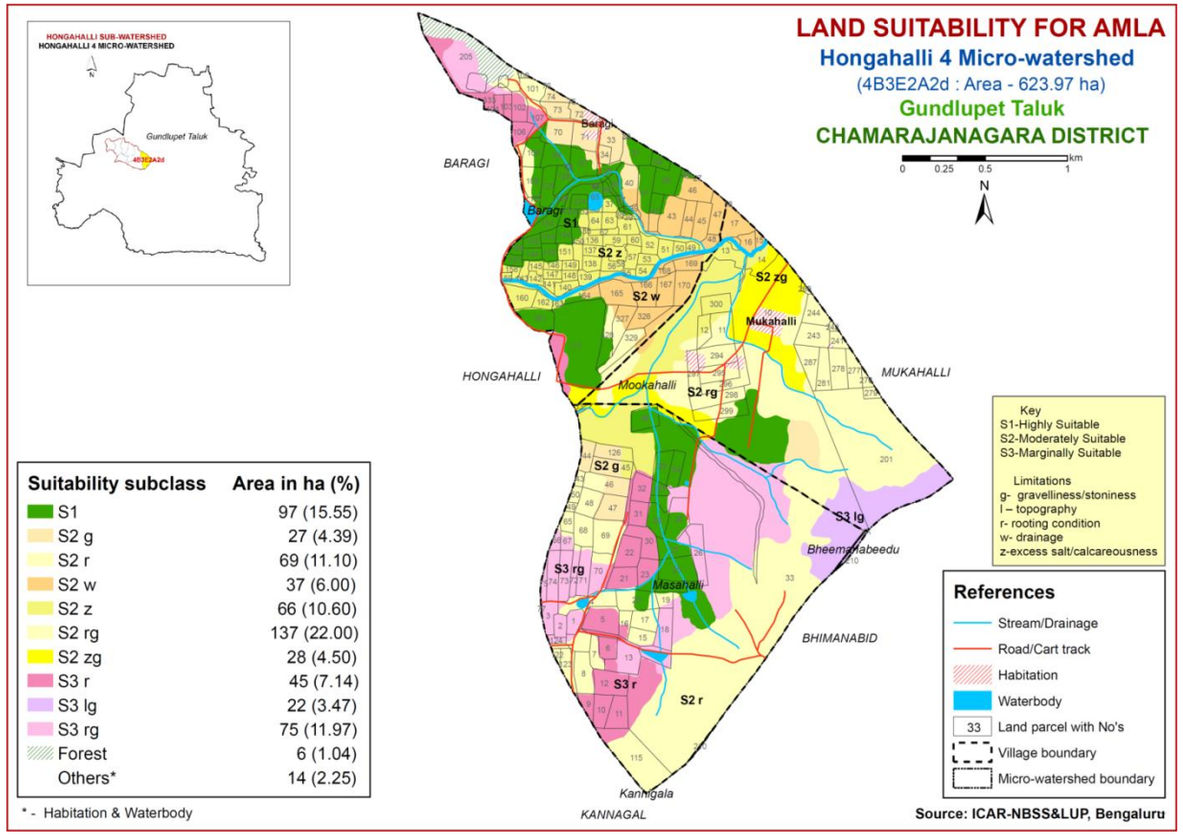
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S2 r	69 (11.10)
S2 w	37 (6.00)
S2 z	94 (15.10)
S2 rg	159 (25.47)
S3 r	45 (7.14)
S3 rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



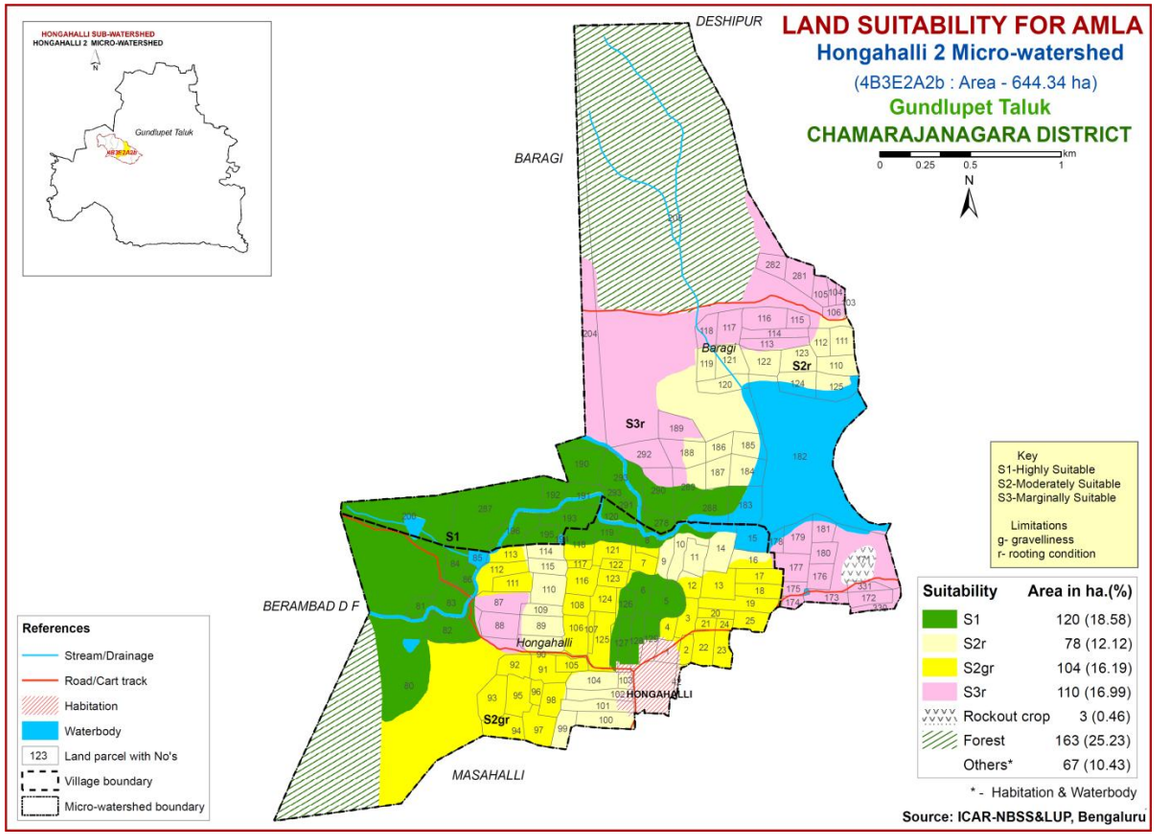
Suitability	Area in ha.(%)
S1	120 (18.58)
S2gr	104 (16.19)
S2r	78 (12.12)
S3r	110 (16.99)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



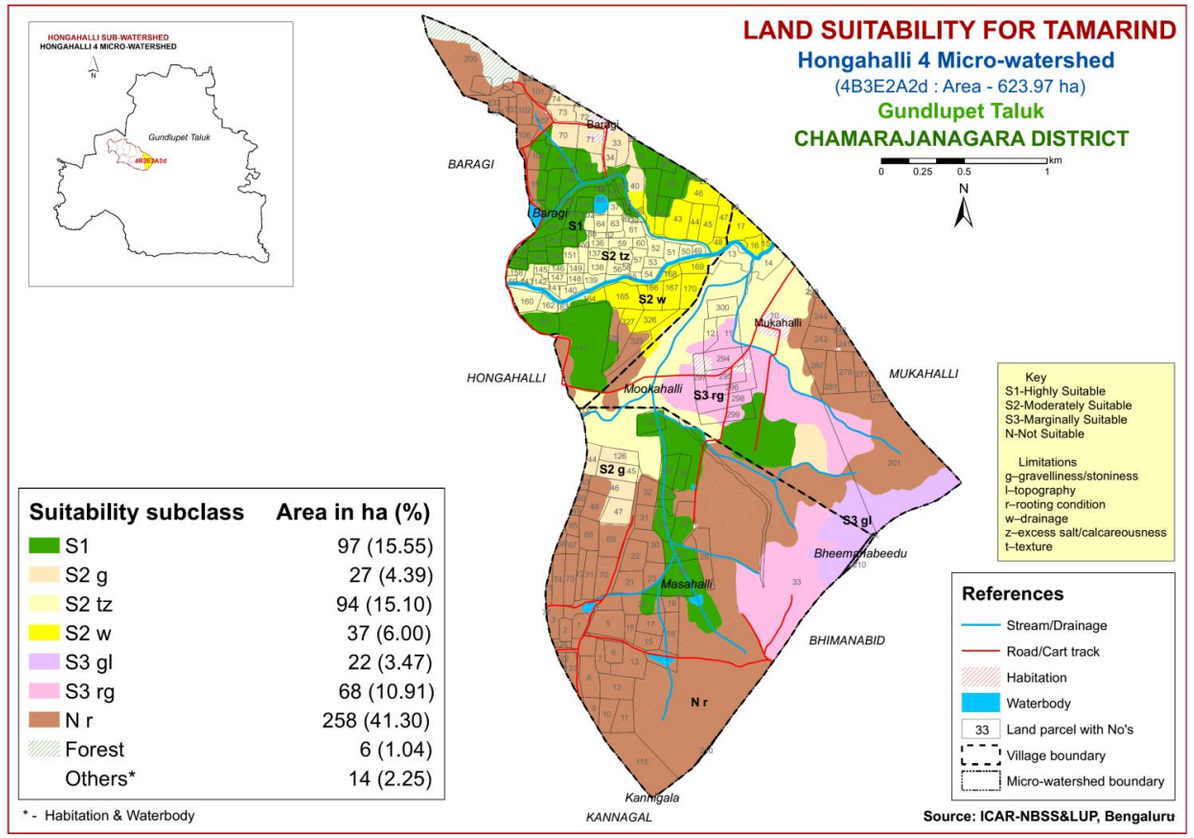
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S2 r	69 (11.10)
S2 w	37 (6.00)
S2 z	66 (10.60)
S2 rg	137 (22.00)
S2 zg	28 (4.50)
S3 r	45 (7.14)
S3 lg	22 (3.47)
S3 rg	75 (11.97)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



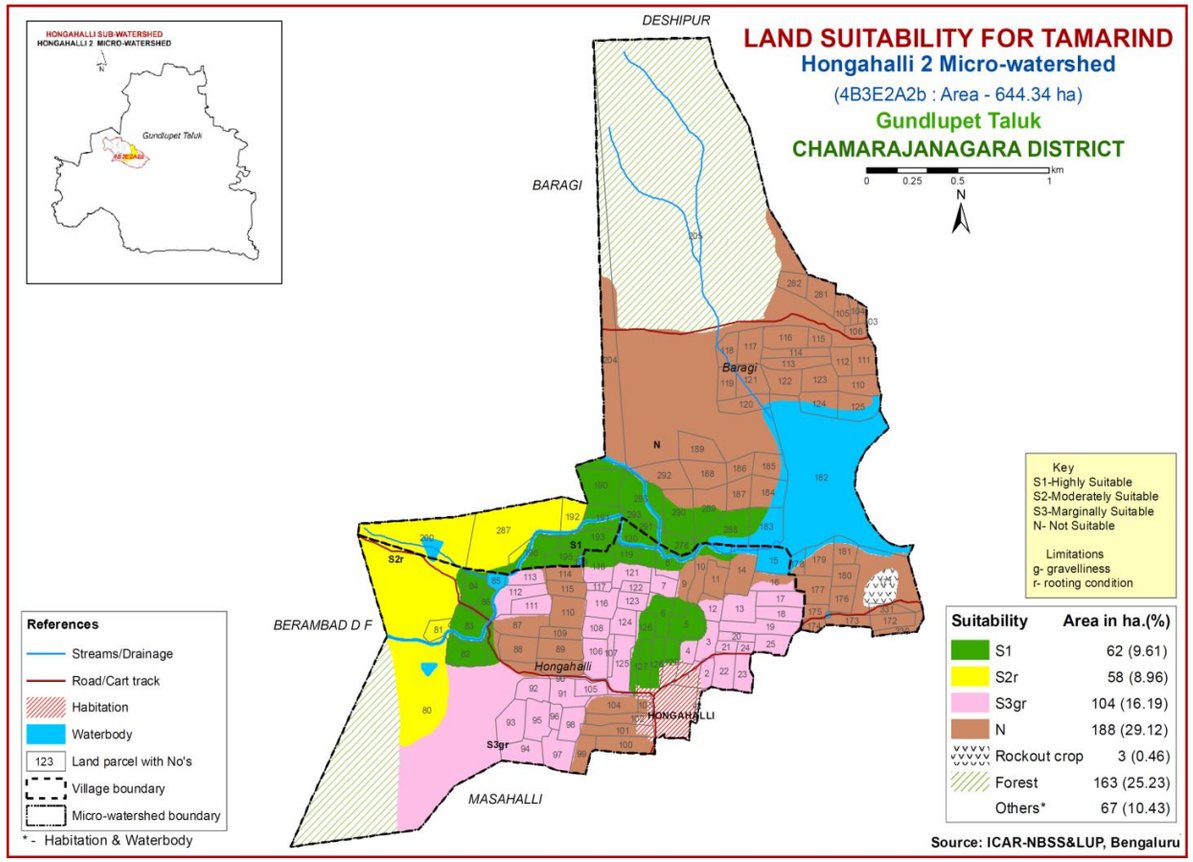
Suitability	Area in ha.(%)
S1	120 (18.58)
S2r	78 (12.12)
S2gr	104 (16.19)
S3r	110 (16.99)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



