Land Resource Inventory of Sonath-1 Micro-watershed for Watershed Planning and Development Gulbarga Taluk, Gulbarga District, Karnataka (AESR 6.2)

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

भाकृअनुप
ICAR

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किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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

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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How to read and use the Atlas

The Land Resource Inventory of Sonath-1 micro-watershed (Gulbarga taluk, Gulbarga district) for Watershed Planning (AESR 6.2) was undertaken to provide comprehensive site- specific cadastral level information useful for farm level planning and integrated development of the area under Sujala – III, Karnataka Watershed Development Project- II.

This atlas contains the basic information on kinds of soils, their geographic distribution, characteristics and classification. The soil map and soil based thematic maps derived from soils data on soil depth, soil gravelliness, slope, land suitability for various crops and land use 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.

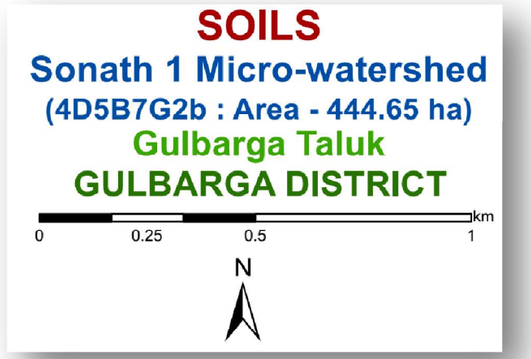
For easy map reading and understanding the information contain in different maps, the physical, cultural and scientific symbols used in the maps are illustrated in the form of colors, graphics and tables.

Physical, Cultural and Scientific symbols used in the Atlas

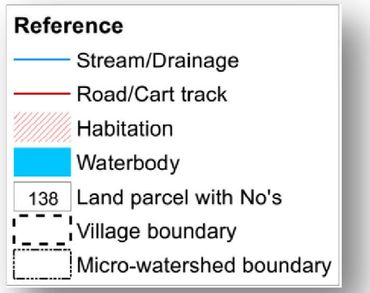
Each map in the atlas sheet is complemented with the physical, cultural and scientific symbols to facilitate easy map reading.

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

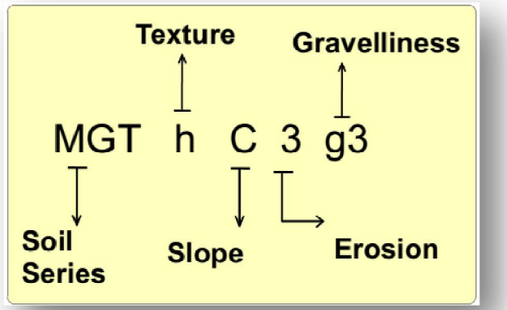
Map title
Map title conveys the relevance of thematic information presented along with a graphical scale, geographical location and watershed details in text form.



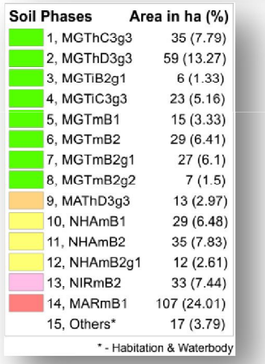
Legends and symbols
*Two legends accompany each map, a **map reference**, which depicts geographic features and a **thematic legend** which portrays spatial information. Picking up the symbol and colour of a particular enables one to go to the legends to obtain the required information.*



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



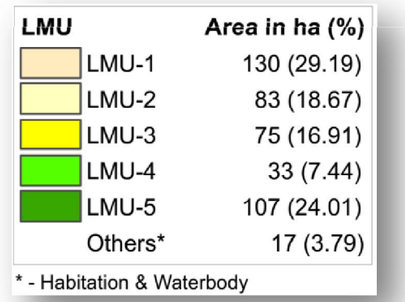
Map colours
Different shades of colours are used as an aid to distinguish the different classes of soils, crop suitability and other maps.



Soil Phases	Area in ha (%)
1, MGThC3g3	35 (7.79)
2, MGThD3g3	59 (13.27)
3, MGTiB2g1	6 (1.33)
4, MGTiC3g3	23 (5.16)
5, MGTmB1	15 (3.33)
6, MGTmB2	29 (6.41)
7, MGTmB2g1	27 (6.1)
8, MGTmB2g2	7 (1.5)
9, MAThD3g3	13 (2.97)
10, NHAmB1	29 (6.48)
11, NHAmB2	35 (7.83)
12, NHAmB2g1	12 (2.61)
13, NIRmB2	33 (7.44)
14, MARmB1	107 (24.01)
15, Others*	17 (3.79)

* - Habitation & Waterbody

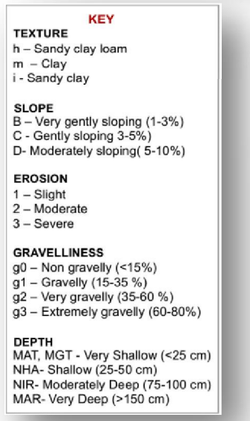
Land Management Units (LMU)
Grouping of similar soil areas based on their soil-site characteristics into management units that respond similarly for a given level of management are designated as land management units

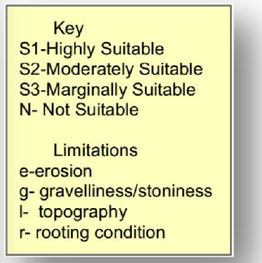


LMU	Area in ha (%)
LMU-1	130 (29.19)
LMU-2	83 (18.67)
LMU-3	75 (16.91)
LMU-4	33 (7.44)
LMU-5	107 (24.01)
Others*	17 (3.79)

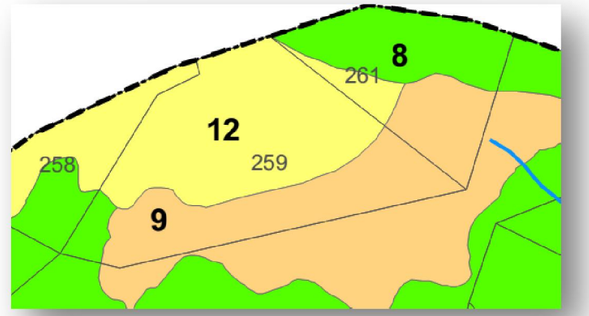
* - Habitation & Waterbody

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.





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 SONATH-1 MICRO-WATERSHED FOR PLANNING
GULBARGA TALUK, GULBARGA 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.

Gulbarga popularly known as Kalaburgi is located in the Northern part of the state and lies between 17 ^{o} 35’ and 17^{o} 45’ North latitude and between 76 ^{o} 10’ and 77 ^{o} 45’ east longitude. The district is biggest district in the state covering 8.49 % of the area. It has Bijapur district and Sholapur district of Maharastra on the West, Bidar district and Osmanabad district of Maharastra on the North, Raichur district on the South. The district has total geographical area of 16174 sq. kms. Major food crops grown in the district are pigeon pea, sorghum, bajra, and paddy. Commercial crops are sugarcane and cotton. Oilseed crops are groundnut and sunflower. The district economy is dominantly agricultural and nearly 75 per cent of population living in the rural areas are dependent on agriculture. Major geology in the district comprise of Deccan trap (basalt), followed by limestone. Laterite and shale were also noticed in patches.

As a pilot study, **ICAR-NBSSLUP, Bangalore** carried out the generation of LRI for the Sonath-1 micro-watershed. Sonath sub-watershed in Gulbarga Taluk, Gulbarga District was selected for data base generation under batch VI of Sujala III project. Sonath-1 micro water shed (code–4D5B7G2b) is a part of Sonath sub-watershed covering an area of 445 ha and spread across Mormanchi, Malsapur, Kinhi, Chengta and Margatti villages.

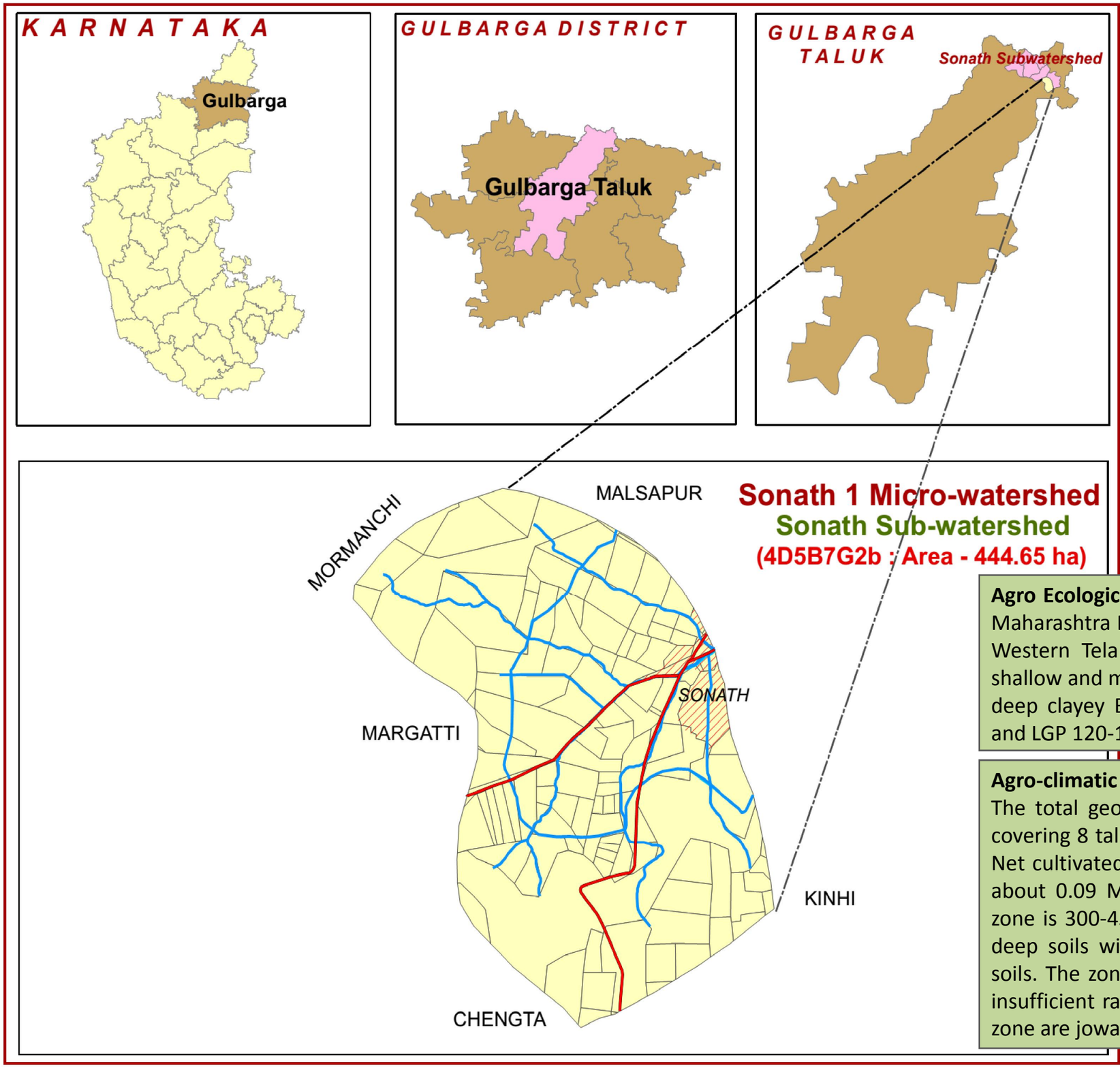
To be continued….