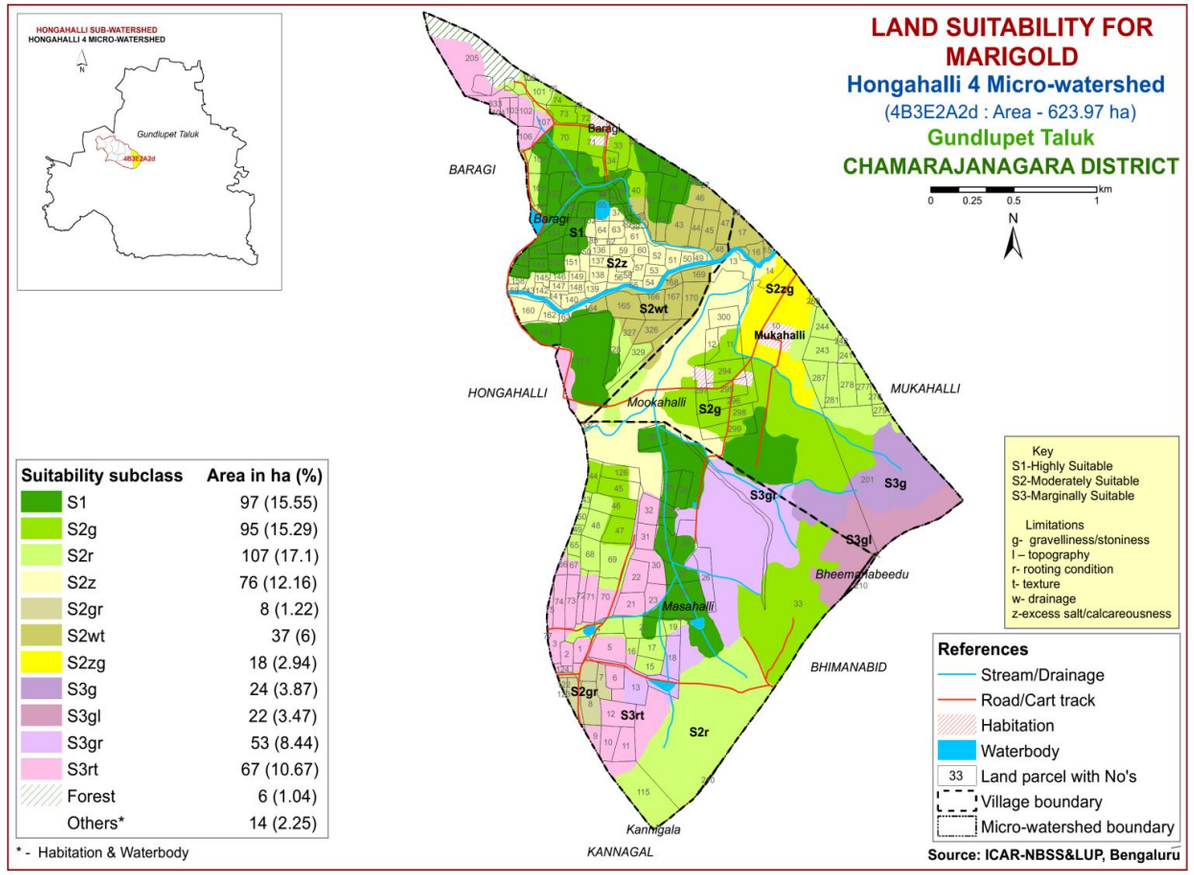
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2 g	27 (4.39)
S2 tz	94 (15.10)
S2 w	37 (6.00)
S3 gl	22 (3.47)
S3 rg	68 (10.91)
N r	258 (41.30)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



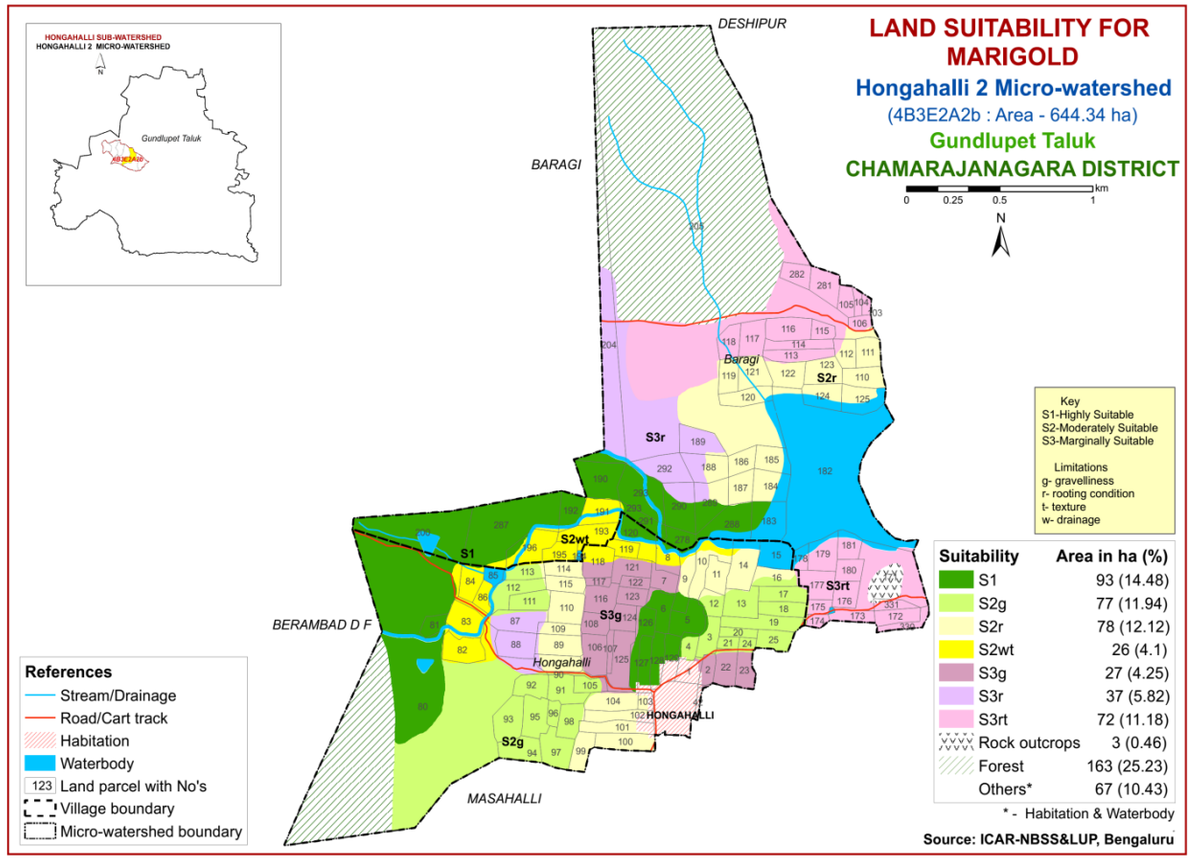
Suitability	Area in ha.(%)
S1	62 (9.61)
S2r	58 (8.96)
S3gr	104 (16.19)
N	188 (29.12)
Rockout crop	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



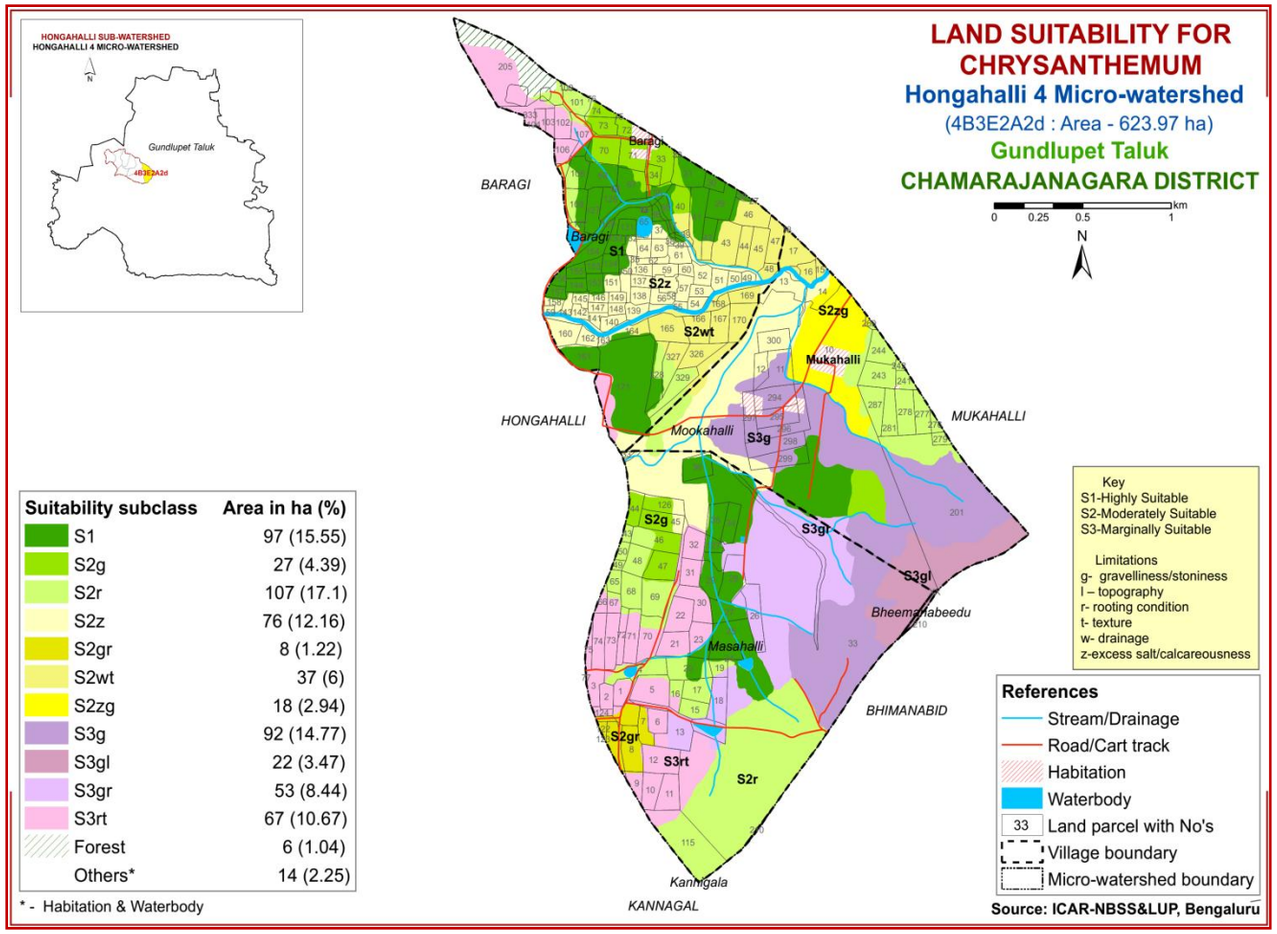
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	95 (15.29)
S2r	107 (17.1)
S2z	76 (12.16)
S2gr	8 (1.22)
S2wt	37 (6)
S2zg	18 (2.94)
S3g	24 (3.87)
S3gl	22 (3.47)
S3gr	53 (8.44)
S3rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

* - Habitation & Waterbody



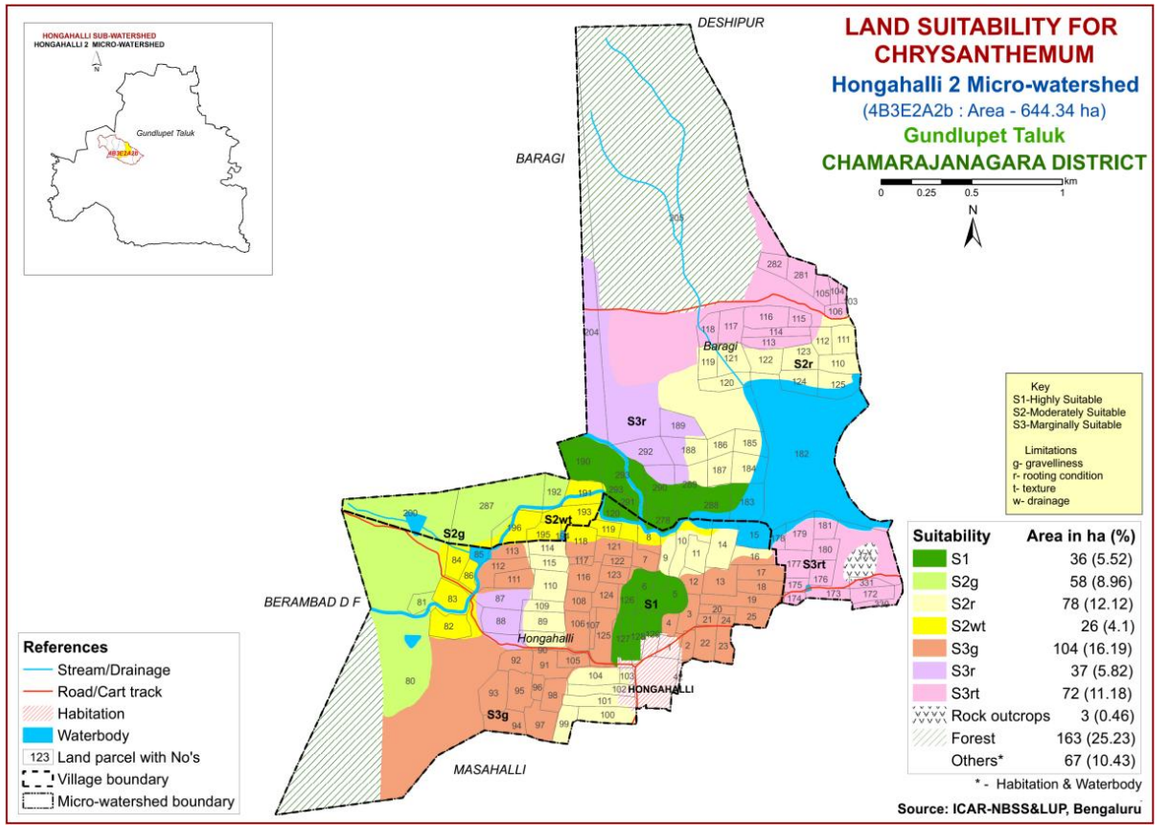
Suitability	Area in ha (%)
S1	93 (14.48)
S2g	77 (11.94)
S2r	78 (12.12)
S2wt	26 (4.1)
S3g	27 (4.25)
S3r	37 (5.82)
S3rt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody



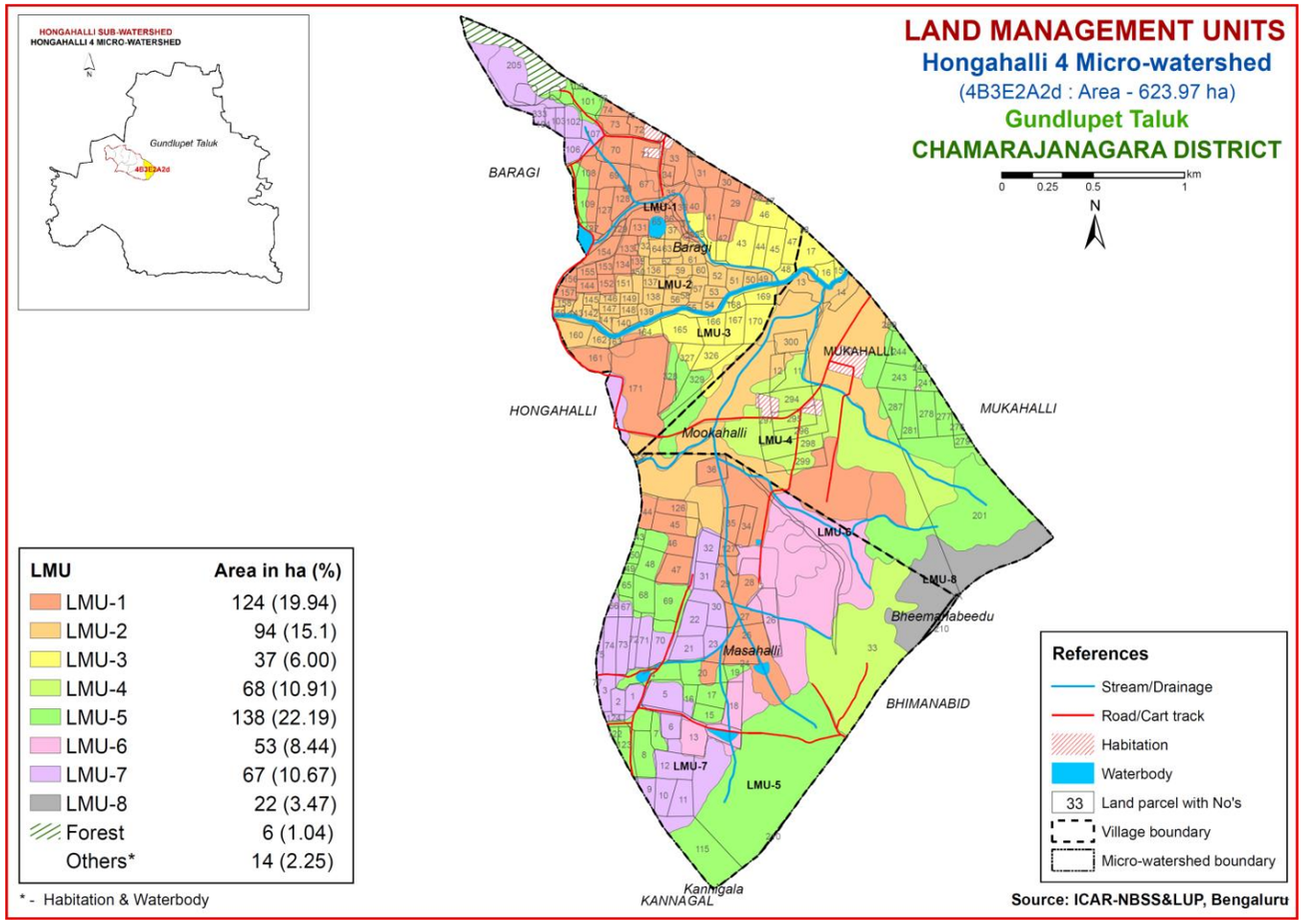
Suitability subclass	Area in ha (%)
S1	97 (15.55)
S2g	27 (4.39)
S2r	107 (17.1)
S2z	76 (12.16)
S2gr	8 (1.22)
S2wt	37 (6)
S2zg	18 (2.94)
S3g	92 (14.77)
S3gl	22 (3.47)
S3gr	53 (8.44)
S3rt	67 (10.67)
Forest	6 (1.04)
Others*	14 (2.25)

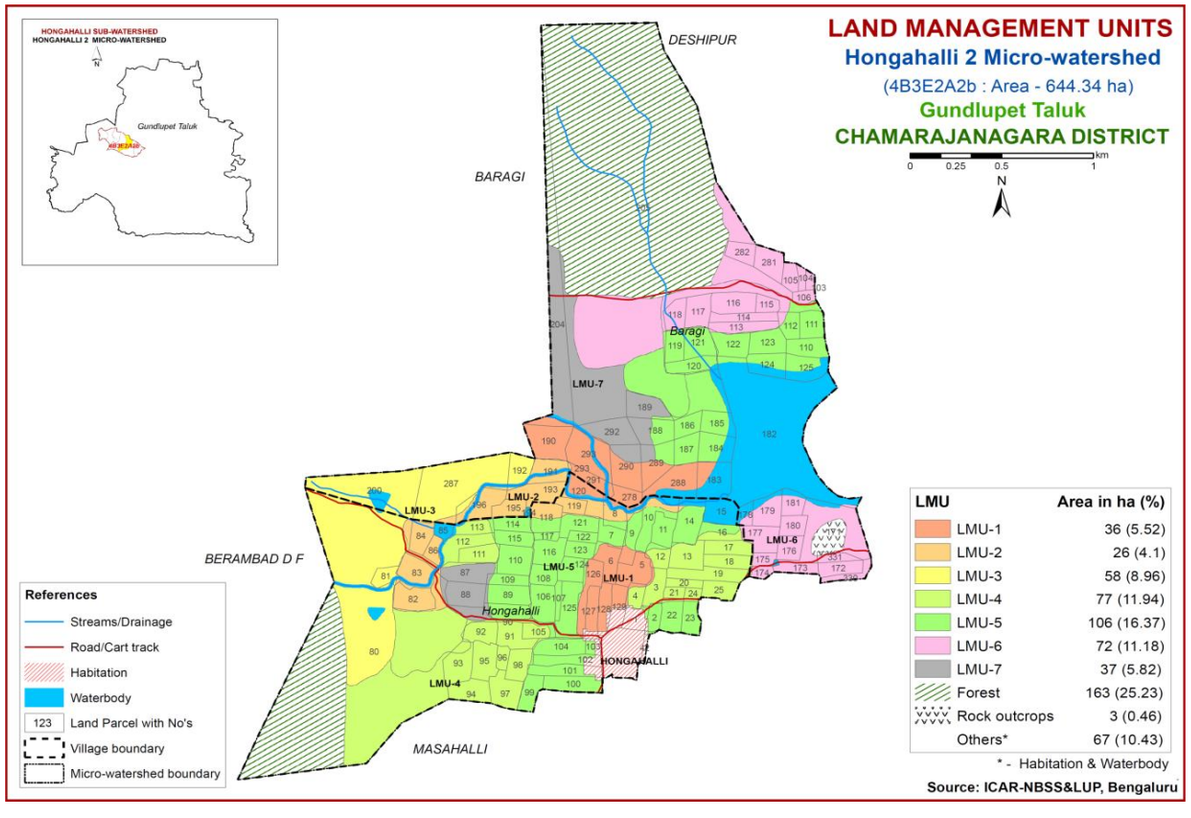
* - Habitation & Waterbody



Suitability	Area in ha (%)
S1	36 (5.52)
S2g	58 (8.96)
S2r	78 (12.12)
S2wt	26 (4.1)
S3g	104 (16.19)
S3r	37 (5.82)
S3rt	72 (11.18)
Rock outcrops	3 (0.46)
Forest	163 (25.23)
Others*	67 (10.43)

* - Habitation & Waterbody





NOTE: *Proposed Crop Plan for LMU's are given in Table*

Table3. Proposed Crop Plan for Hongahalli - 4 Micro-watershed, Hongahalli Sub-watershed Gundlupet Taluk, Chamarajanagara District based on soil-site–crop suitability Assessment

LMU NO	Mapping Units	Survey Number	Field Crops/Forestry	Suitable Horticulture Crops under Irrigation	Horticulture Crops with suitable Interventions	Suitable Interventions
LMU-1	18, 19, 20, 21, 22, 23, 24, 25, 26, 27 (>150 cm)	**Baragi:** 28,29,30,31,32,33,34,35,36, 40,41,42,65,66,67,68,69,70, 71,72,73,74,75,108,109,127, 128,129,131,133,134,135,144, 152,153,154,155,156,157,161, 171,328 **Masahalli:** 126,127,24,25,27,28,29,34, 35,36,44,45,46,47	Maize, Sorghum, Redgram, Cotton, Sugarcane, Sunflower, **Multiple crop rotation:** Redgram+Maize Redgram+Groundnut Pulses+Ragi Pulses+Sorghum	Mango, Sapota, Guava, Turmeric, Banana, Lime, Tomato, Beans, Bhendi	**Flower crops:** Marigold, Chrysanthemum **Perenial components:** Mango, Sapota, Custard apple, Amla, Lime, Moosambi. **Vegetables:** Chillies, Bhendi	Drip irrigation, Mulching, crop suitable conservation practisces
LMU-2	28, 29, 30, 31, 32 (>150 cm)	**Baragi:** 37,38,49,50,51,52,53,54,55,56, 57,58,59,60,61,62,63,64,132, 136,137,138,139,140,141,142, 143,145,146,147,148,149,150, 151,158,159,160,162,163 **Mookahalli:** 12,13,14,269,300	Sorghum, Redgram, Cotton, Sunflower, Sugarcane **Multiple crop rotation:** Redgram+Fodder sorghum Pulses+Sorghum	**Vegetables:** Beetroot, Banana, Lime, Tomato, Beans, Bhendi	**Flower crops:** Marigold, Chrysanthemum **Perenial components:** Custard apple, Amla, Lime, **Vegetables:** Chillies, Bhendi	Drip irrigation, Mulching, crop suitable conservation practices
LMU-3	33 (>150 cm)	**Baragi:** 27,39,43,44,45,46,47,48,164, 165,166,167,168,169,170,326, 327 **Mookahalli:** 15,16,17,18	-do-	-do-	-do-	-do-
LMU-4	15, 16 (75-100 cm)	**Mookahalli:** 10,11,294,295,296,297,298,29 9	Maize, Sorghum, Cotton, Ragi, Sunflower, Pulses+Sorghum	Fieldbean, Beetroot, Onion, Turmeric, Tomato	**Perenial components:** Sapota, Guava **Flower crops:** Marigold, Chrysanthemum **Vegetables:** Bhendi, Chillies	Drip irrigation, Mulching, Crop suitable conservation practices

To be continued….