The major landforms identified in the micro-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 Sonath-1 micro watershed covering an area of 445 ha during February-March 2015 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 SONATH-1 MICRO WATERSHED

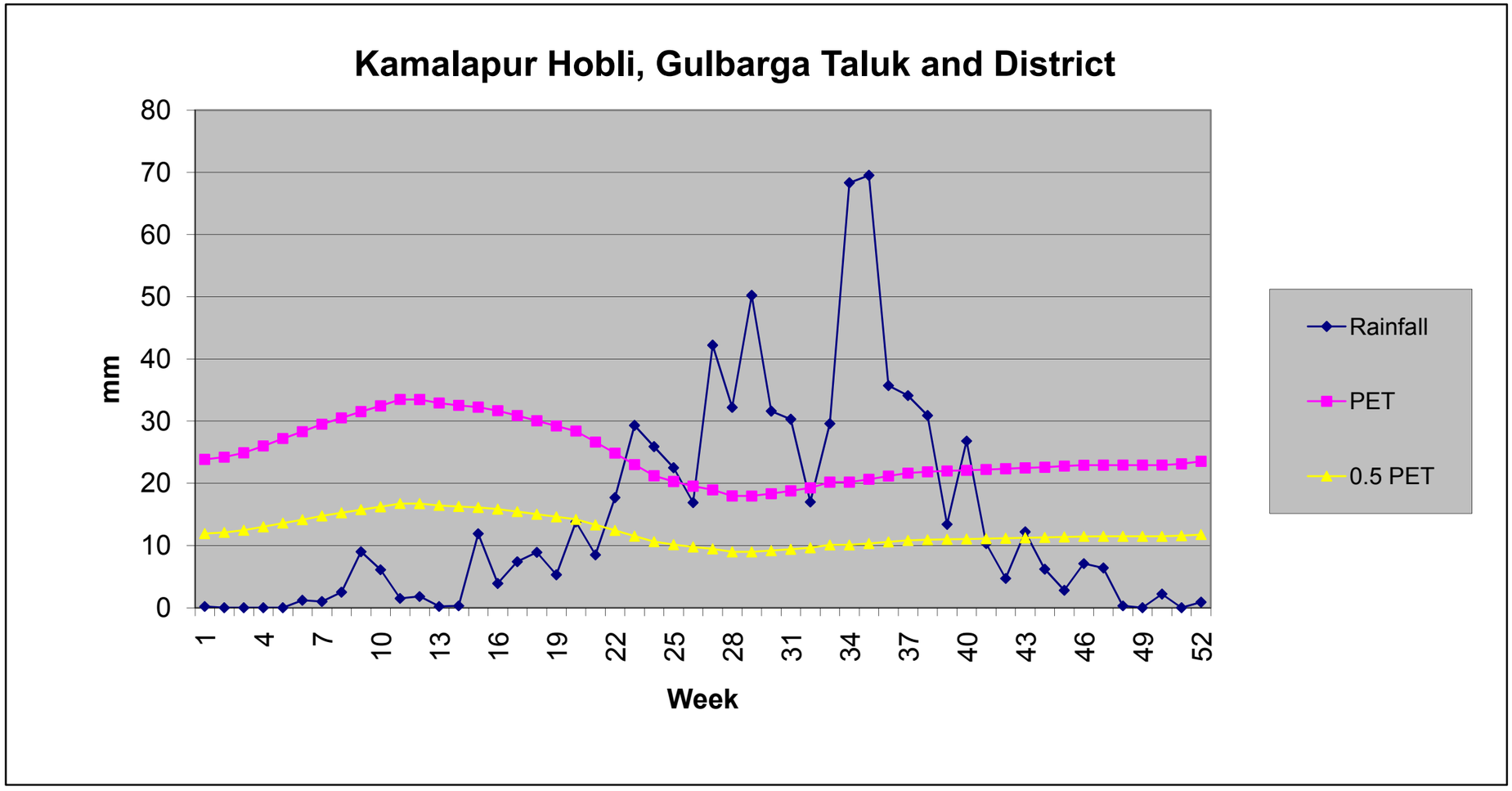


Sonath-1 micro-watershed (Sonath sub-watershed, Gulbarga taluk, Gulbarga district) is located in between $17^0$35'–$17^0$37' North latitudes and $77^0$5'–$77^0$7' East longitudes, covering an area of about 445 ha, bounded by Mormanchi, Malsapur, Kinhi, Chengta and Margatti villages.

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

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

Climate

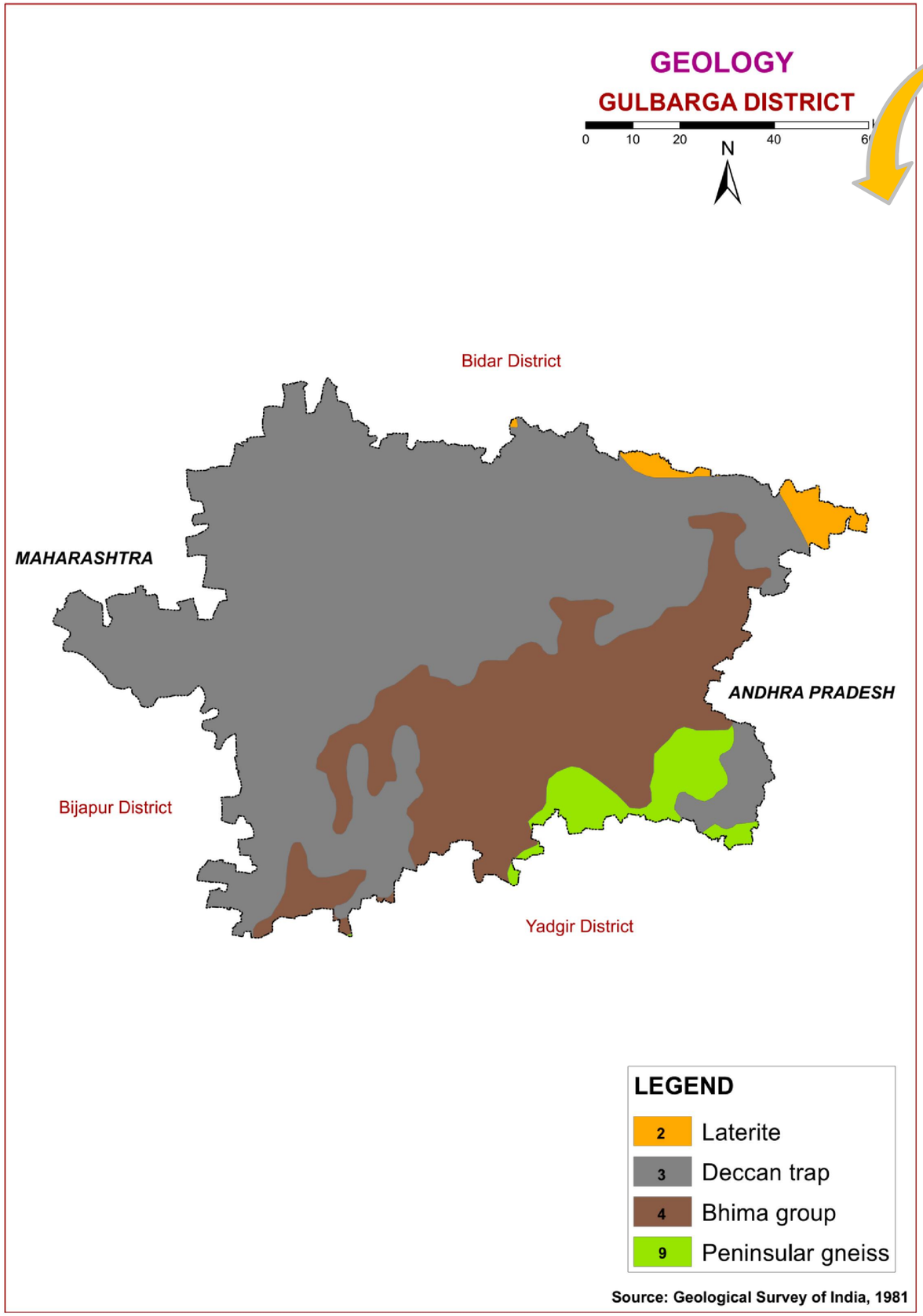


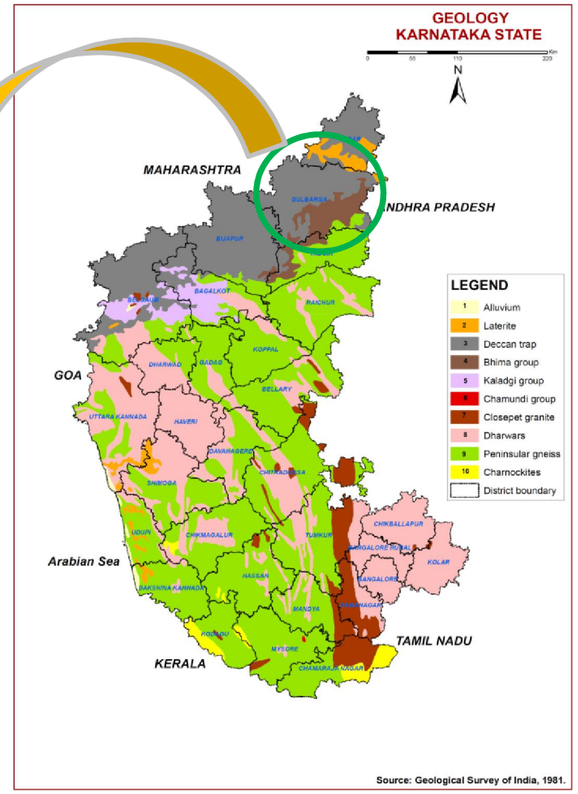
Length of Growing Period (LGP) is varying from May last week to 1st week of October (120-150 days)

Annual Rainfall : 760.7 mm. in the Gulbarga taluk and district

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 - GULBARGA DISTRICT

Cainozoic Group

The Palaeocene and Recent formations of Karnataka are the laterites and alluvium of marine and riverine origin

Laterite: Laterite is a porous, pitted, clay-like rock with yellow, red, brown, grey and mottled colours, and is composed mainly of hydrated oxides of iron and aluminium.

Mesozoic Group

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

Deccan Trap: The Deccan Trap covers the whole of Bidar district, and parts of Gulbarga, Bijapur and Belgaum districts, occupying an area of 25,000 sq. km.

Upper Proterozoic Group

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

Bhima series: This series, equivalent to the Kurnool formations, is named after the Bhima river and occurs in Bijapur and Gulbarga districts.

Archaean Group

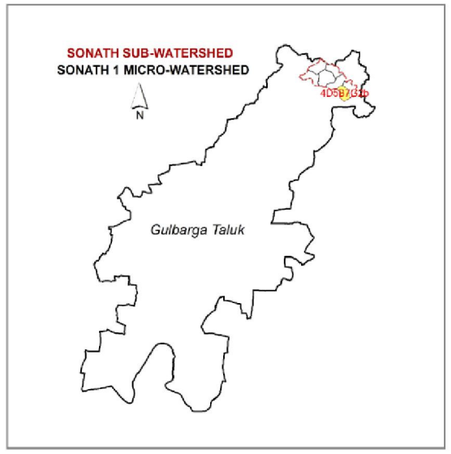
The important formations of this group are Peninsular Gneiss, Dharwar schists, and Charnockites.

Peninsular Gneiss: Exposed over a large area of Karnataka in all the districts except Bidar is the Peninsular Gneiss which includes granites of all shades with varying composition.

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.



Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N

MORMANCHI

MALSAPUR

MARGATTI

Sontha

SONATH

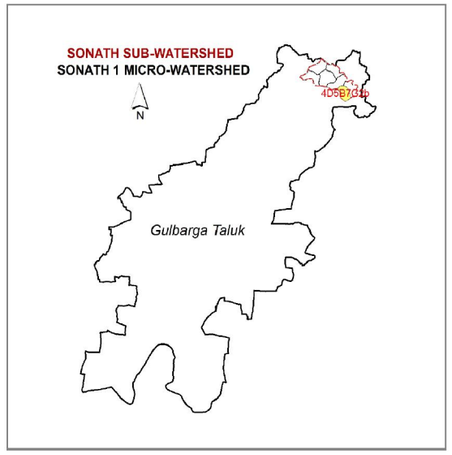
CHENGTA

KINHI

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



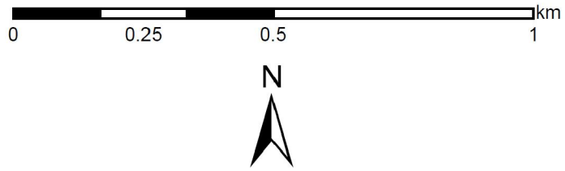
SATELLITE IMAGE

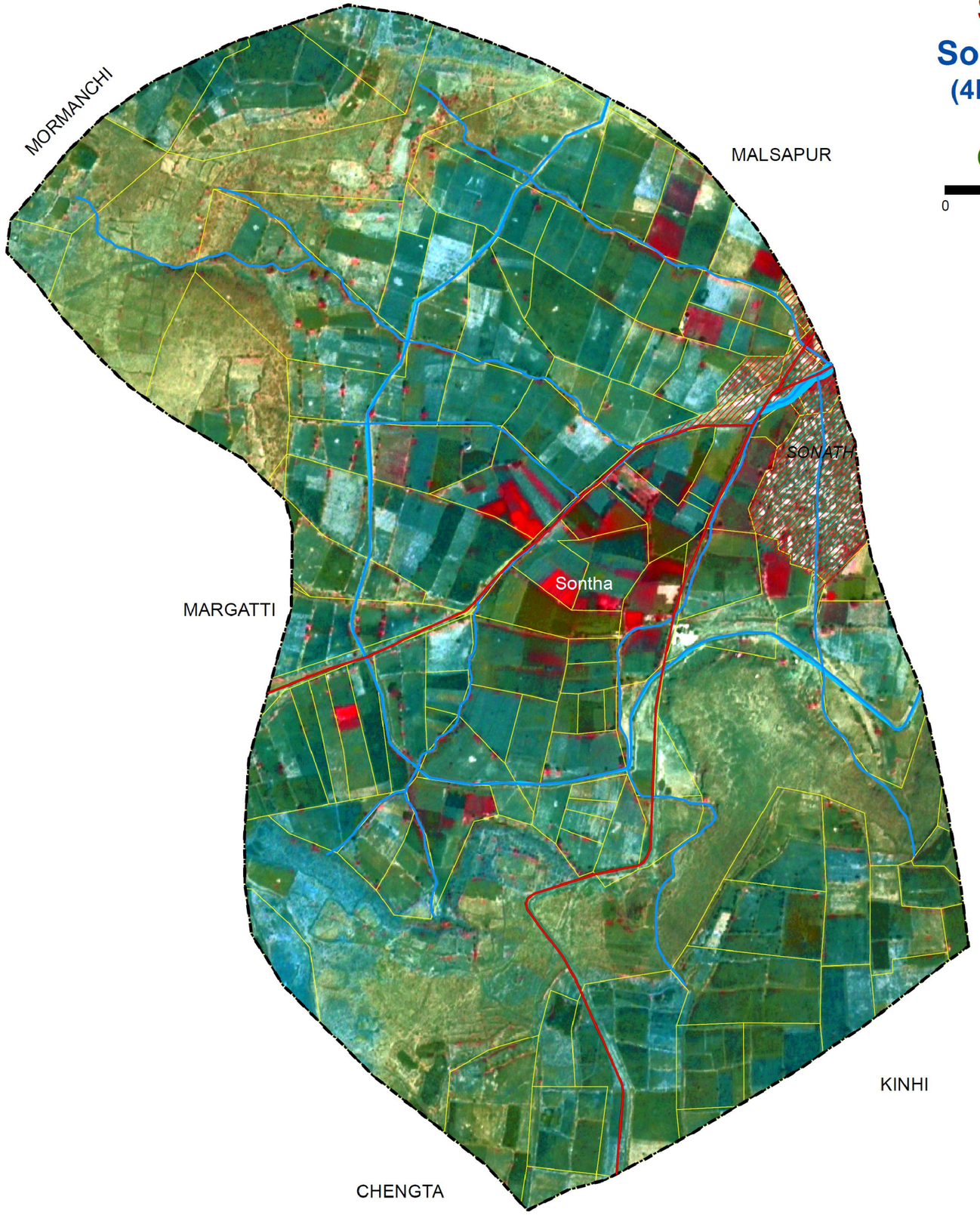
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Reference

- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- Land Parcels
- Village boundary
- Micro-watershed boundary

Source: Carto stat 1, Imagenry, 2011

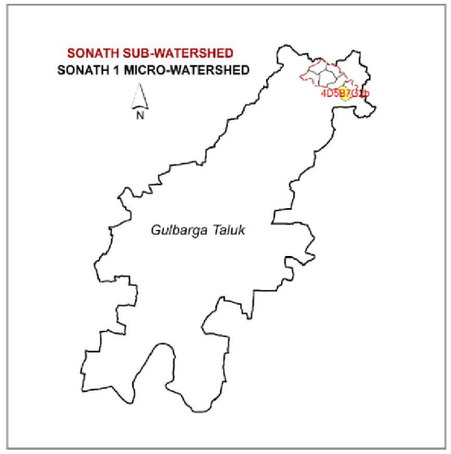
CURRENT LANDUSE (2015)