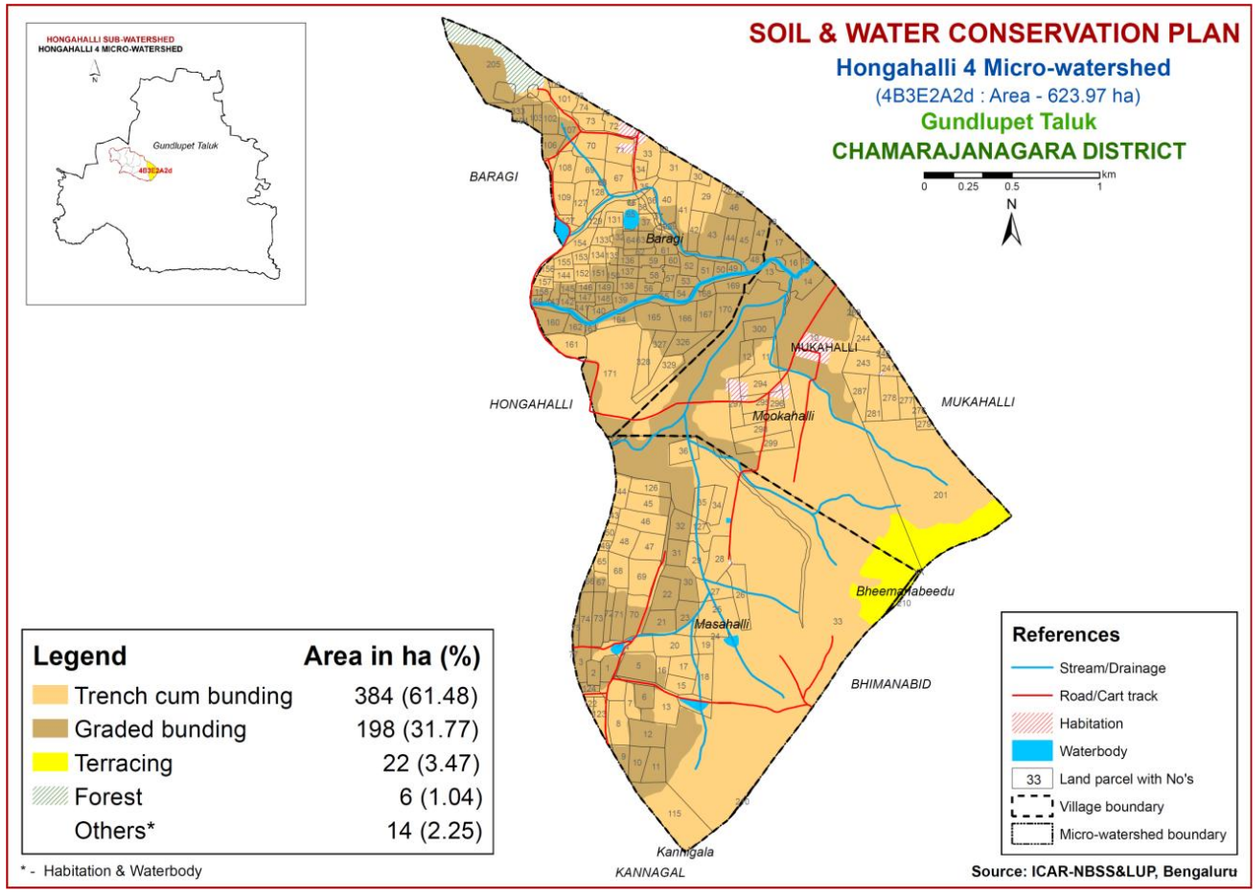
LMU No	Mapping Units	Survey Number	Field Crops/Forestry	Suitable Horticulture Crops under Irrigation	Horticulture Crops with suitable Interventions	Suitable Interventions
LMU-5	9, 10, 11, 12, 13, 14 (50-75 cm)	**Baragi:** 100,101,329,76 **Kannigala:** 333 **Masahalli:** 4,7,8,15,16,17,19,20,33,43,48,49, 50,65,68,69,115,122,123 **Mookahalli:** 201,241,242,243,244,276,277, 278,279,281,287	Ragi, Groundnut, Maize, Sorghum, Cotton, Pulses+Sorghum	Fieldbean, Beetroot, Onion, Turmeric, Tomato, Banana	Custard apple, Ber, Aonla **Flower crops:** Marigold, Chrysanthemum, Gillardia **Vegetables:** Bhendi, Clusterbean	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-6	1, 2, 3, 4 (25-50cm)	**Masahalli**: 13,14_TANK,18,26	Groundnut, Horsegram	Custard apple, Amla	Custard apple, Ber	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-7	5, 6, 7, 8 (25-50 cm)	**Baragi:** 102,103,104,106,107,333 **Masahalli:** 1,3,9,10,11,12,16,2,21,22,23,30, 31,32,5,6,66,67,70,71,72,73,74, 75,77, 124,	Bengal gram, Horsegram	Custard apple, Amla	Custard apple, Ber	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-8	17 (100- 150 cm)	**Bheemanabeedu:** 210	**Silviculture:** Acasia auriculiformis, Glycirdia, Simaruba, Agave, Cassia **Grasses**: Styloxanthes hamata, Styloxanthes scabra, Styloxanthus hamata, Khus grass	Custard apple, Amla	Custard apple, Ber	Drip irrigation, Mulching, Crop suitable conservation practices

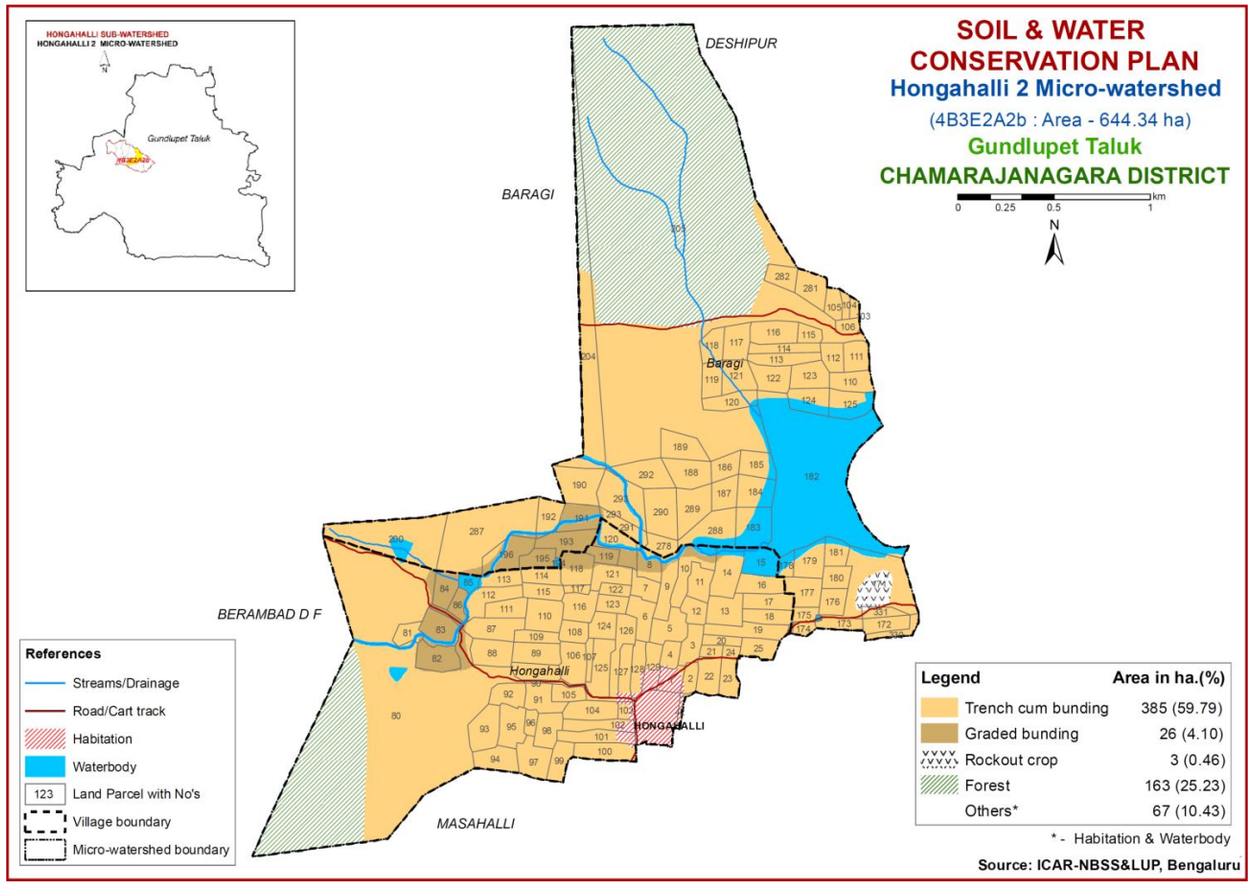
Table4. Proposed Crop Plan for Hongahalli-2 Micro-watershed, Hongahalli Sub-watershed Gundlupet Taluk, Chamarajanagara District based on soil-site–crop suitability Assessment

LMU No	Mapping Units	Survey Number	Field Crops/Forestry	Suitable Horticulture Crops under Irrigation	Horticulture Crops with suitable Interventions	Suitable Interventions
LMU-1	1, 9 (>150 cm)	**Baragi:** 190,278,288,289,290,291, 293 **Hongahalli:** 5,6,120,126,127,128,129	Maize, Sorghum, Redgram, Cotton, Sugarcane, Sunflower, **Multiple crop rotation:** Redgram+Maize Redgram+Groundnut Pulses+Ragi Pulses+Sorghum	Mango, Sapota, Guava, Turmeric, Banana, Lime, Tomato, Beans, Bhendi	**Flower crops:** Marigold, Chrysanthemum **Perenial components:** Mango, Sapota, Custard apple, Amla, Lime, Moosambi. **Vegetables:** Chillies, Bhendi	Drip irrigation, Mulching, crop suitable conservation practices
LMU-2	2 (>150 cm)	**Baragi:** 191,193,195,196 **Hongahalli:** 8,82,83,84,86,118,119	Sorghum, Redgram, Cotton, Sunflower, Sugarcane **Multiple crop rotation:** Redgram+Fodder sorghum Pulses+Sorghum	**Vegetables:** Beetroot, Banana, Lime, Tomato, Beans, Bhendi	**Flower crops:** Marigold, Chrysanthemum **Perenial components:** Custard apple, Amla, Lime, **Vegetables:** Chillies, Bhendi	Drip irrigation, Mulching, crop suitable conservation practices
LMU-3	14 (100-150 cm)	**Baragi:** 192,200,287 **Hongahalli:** 81	Maize, Sorghum, Redgram, Cotton, Sugarcane, Sunflower **Multiple crop rotation:** Redgram+Maize Redgram+Groundnut Pulses+Sorghum	**Vegetables:** Tomato, Beetroot, Potato, Beans, Bhendi, Turmeric	**Perenial components:** Sapota, lime **Flower crops:** Marigold,Chrysanthemum **Vegetables:** Chillies, Bhendi	Drip irrigation, Mulching, Crop suitable conservation practices

To be continued….

LMU No	Mapping Units	Survey Number	Field Crops/Forestry	Suitable Horticulture Crops under Irrigation	Horticulture Crops with suitable Interventions	Suitable Interventions
LMU-4	15, 16, 17, 18 (75-100 cm)	**Hongahalli:** 3,4,12,13,17,18,19,20,21,24,25,91, 92,93,94,95,96,97,98,105,111,112, 113	Maize, Sorghum, Cotton, Ragi, Sunflower, Pulses+Sorghum	Fieldbean, Beetroot, Onion, Turmeric, Tomato	**Perenial components:** Sapota, Guava **Flower crops:** Marigold, Chrysanthemum **Vegetables:** Bhendi, Chillies	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-5	6, 10, 11, 12, 13, 19, 20 (50-75 cm)	**Baragi:** 110,111,112,119,120,121,122,123, 124,184,185,186,187,188 **Hongahalli:** 2,7,10,14,16,22,23, 89,9,90,99, 100,101,102,103,104,106,107,108, 109,11,110,114, 115,116,117, 121,122,123,124,125	Ragi, Groundnut, Maize, Sorghum, Cotton, Pulses+Sorghum	Fieldbean, Beetroot, Onion, Turmeric, Tomato, Banana	Custard apple, Ber, Aonla **Flower crops:** Marigold, Chrysanthemum, Gillardia **Vegetables:** Bhendi, Clusterbean	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-6	3, 4, 5 (25-50 cm)	**Baragi:** 103,104,105,106,113,114,115,116, 117,118,171,172,173,174,175,176, 177,179, 180,181,281,282,330,331	Bengal gram, Horsegram	Custard apple, Amla	Custard apple, Ber	Drip irrigation, Mulching, Crop suitable conservation practices
LMU-7	7, 8 (25-50 cm)	**Baragi:** 189,204,292 **Hongahalli:** 87,88	Groundnut, Horsegram	Custard apple, Amla	Custard apple, Ber	Dripirrigation, Mulching, Crop suitable conservation practices


SOIL & WATER CONSERVATION PLAN
Hongahalli 4 Micro-watershed
(4B3E2A2d : Area - 623.97 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 4 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2d
0 0.25 0.5 1 km
N
BARAGI
Baragi
HONGAHALLI
MUKAHALLI
Mookahalli
Bheemanabeedu
Masahalli
BHIMANABID
Kannigala
KANNAGAL
Legend
Area in ha (%)
Trench cum bunding 384 (61.48)
Graded bunding 198 (31.77)
Terracing 22 (3.47)
Forest 6 (1.04)
Others* 14 (2.25)
* - Habitation & Waterbody
References
Stream/Drainage
Road/Cart track
Habitation
Waterbody
33 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