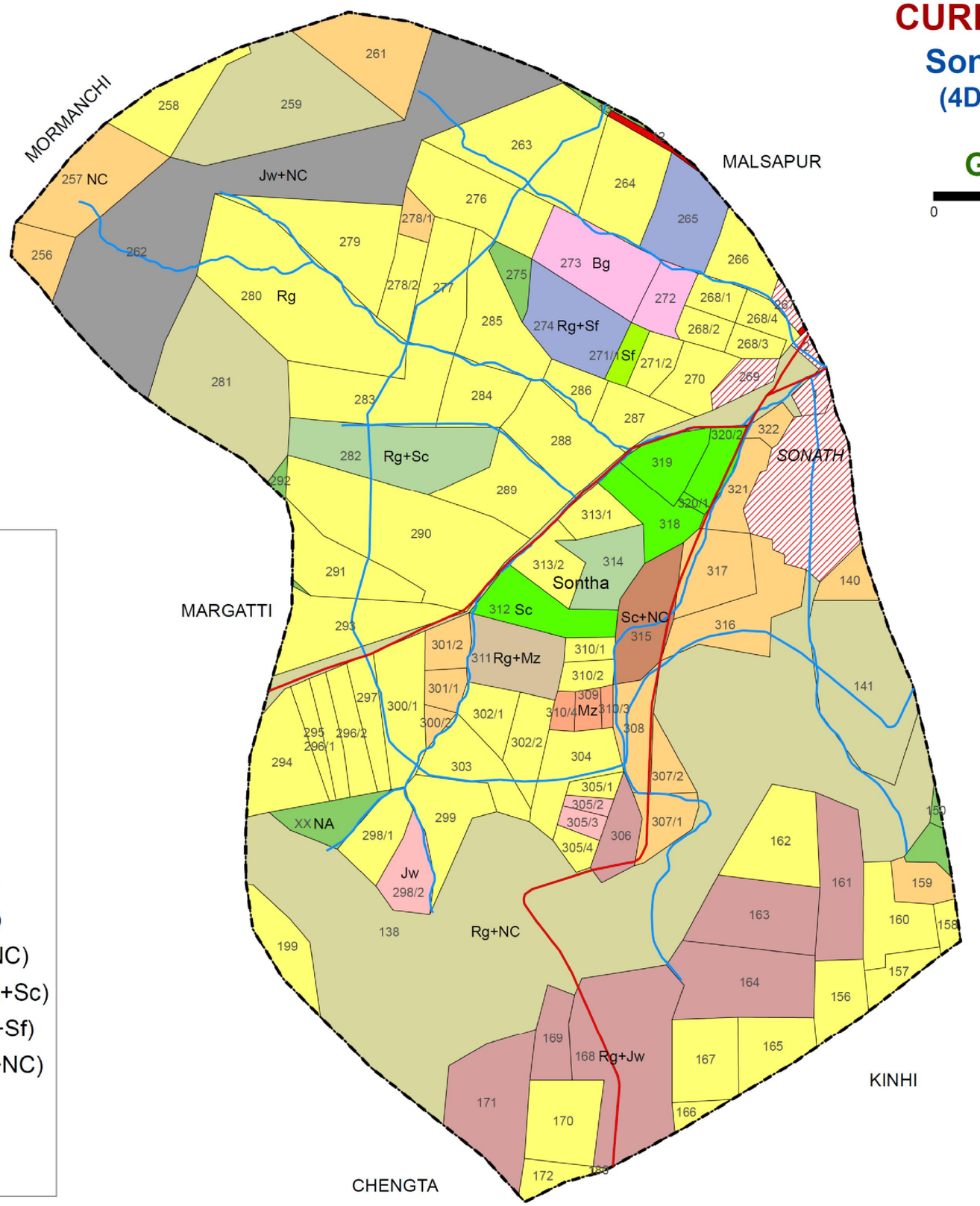
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Current Landuse

- Jowar (Jw)
- Maize (Mz)
- No Crop (NC)
- Redgram (Rg)
- Sunflower (Sf)
- Sugarcane (Sc)
- Bengalgram (Bg)
- Jowar+No Crop (Jw+NC)
- Redgram+Jowar (Rg+Jw)
- Redgram+Maize (Rg+Mz)
- Redgram+No Crop (Rg+NC)
- Redgram+Sugarcane (Rg+Sc)
- Redgram+Sunflower (Rg+Sf)
- Sugarcane+No Crop (Sc+NC)
- NA
- Road
- Habitation

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

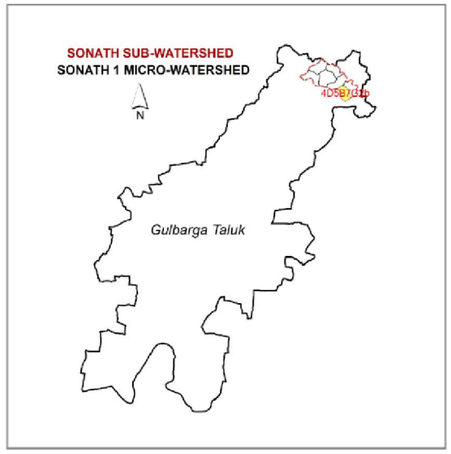
LOCATION OF WELLS

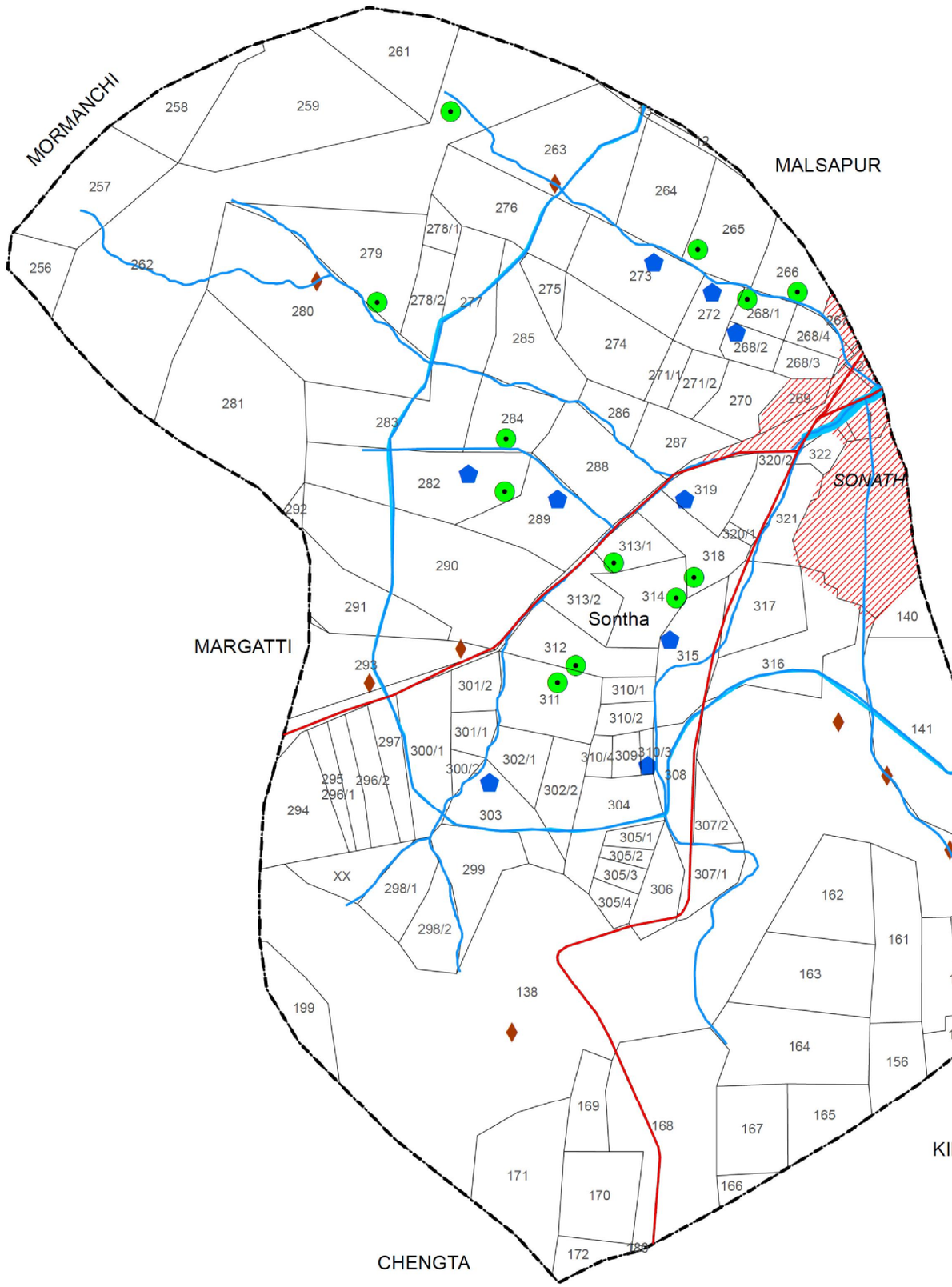
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Legend	No's
Bore well	12
Check dum	8
Open well	9

Reference

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

0 0.25 0.5 1 km

N

Source: ICAR-NBSS&LUP, Bengaluru

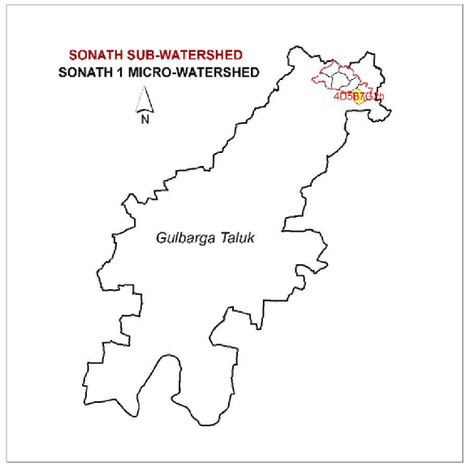
SOILS

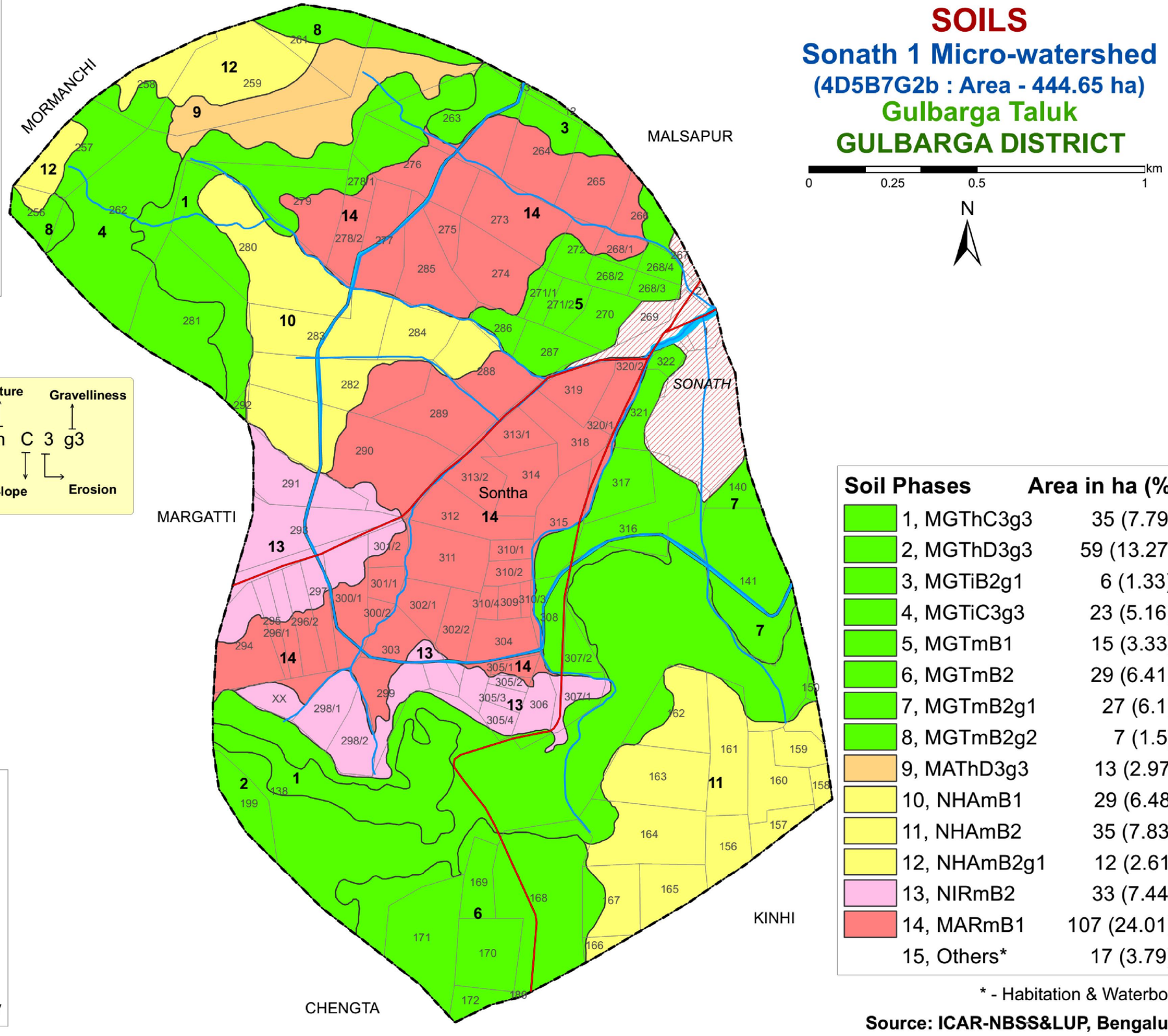
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