SOIL & WATER CONSERVATION PLAN
Hongahalli 2 Micro-watershed
(4B3E2A2b : Area - 644.34 ha)
Gundlupet Taluk
CHAMARAJANAGARA DISTRICT
HONGAHALLI SUB-WATERSHED
HONGAHALLI 2 MICRO-WATERSHED
Gundlupet Taluk
4B3E2A2b
0 0.25 0.5 1 km
N
DESHIPUR
BARAGI
Baragi
BERAMBAD D F
Hongahalli
HONGAHALLI
MASAHALLI
References
Streams/Drainage
Road/Cart track
Habitation
Waterbody
123 Land Parcel with No's
Village boundary
Micro-watershed boundary
Legend
Area in ha.(%)
Trench cum bunding 385 (59.79)
Graded bunding 26 (4.10)
Rockout crop 3 (0.46)
Forest 163 (25.23)
Others* 67 (10.43)
* - Habitation & Waterbody
Source: ICAR-NBSS&LUP, Bengaluru

PART - B

Hydrological Inventory of Hongahalli Sub-watershed, Gundlupet Taluk, Chamarajanagara 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 Hongahalli Sub-watershed, Gundlupet Taluk, Chamarajanagar 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

Phone:080-23412242 **E-mail:nbssrcb@gmail.com**

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

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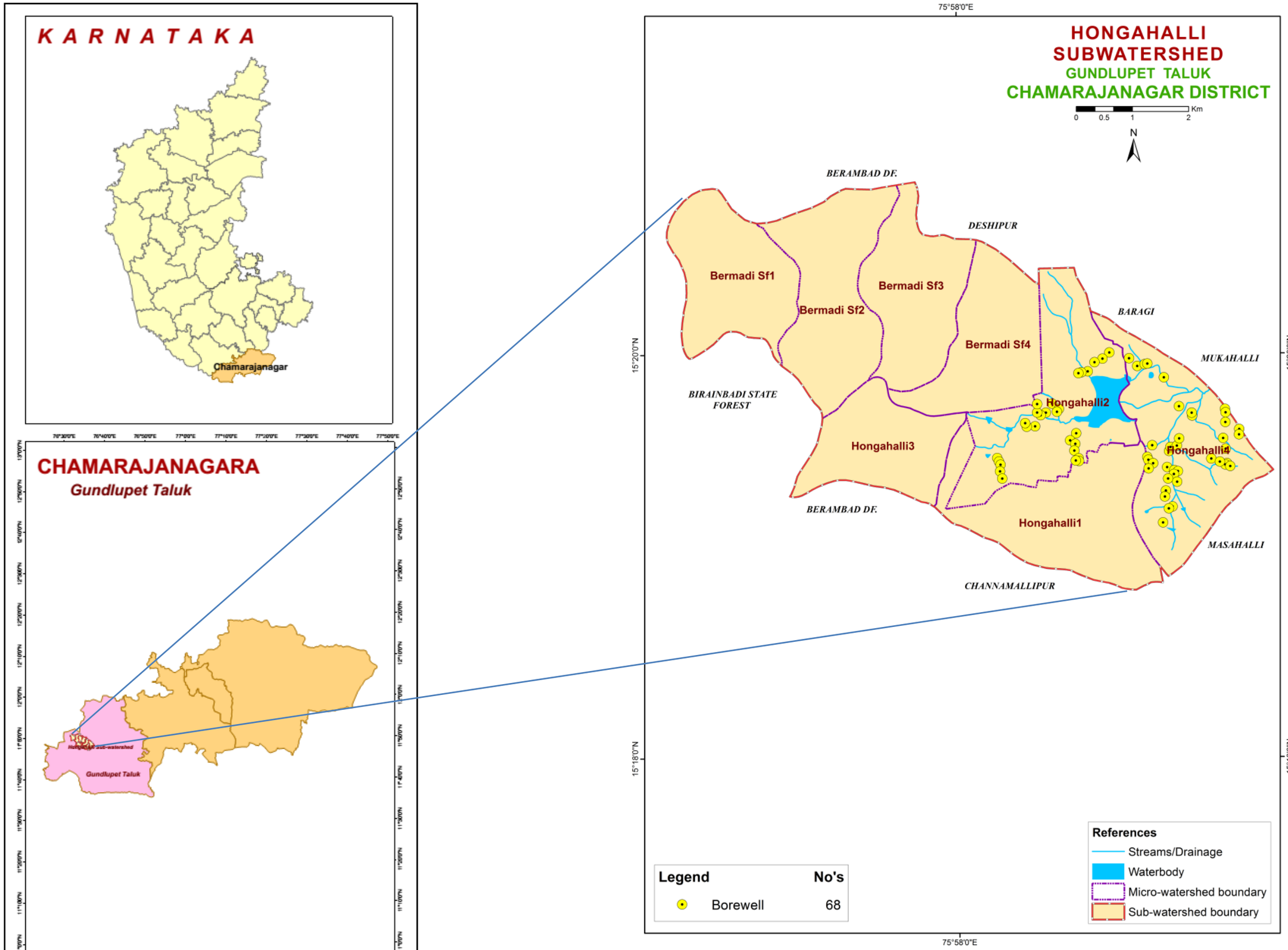
Dr. S. Srinivas	Principal Scientist
Dr. K .V. Niranjana	Chief Technical Officer
Sh. R.S.Reddy	Consultant
Sh. A.G.Devendra Prasad	Consultant
Smt. K.Karunya Lakshmi	Research Associate
Ms. Seema, K.V.	Senior Research Fellow
Dr. Sekhar Muddu (Reviewed and approved)	Professor & Lead Scientist, Dept. of Civil Engineering & ICWaR, IISc, Bangalore
	Email: hd_rcb.nbsslup@icar.gov.in nbssrcb@gmail.com **Phone: Office:** 080-23412242,23410993 **Fax:** 080-23510350

INTRODUCTION

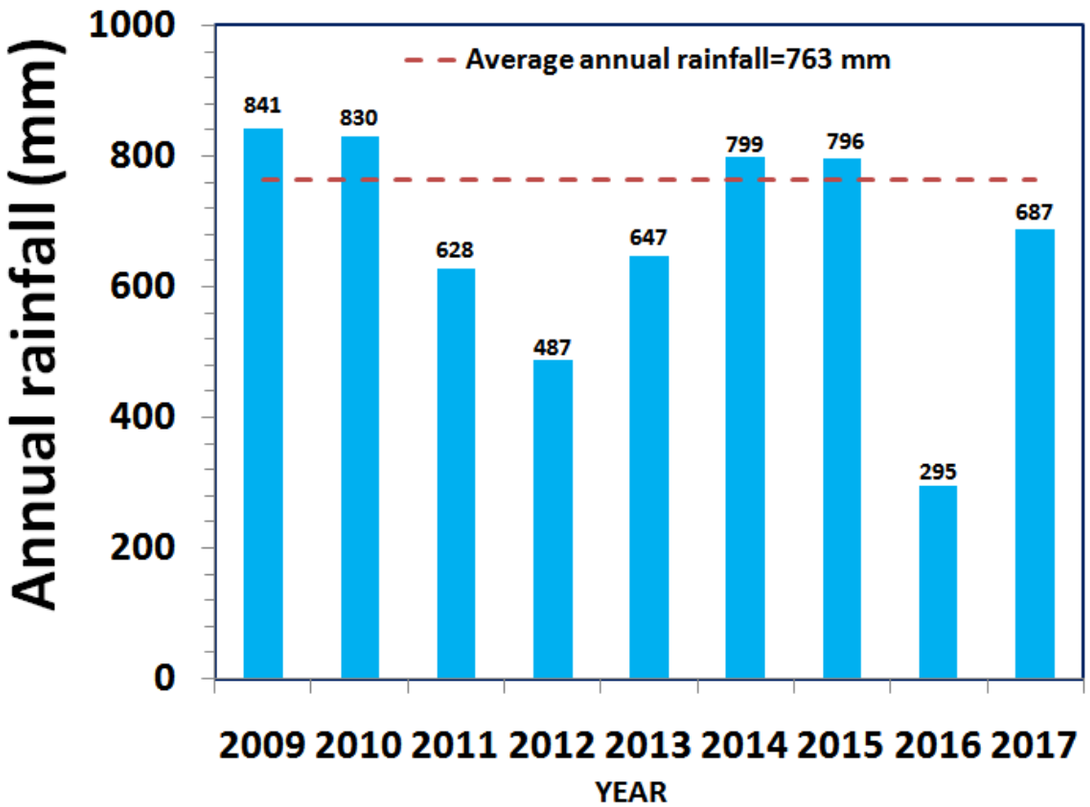
- The inventory and documentation of spatial and temporal changes in hydrological components of Hongahalli sub-watershed (4B3E2A) in Gundlupet Taluk, Tumkur District, has been undertaken for integrated planning, development and management.
- Hongahalli sub-watershed (Gundlupet Taluk, Chamarajanagar District) is located between $11^0$47' 10''–$11^0$51' 4'' North latitudes and 76^0 31'0.1''- 76^0 36'57'' East longitudes, covering an area of about 4180 ha.
- This sub-watershed encompasses of 8 MWs namely Berambadi Sf-1 (4B3E2A1a), Berambadi Sf-2 (4B3E2A1b), Berambadi Sf-3 (4B3E2A1c), Berambadi Sf-4 (4B3E2A1d), Hongahalli-1 (4B3E2A2c), Hongahalli-2 (4B3E2A2b), Hongahalli-3 (4B3E2A2a) and Hongahalli-4 (4B3E2A2d). Land Resource Inventory (LRI) was generated for two among eight micro-watersheds.
- Average annual rainfall (1960-2014) of the Hobli (Block) pertaining to the sub-watershed is 763 mm.
- In this sub-watershed major *kharif* crops are Maize, Groundnut, Redgram , Cotton , Sunflower, Onion, Marigold and major *rabi* crops are Sorghum.
- 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 HONGAHALLI SUB-WATERSHED



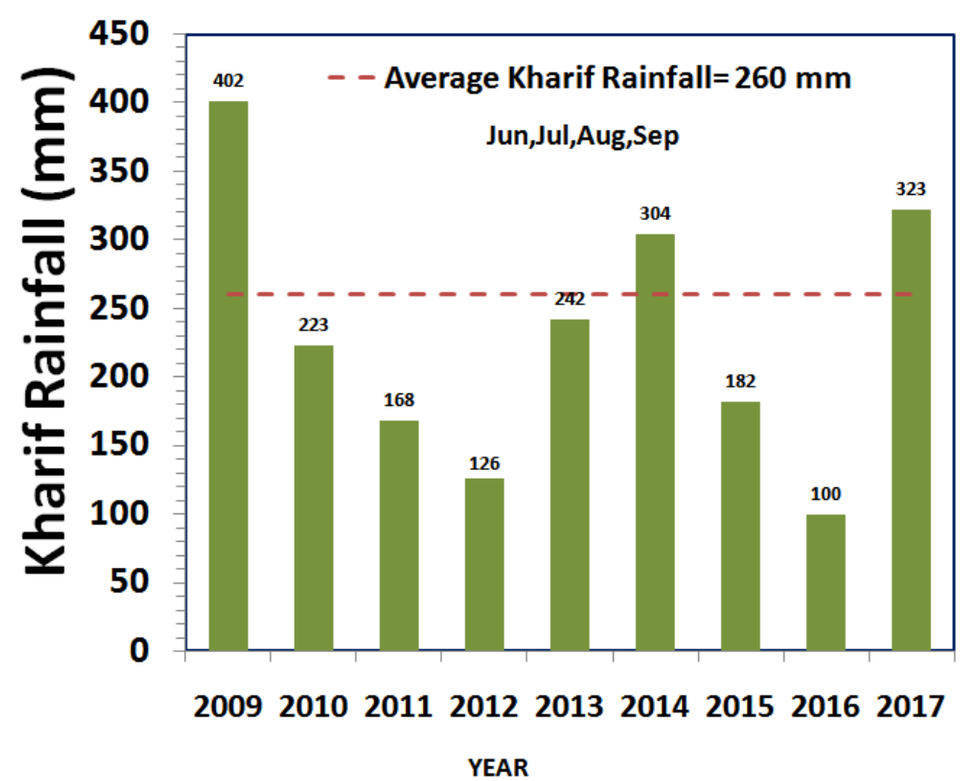
Soil & Water Conservation Structures in Hongahalli Sub-watershed, Gundlupet Taluk, Chamarajanagar District

RAINFALL INDEX

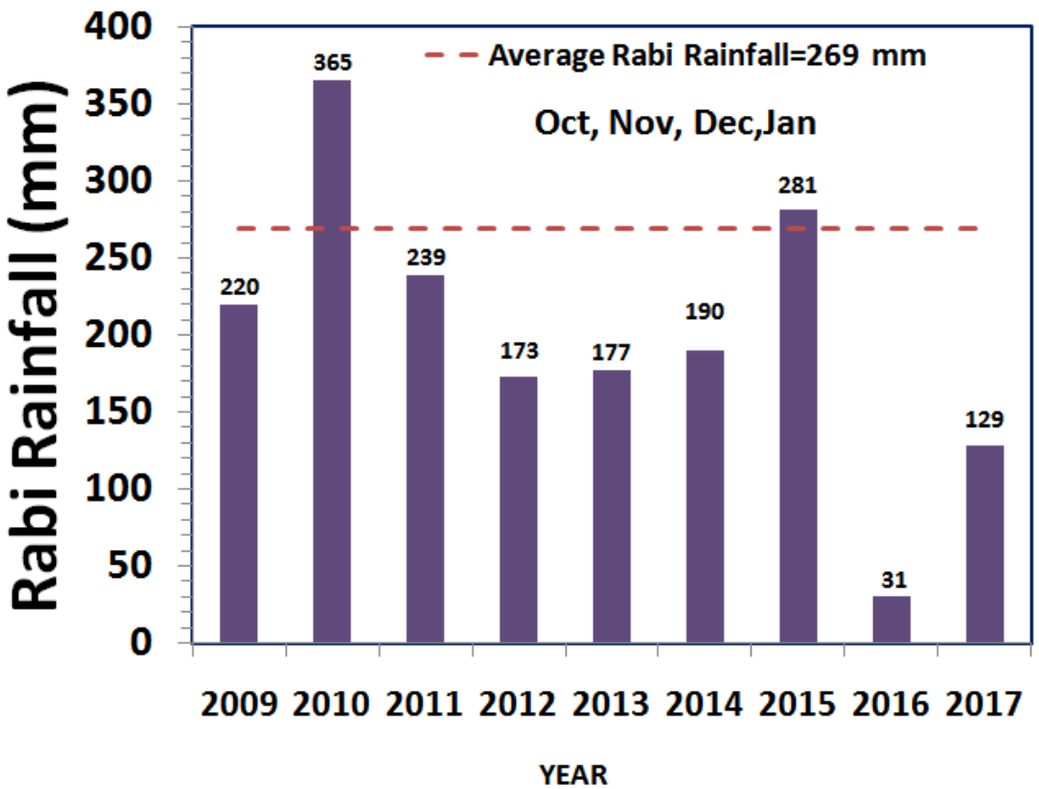


The average annual rainfall (1960-2014) recorded at the Gundlupet station in Gundlupet taluk of Chamarajanagar district is 763 mm. The annual rainfall at Gundlupet station (Hobli H.Q.) is presented. During the years 2011, 2012, 2013, 2016 and 2017 the annual rainfall was deficient by 18%, 36%, 15%, 61% and 10% respectively.

The *kharif* rainfall (Jun–Sep) is an average about 31% of the annual rainfall and it typically follows the annual rainfall patterns.

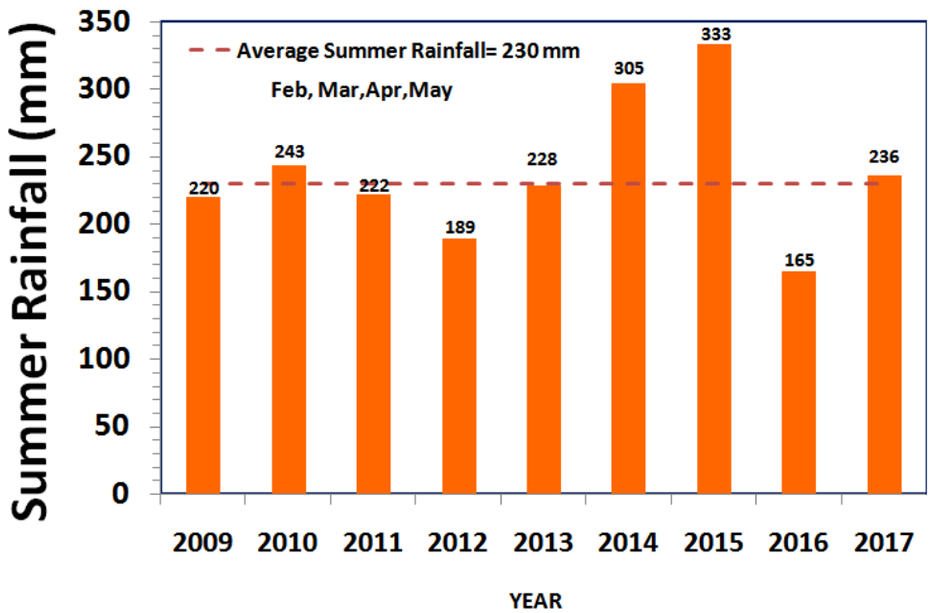


RAINFALL INDEX

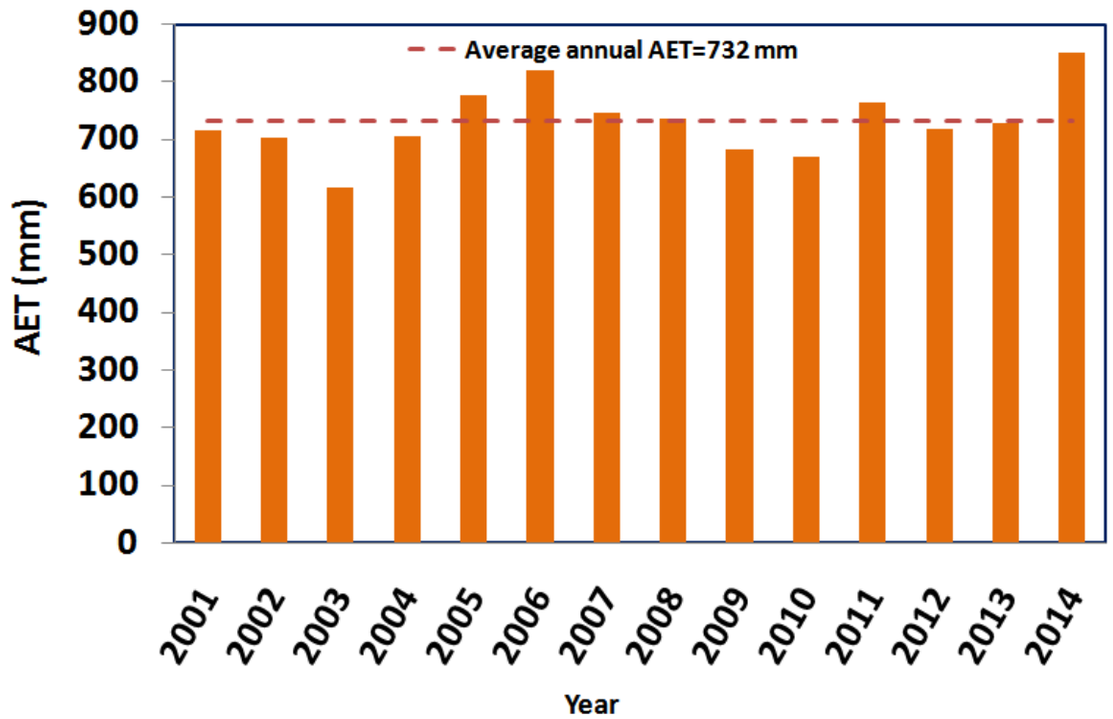


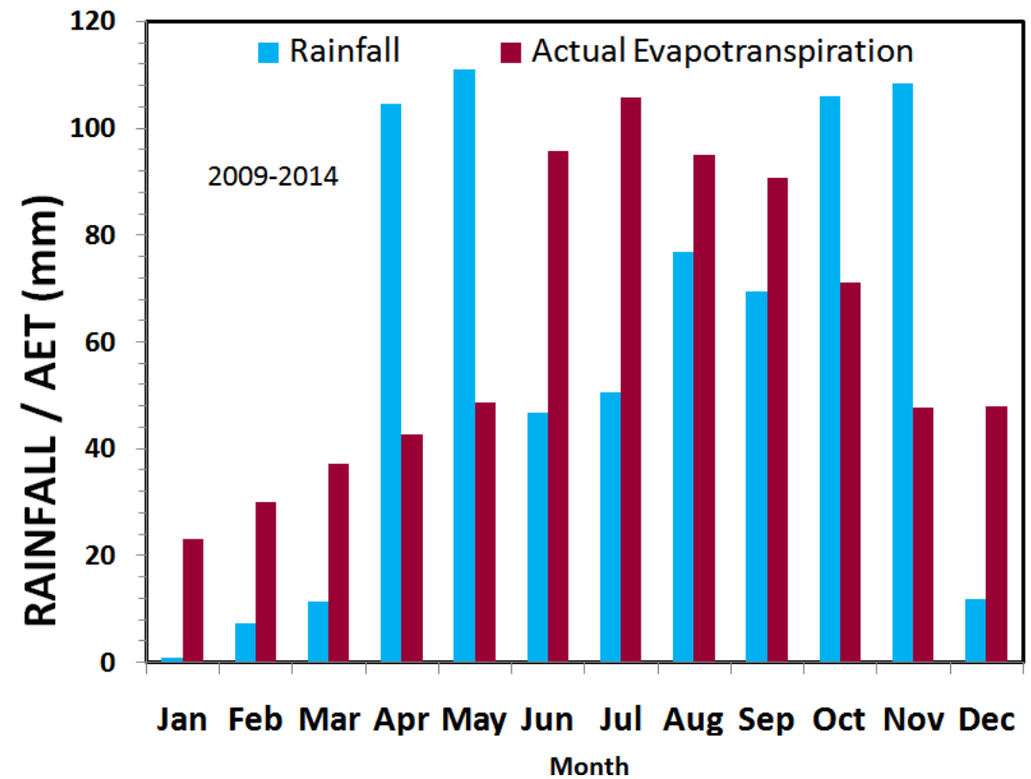
The average *rabi* rainfall (Oct-Jan) is about 26% of the Average annual rainfall. During the years 2010 and 2015 high *rabi* rainfall was received, where as other years showed deficient rainfall.

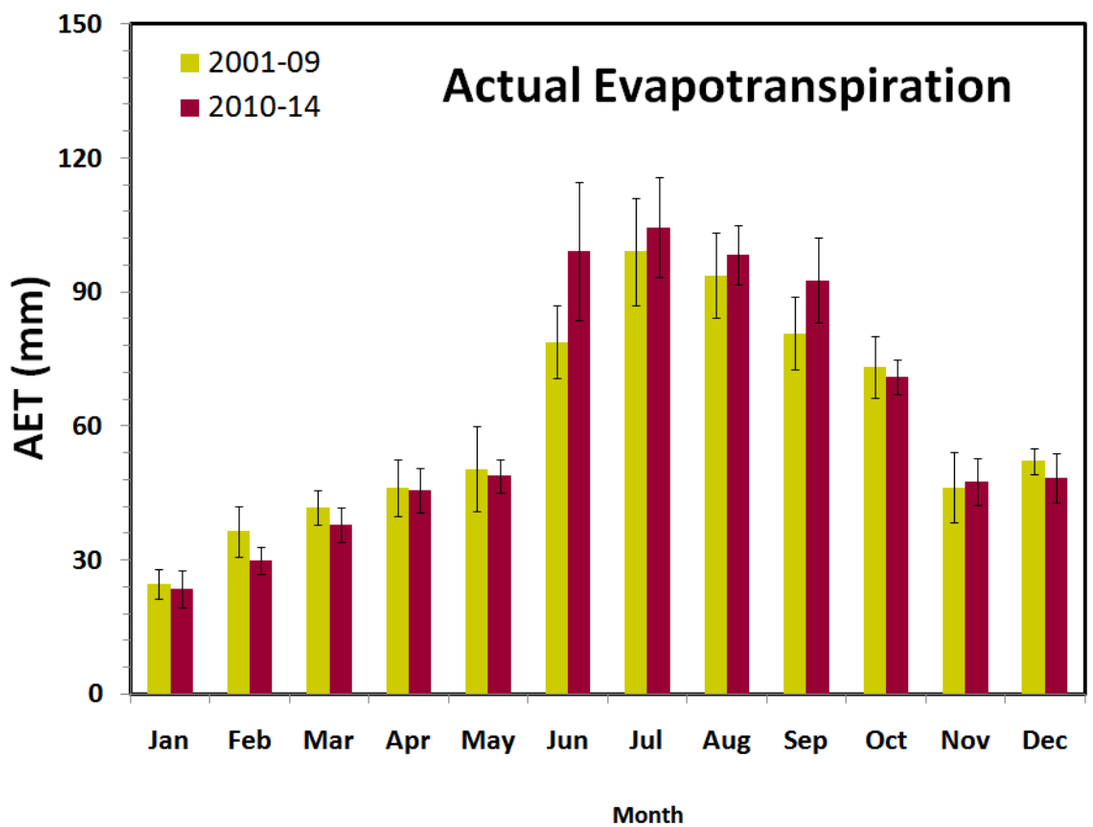
The average summer rainfall (Feb-May) is about 32% of the average annual rainfall.