KEY

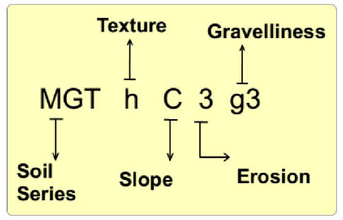
TEXTURE
h – Sandy clay loam
m – Clay
i - Sandy clay

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

EROSION
1 – Slight
2 – Moderate
3 – Severe

GRAVELLINESS
g0 – Non gravelly (<15%)
g1 – Gravelly (15-35 %)
g2 – Very gravelly (35-60 %)
g3 – Extremely gravelly (60-80%)

DEPTH
MAT, MGT - Very Shallow (<25 cm)
NHA- Shallow (25-50 cm)
NIR- Moderately Deep (75-100 cm)
MAR- Very Deep (>150 cm)



Reference

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

Soil Phases	Area in ha (%)
1, MGThC3g3	35 (7.79)
2, MGThD3g3	59 (13.27)
3, MGTiB2g1	6 (1.33)
4, MGTiC3g3	23 (5.16)
5, MGTmB1	15 (3.33)
6, MGTmB2	29 (6.41)
7, MGTmB2g1	27 (6.1)
8, MGTmB2g2	7 (1.5)
9, MAThD3g3	13 (2.97)
10, NHAmB1	29 (6.48)
11, NHAmB2	35 (7.83)
12, NHAmB2g1	12 (2.61)
13, NIRmB2	33 (7.44)
14, MARmB1	107 (24.01)
15, Others*	17 (3.79)

* - Habitation & Waterbody

Source: ICAR-NBSS&LUP, Bengaluru

Mapping unit description of Sonath-1 Micro-watershed in Gulbarga taluk, Gulbarga district

Sl.No	Map unit	Description	Area in ha. (%)
	MGT	**Marguti soils are very shallow (<25cm), well drained. They have very dark grayish brown to dark brown, clayey soils and occur on very gently sloping to moderately sloping uplands**	
1	MGThC3g3	Sandy clay loam surface, 3-5 % slope, severe erosion, extremely gravelly (60-80 %)	34.63 (7.79)
2	MGThD3g3	Sandy clay loam surface, 5-10 % slope, severe erosion, extremely gravelly (60-80 %)	58.99 (13.27)
3	MGTiB2g1	Sandy clay surface, 1-3% slope, moderate erosion, gravelly (15-35%)	5.93 (1.33)
4	MGTiC3g3	Sandy clay surface, 3-5 % slope, severe erosion, extremely gravelly (60-80 %)	22.93 (5.16)
5	MGTmB1	Clay surface, 1-3% slope, slight erosion	14.80 (3.33)
6	MGTmB2	Clay surface, 1-3% slope, moderate erosion	28.50 (6.41)
7	MGTmB2g1	Clay surface, 1-3% slope, moderate erosion, gravelly (15-35%)	27.11 (6.10)
8	MGTmB2g2	Clay surface, 1-3% slope, moderate erosion, very gravelly (35-60%)	6.68 (1.50)
	MAT	**Matki soils are very shallow (<25cm), well drained. They have dark reddish brown to dark reddish gray, clayey soils and occur on very gently sloping to moderately sloping uplands**	
9	MAThD3g3	Sandy clay loam surface, 5-10 % slope, severe erosion, extremely gravelly (60-80 %)	13.22 (2.97)
	NHA	**Novinihala soils are shallow (25-50 cm), well drained. They have very dark grayish brown to dark brown clayey soils and occur on very gently sloping to moderately sloping uplands**	
10	NHAmB1	Clay surface, 1-3% slope, slight erosion	28.80 (6.48)
11	NHAmB2	Clay surface, 1-3% slope, moderate erosion	34.80 (7.83)
12	NHAmB2g1	Clay surface, 1-3% slope, moderate erosion, gravelly (15-35%)	11.59 (2.61)
	NIR	**Nirgudi soils are moderately deep (75-100 cm), moderately well drained. They have very dark grayish brown to very dark gray, calcareous, clayey soils and occur on nearly level to very gently sloping uplands**	
13	NIRmB2	Clay surface, 1-3% slope, moderate erosion	33.07 (7.44)
	MAR	**Mannur soils are very deep (>150 cm), moderately well drained. They have very dark gray to brown, calcareous, clayey soils and occur on nearly level to very gently sloping uplands**	
14	MARmB1	Clay surface, 1-3% slope, slight erosion	106.75 (24.01)

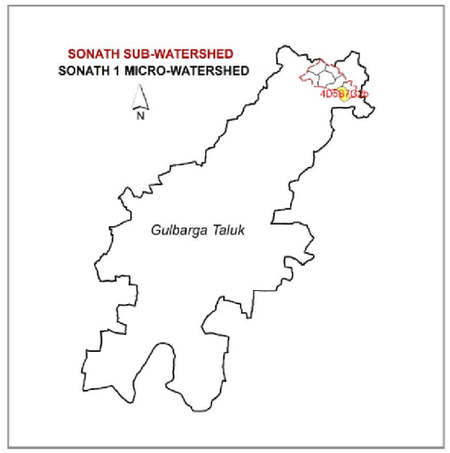
LAND CAPABILITY

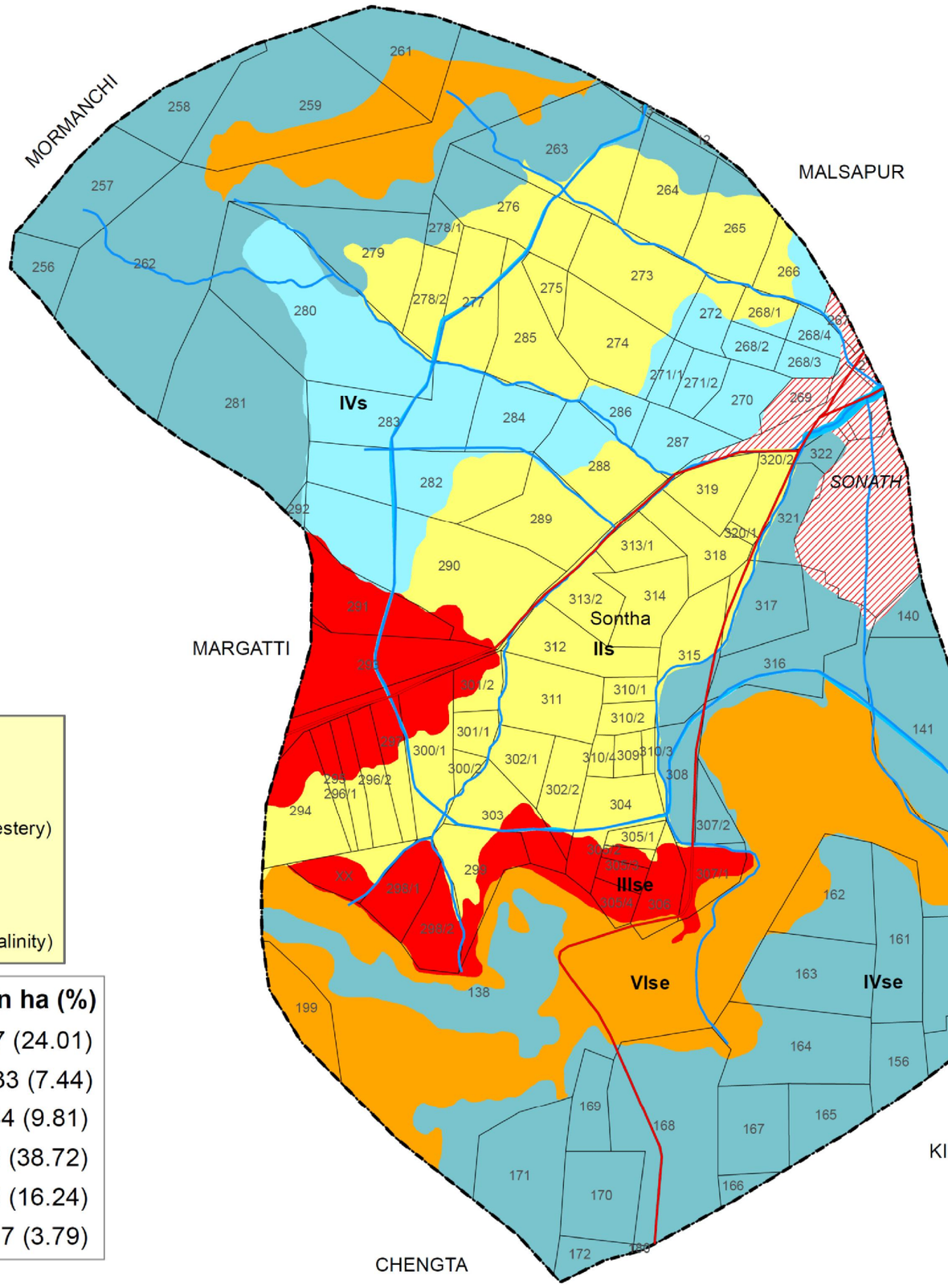
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key