EVAPOTRANSPIRATION

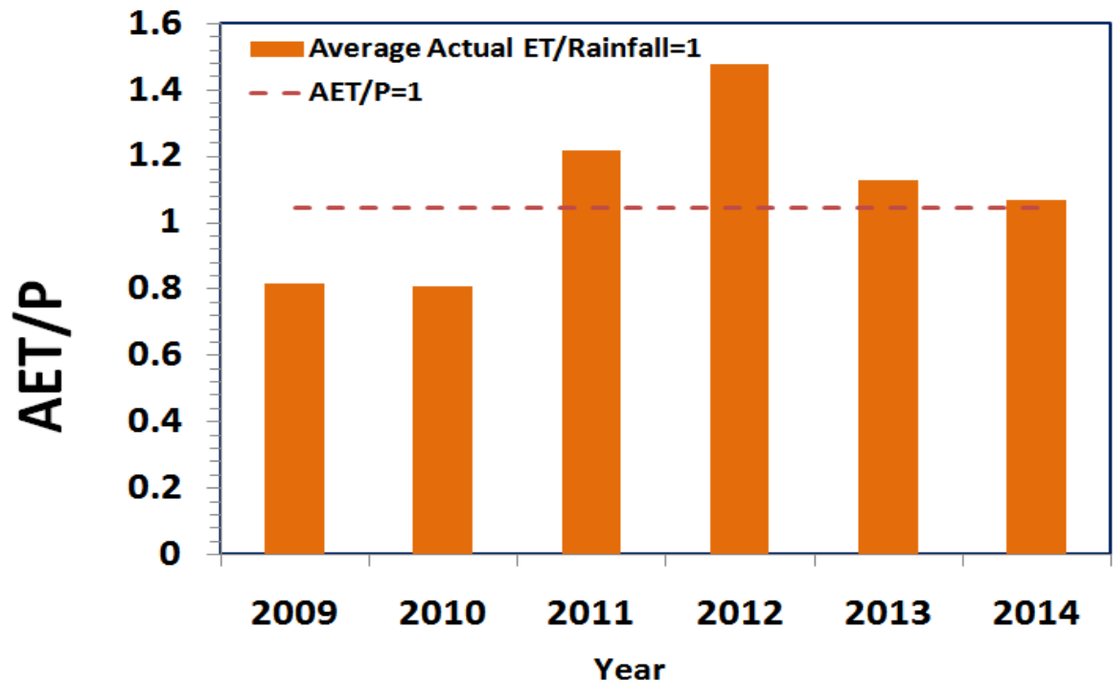


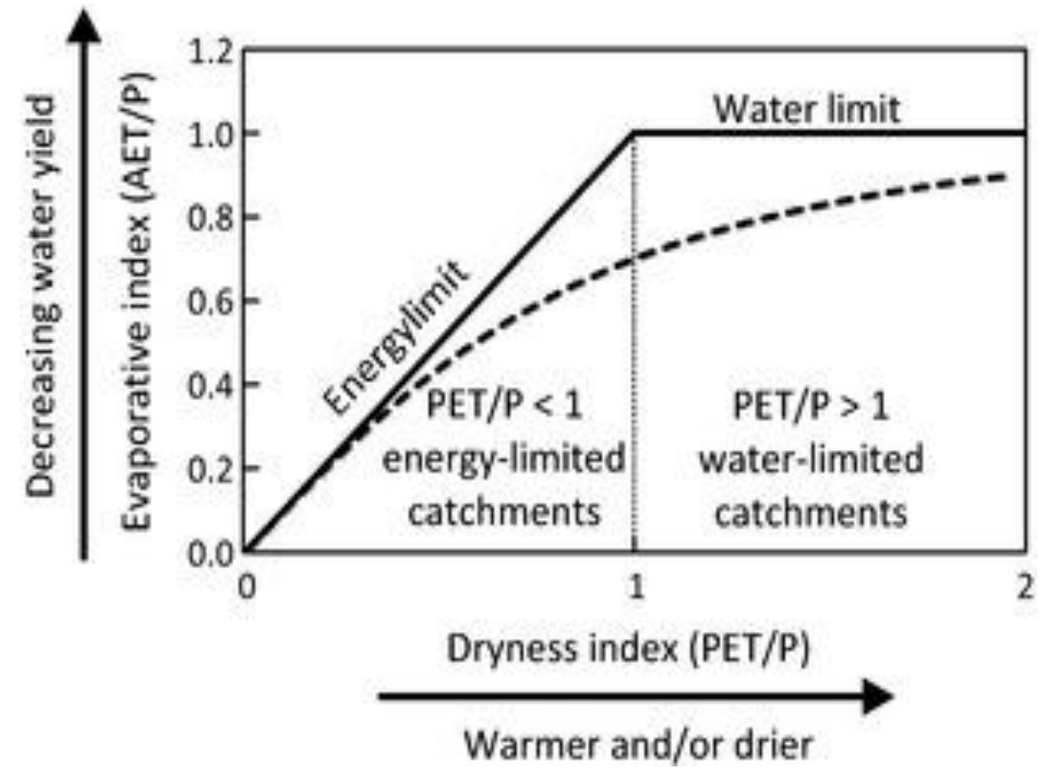




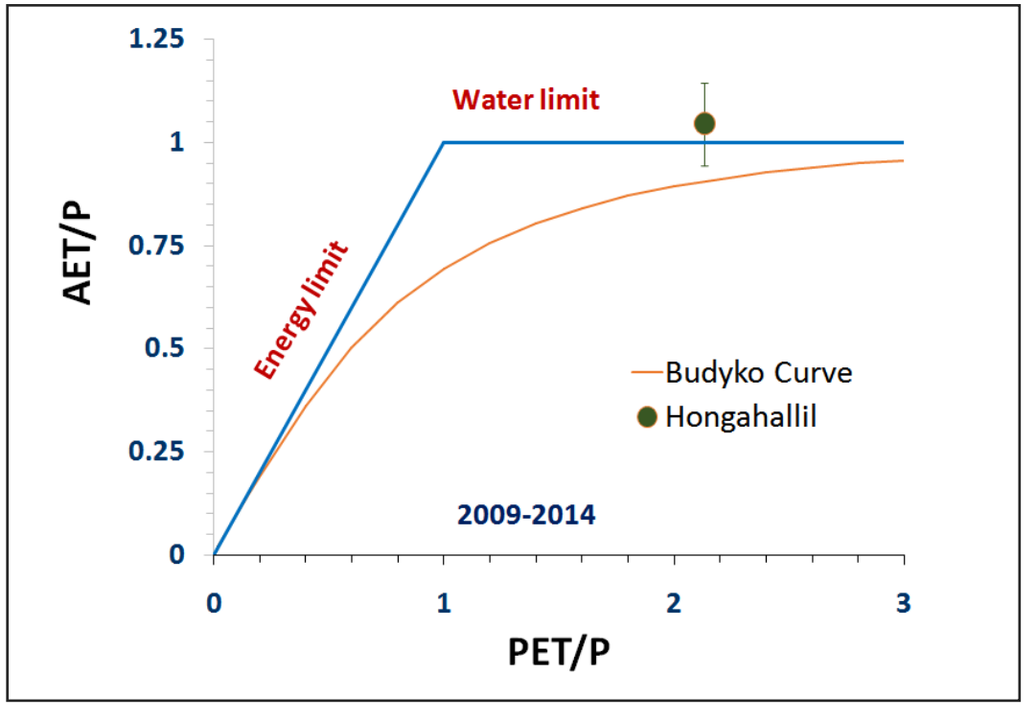
The average annual actual ET is lower than the average rainfall. During *kharif*, average rainfall and AET was found to be 260 mm and 387 mm respectively, whereas in *rabi* it was about 269 mm and 190 mm. The annual ET increased by 3% during 2010-2014 compared to 2001-2009 .

EVAPOTRANSPIRATION INDEX

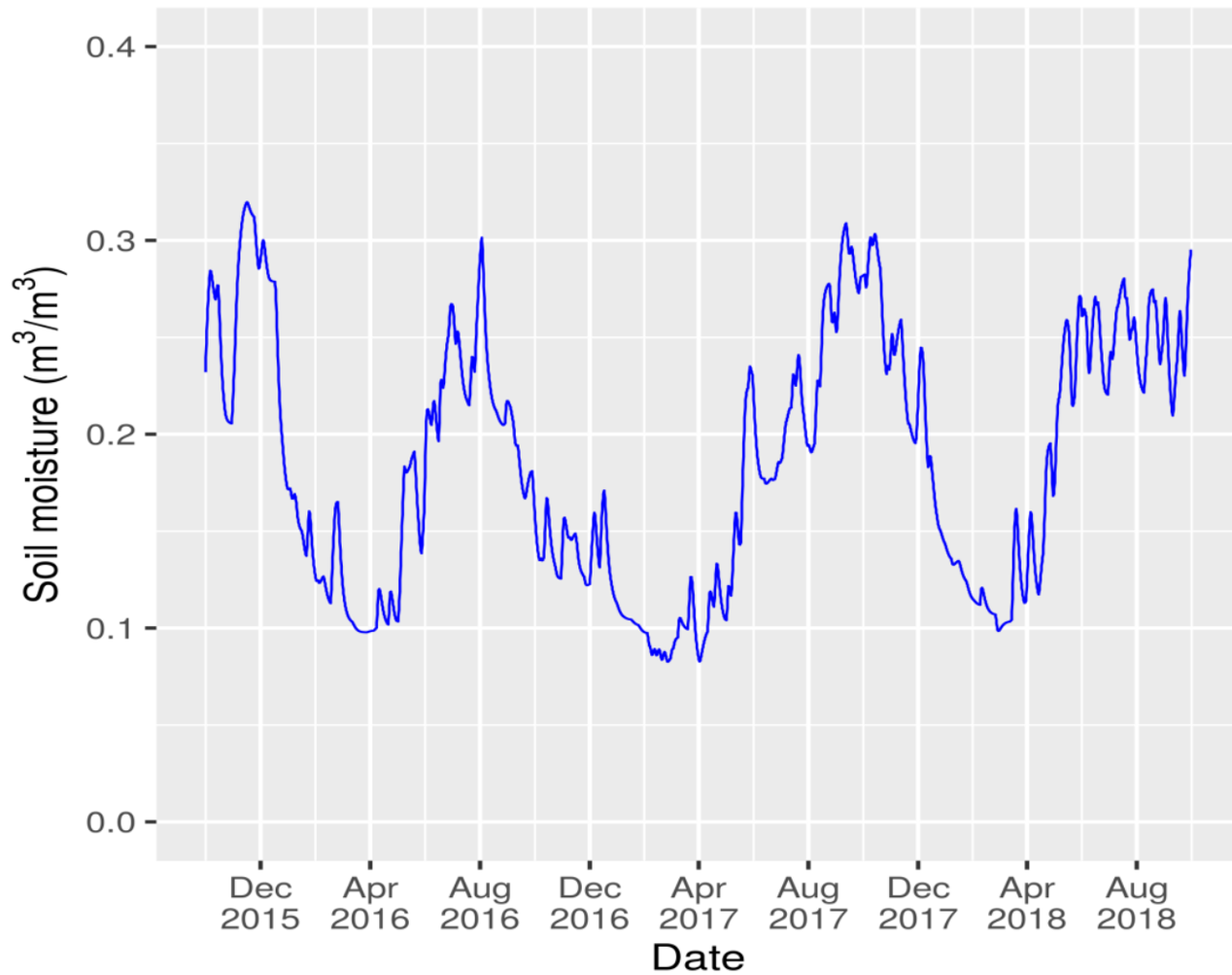




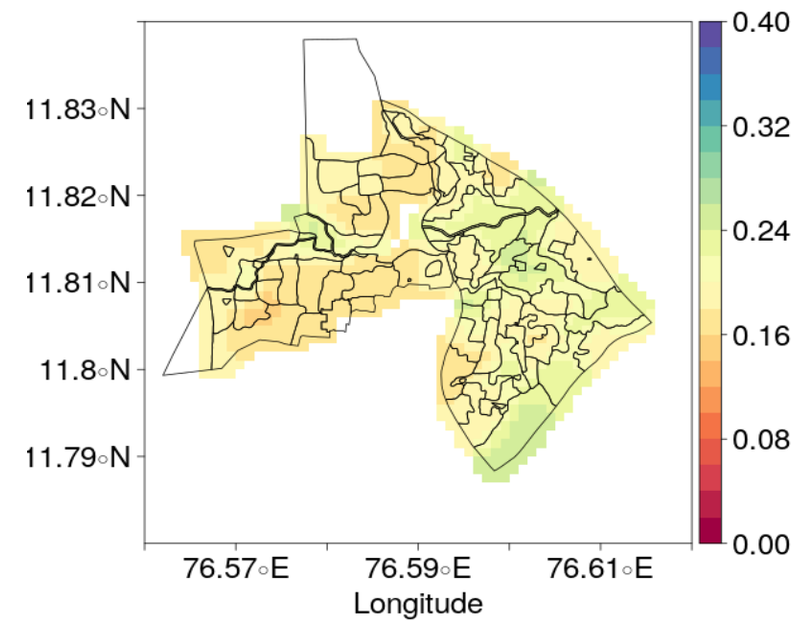
The average AET/P ratio was about 104%, which is higher than the sustainable limit of about 80%. Even during extremely lower rainfall year of 2012, AET was 740 mm. This suggests the presence of water storage and utilization from other sources such as groundwater, which buffered the lower rainfall.