II-Good cultivable land
III-Moderately good cultivable land
IV-Marginally suitable for cultivation
VI-Not suitable for cultivation (grazing/forestery)

Limitations

e- erosion limitation
s- soil limitation
(depth, gravelliness, texture, salinity/alkalinity)

Capability Class	Area in ha (%)
IIs	107 (24.01)
IIIse	33 (7.44)
IVs	44 (9.81)
IVse	172 (38.72)
VIse	72 (16.24)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

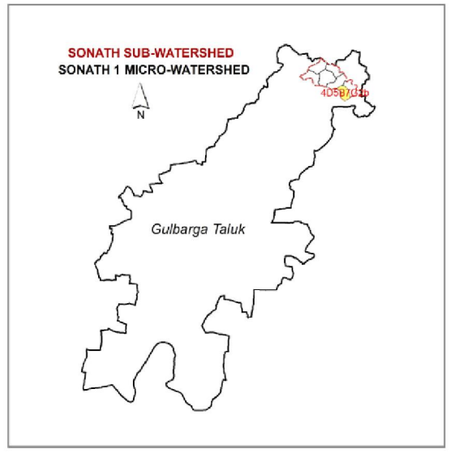
SOIL DEPTH

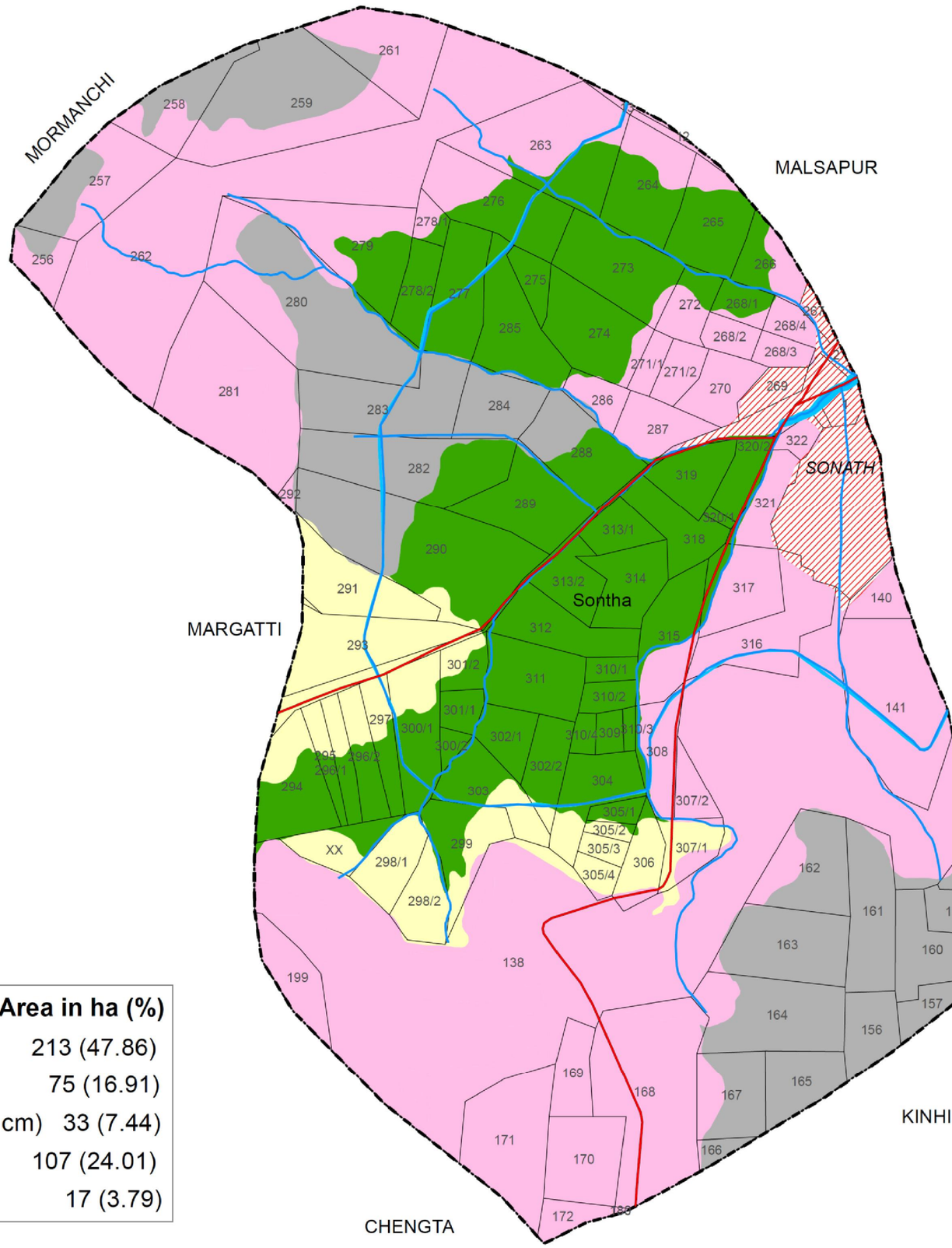
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Depth Class	Area in ha (%)
Very shallow (<25 cm)	213 (47.86)
Shallow (25-50 cm)	75 (16.91)
Moderately deep (75-100 cm)	33 (7.44)
Very deep (>150 cm)	107 (24.01)
Others*	17 (3.79)

* - Habitation & Waterbody

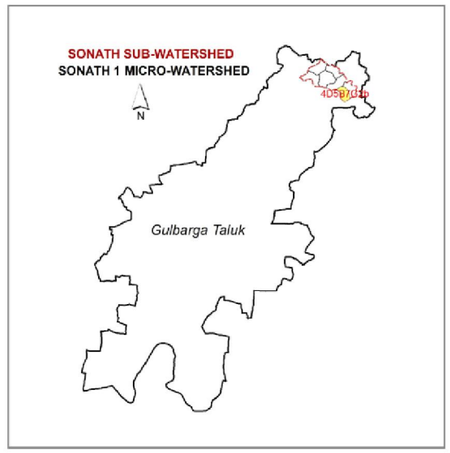
km
0 0.25 0.5 1

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



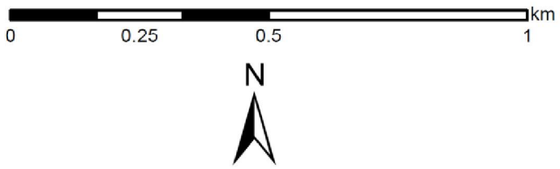
SURFACE SOIL TEXTURE

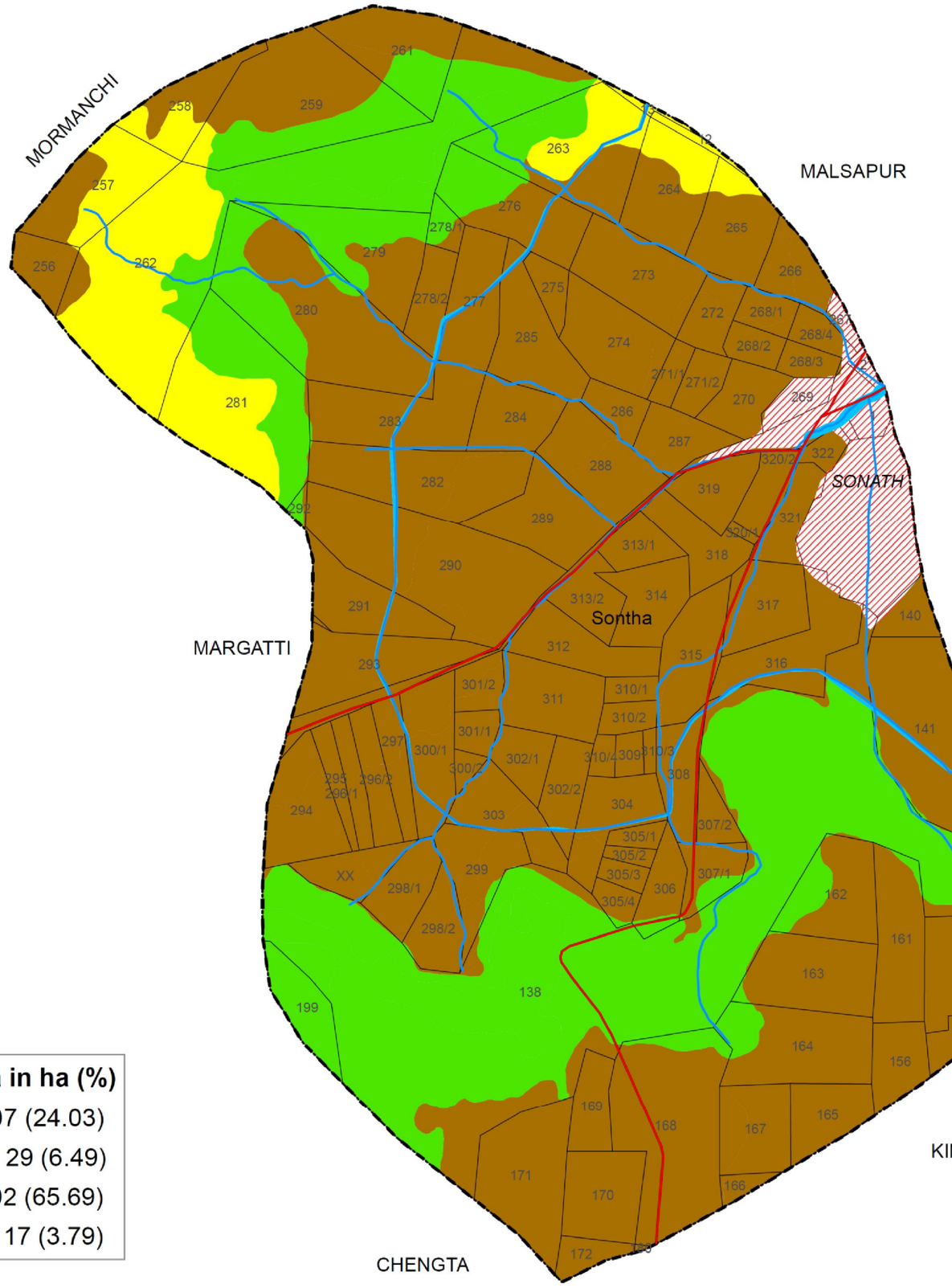
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