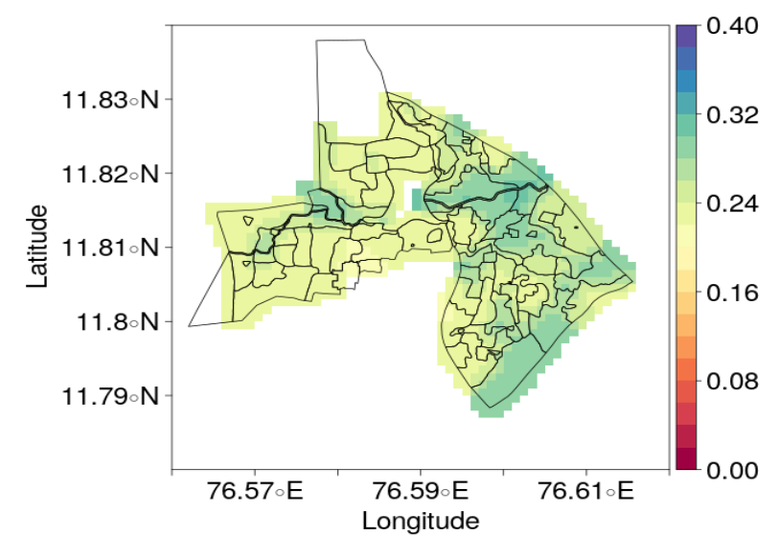
SATELLITE RETRIEVED SOIL MOISTURE



Hongahalli– Rabi Soil Moisture



Hongahalli– Kharif Soil Moisture

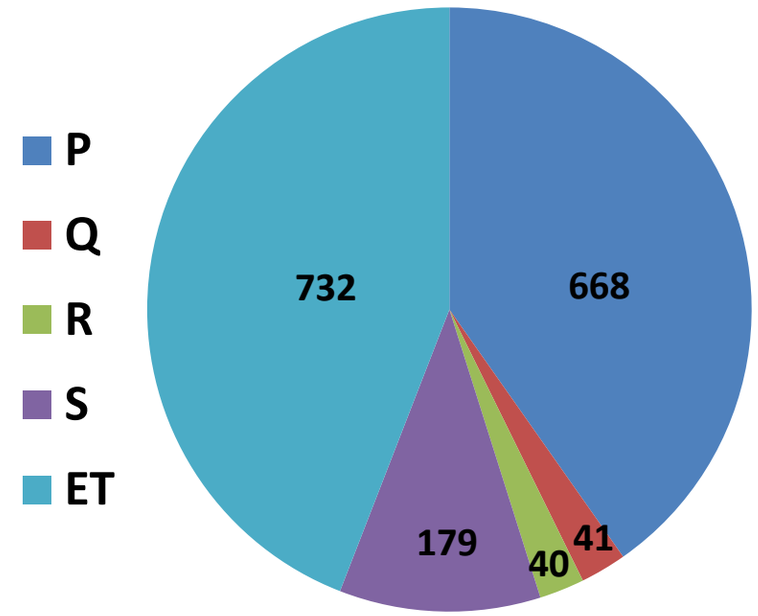


The method developed for retrieving soil moisture from multi-satellite observations allowed to map surface soil moisture behavior in the micro-watershed. The available surface moisture was varied in the range of 22-23 % in *kharif* and 17-18% in *rabi* seasons of 2016 and 24-31% in *Kharif* and 12-28% in *rabi* seasons of 2017.

WATER BALANCE

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

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

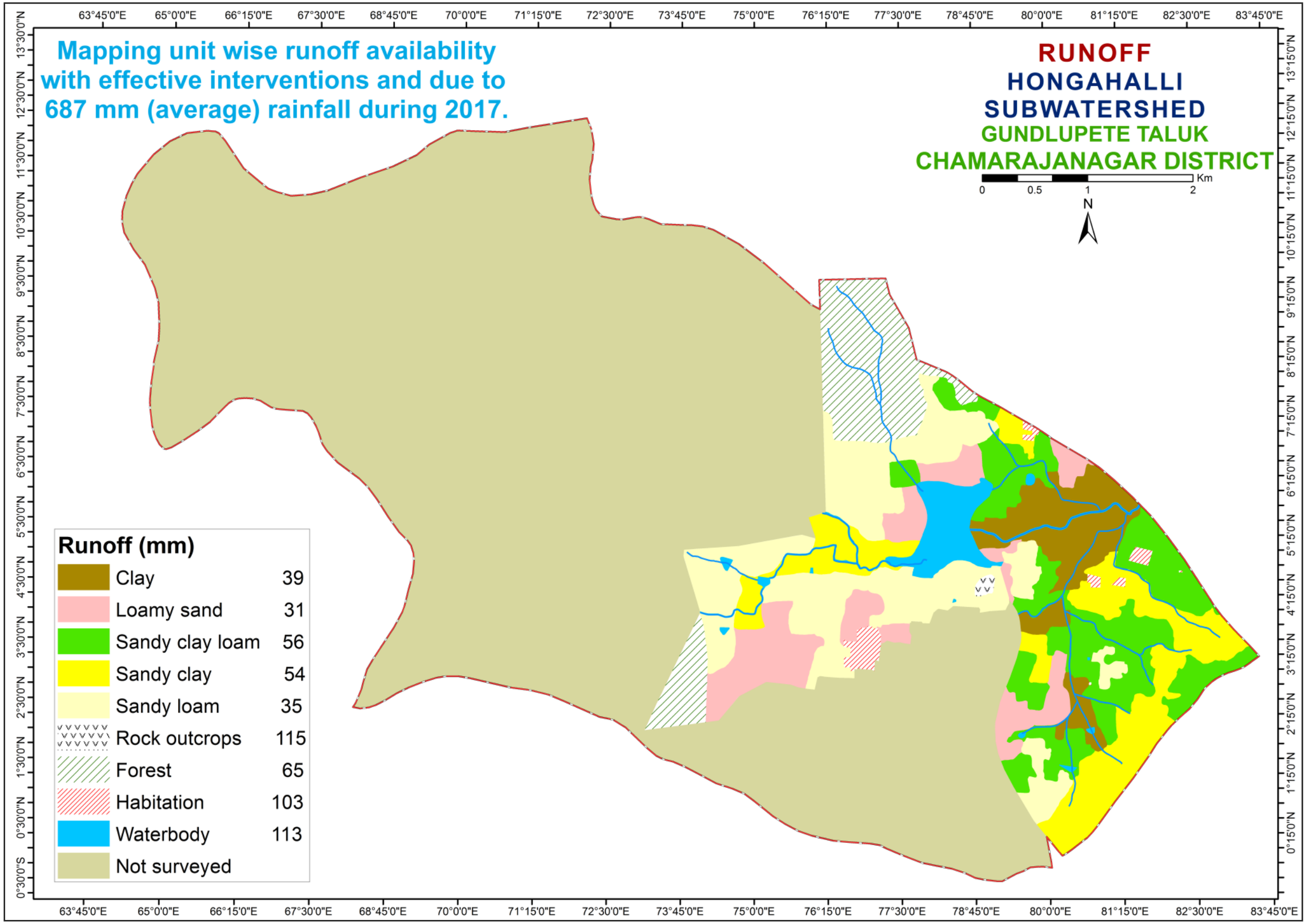


During October-November months, Precipitation is higher than Evapotranspiration, hence Runoff can occur in the watershed.

P = 668 mm (average of 2009-2017) ET = 732 mm R = 40 mm S = 179 mm Q = 41 mm

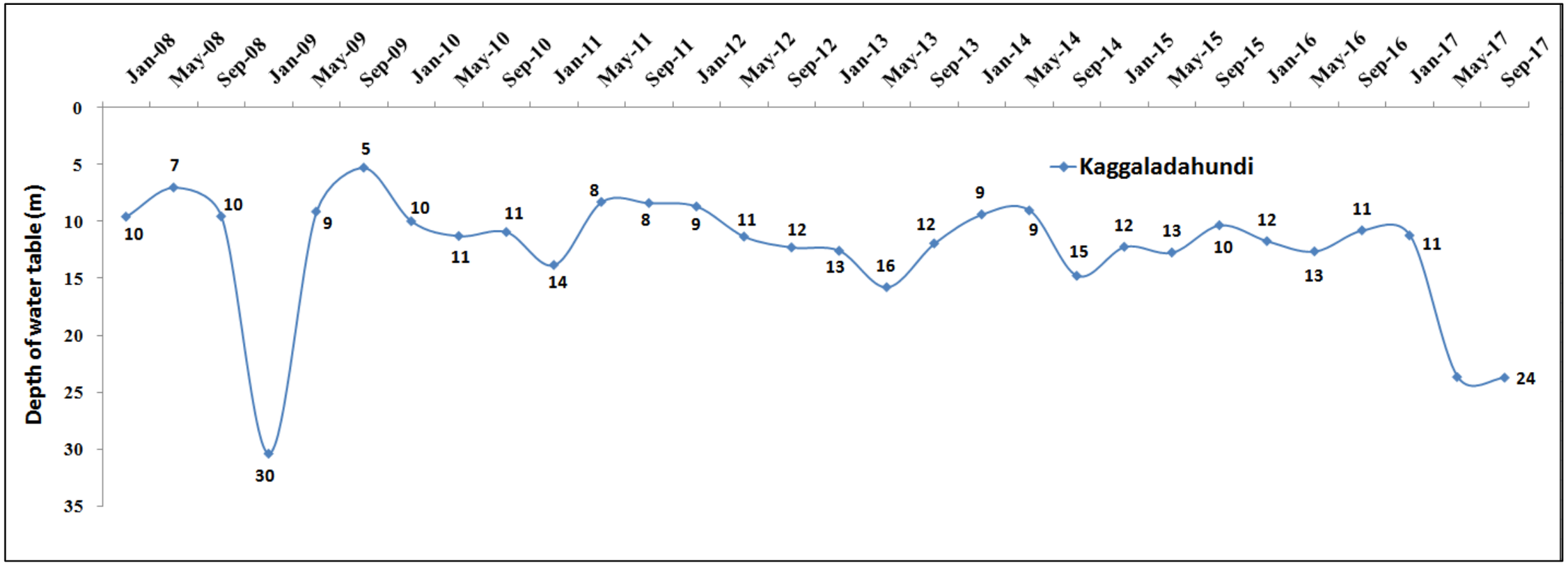
Sl. No.	Parameters	Average_ 2017 (mm)
1.	Rainfall	687
2.	Runoff availability with existing conditions	70
3.	Runoff availability with effective interventions	51
4.	Runoff allowed as environmental flow at the outlet	10
5.	Runoff excess for harvesting by construction of structures	41

RUNOFF


Mapping unit wise runoff availability with effective interventions and due to 687 mm (average) rainfall during 2017.
RUNOFF
HONGAHALLI
SUBWATERSHED
GUNDLUPETE TALUK
CHAMARAJANAGAR DISTRICT
0 0.5 1 2 Km
N
Runoff (mm)
Clay 39
Loamy sand 31
Sandy clay loam 56
Sandy clay 54
Sandy loam 35
Rock outcrops 115
Forest 65
Habitation 103
Waterbody 113
Not surveyed

GROUND WATER STATUS

KAGGALADAHUNDI STATION



The total number of wells present in Hongahalli Sub-watershed as per LRI data is 68 Bore wells. The groundwater level shown above is from the data obtained from Dept. of Mines & Geology for the nearest station Kaggaladahundi. The graph depicts the groundwater levels during the years 2008-2017 were slightly varying, except the year 2009. Deepest level was found in 2009 year.

SUMMARY

- The average annual rainfall of 763 mm in the Hongahalli sub-watershed as recorded from the Gundlupet station data.
- 31%, 26% and 32% 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 41 mm for an average annual rainfall of 668 mm (2009-2017). The utilizable groundwater is 28 mm (70% of 40 mm recharge estimated). This means the total available water resource combining the soil moisture store for kharif & rabi (179 mm) and utilizable runoff plus recharge is 248 (=179+41+28)
- The average actual evapotranspiration estimated in the watershed based on the current land use and irrigation practices for the kharif and rabi seasons is 578 mm. Hence the amount of water use for kharif and rabi seasons may be estimated as 722 mm (i.e. 125% of AET). This demand for the two seasons is higher by 474 mm, i.e. (722-248). The AET in June-Sept months is 63% of rainfall. Hence, there is slightly less opportunity to harvest the excess water through watershed management practices for utilizing during rabi season.
- The total number of wells present in Hongahalli Sub-watershed as per LRI data is 68 Bore wells. The groundwater level shown above is from the data obtained from Dept. of Mines & Geology for the nearest station Kaggaladahundi.