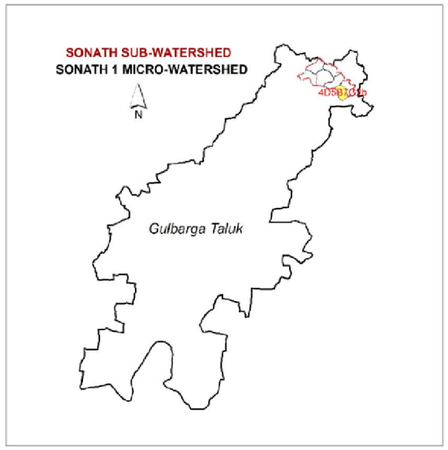
Texture Class	Area in ha (%)
Sandy clay loam	107 (24.03)
Sandy clay	29 (6.49)
Clay	292 (65.69)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



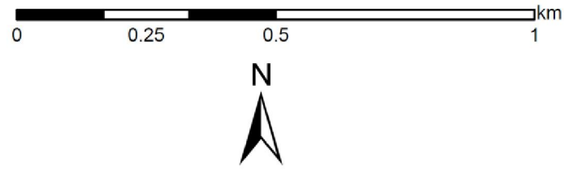
SOIL GRAVELLINESS

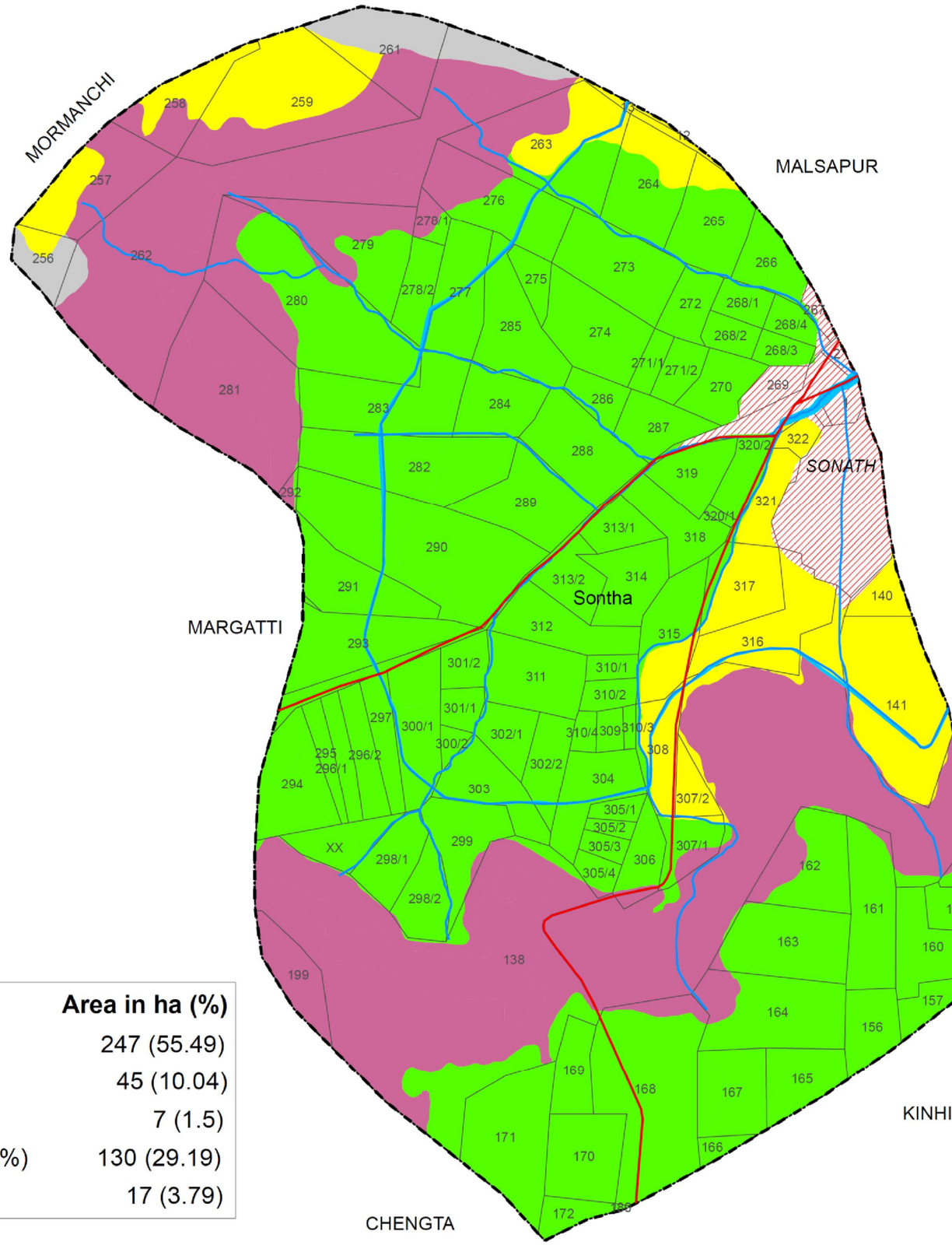
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Gravelliness Class	Area in ha (%)
Non gravelly (<15%)	247 (55.49)
Gravelly (15-35%)	45 (10.04)
Very gravelly (35-60%)	7 (1.5)
Extremely gravelly (60-80%)	130 (29.19)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

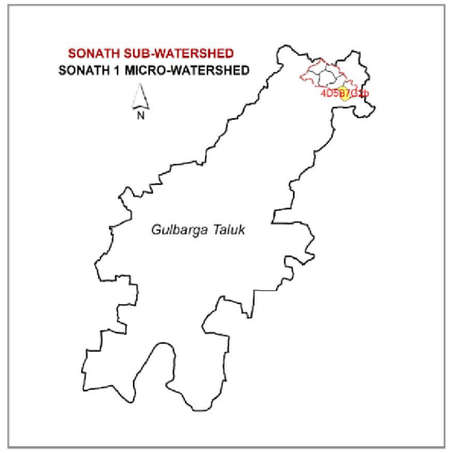
AVAILABLE WATER CAPACITY

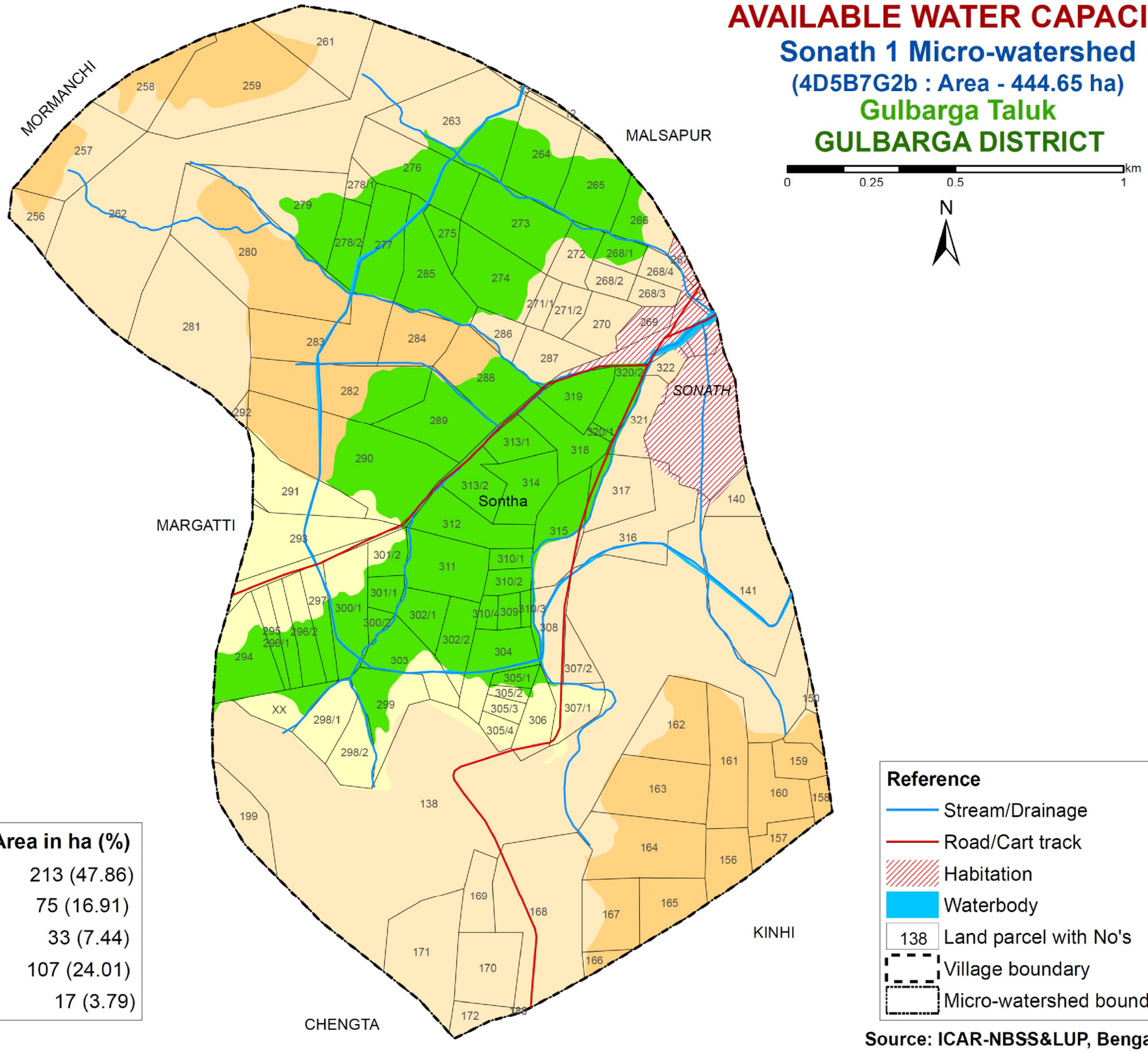
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





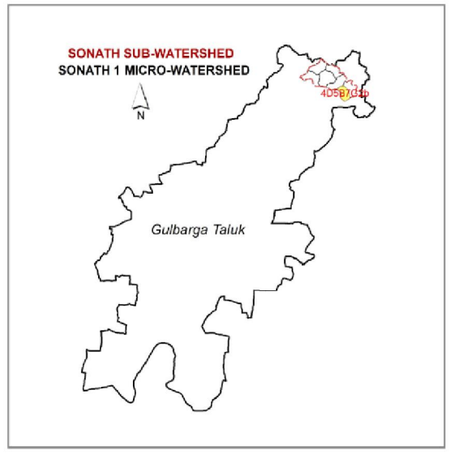
Available Water Capacity	Area in ha (%)
Very low (<50 mm/m)	213 (47.86)
Low (51-100 mm/m)	75 (16.91)
Medium (101-150 mm/m)	33 (7.44)
Very high (>200 mm/m)	107 (24.01)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



SLOPE

Sonath 1 Micro-watershed

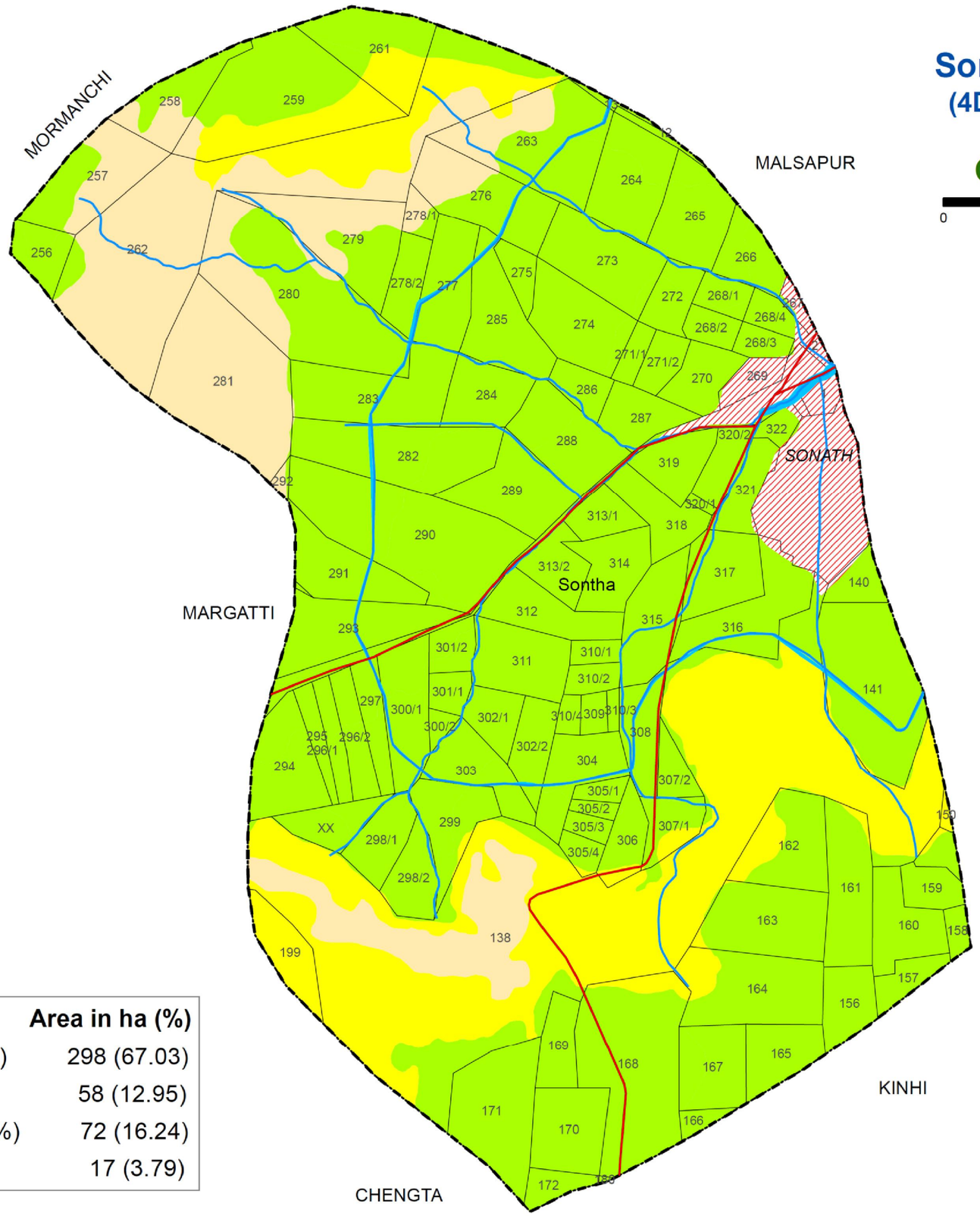
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



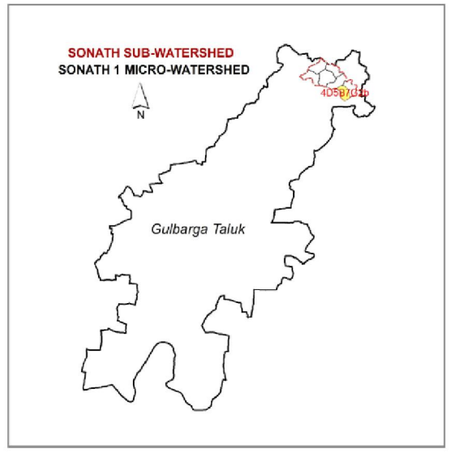
Slope Class	Area in ha (%)
Very gently sloping (1-3%)	298 (67.03)
Gently sloping (3-5%)	58 (12.95)
Moderately sloping (5-10%)	72 (16.24)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



SOIL EROSION

Sonath 1 Micro-watershed

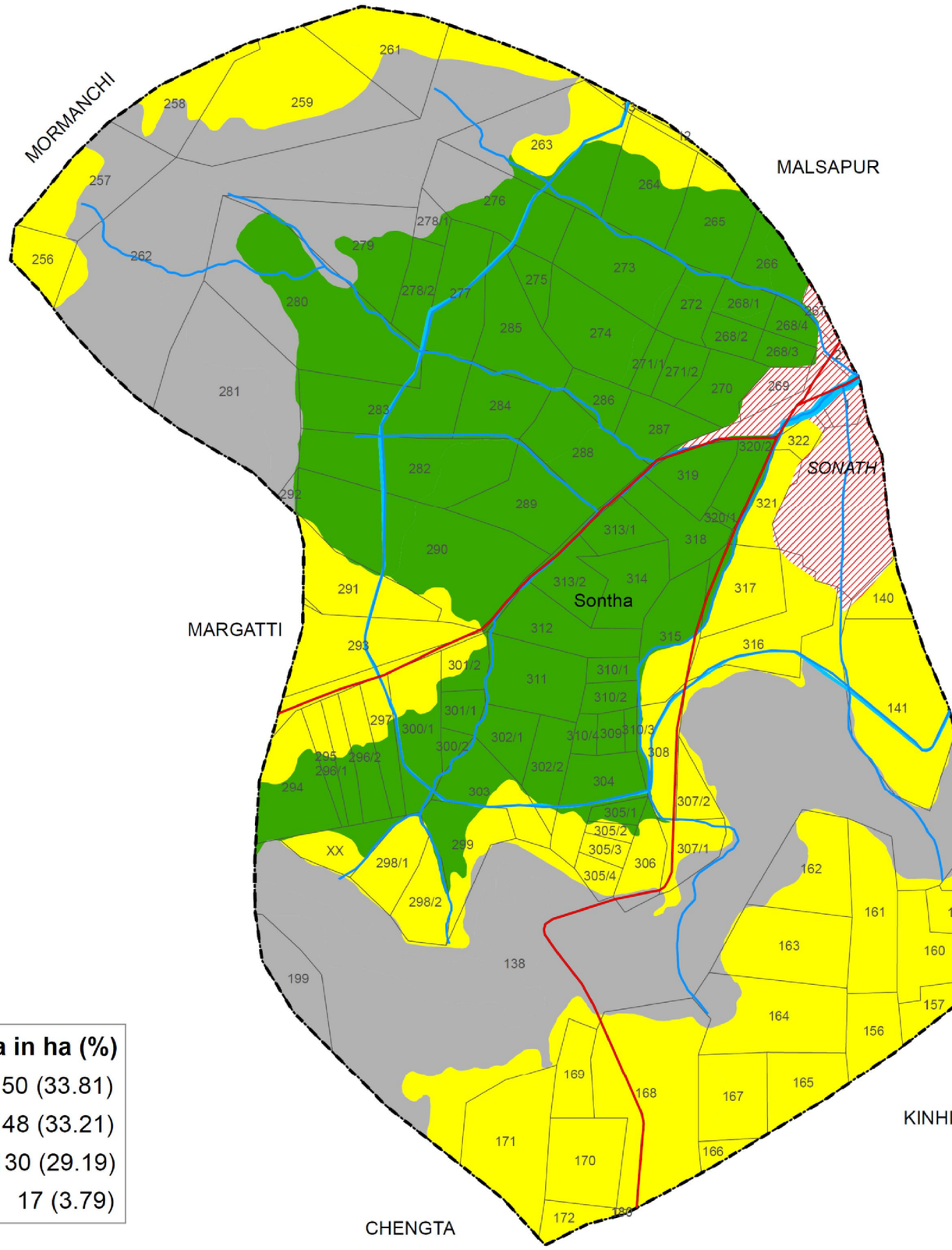
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



Erosion Class	Area in ha (%)
Slight	150 (33.81)
Moderate	148 (33.21)
Severe	130 (29.19)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

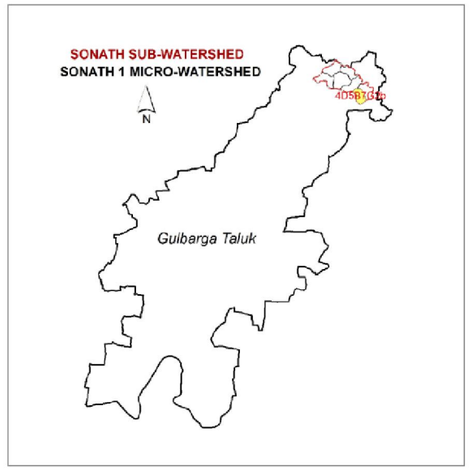
SOIL REACTION (pH) (2015)

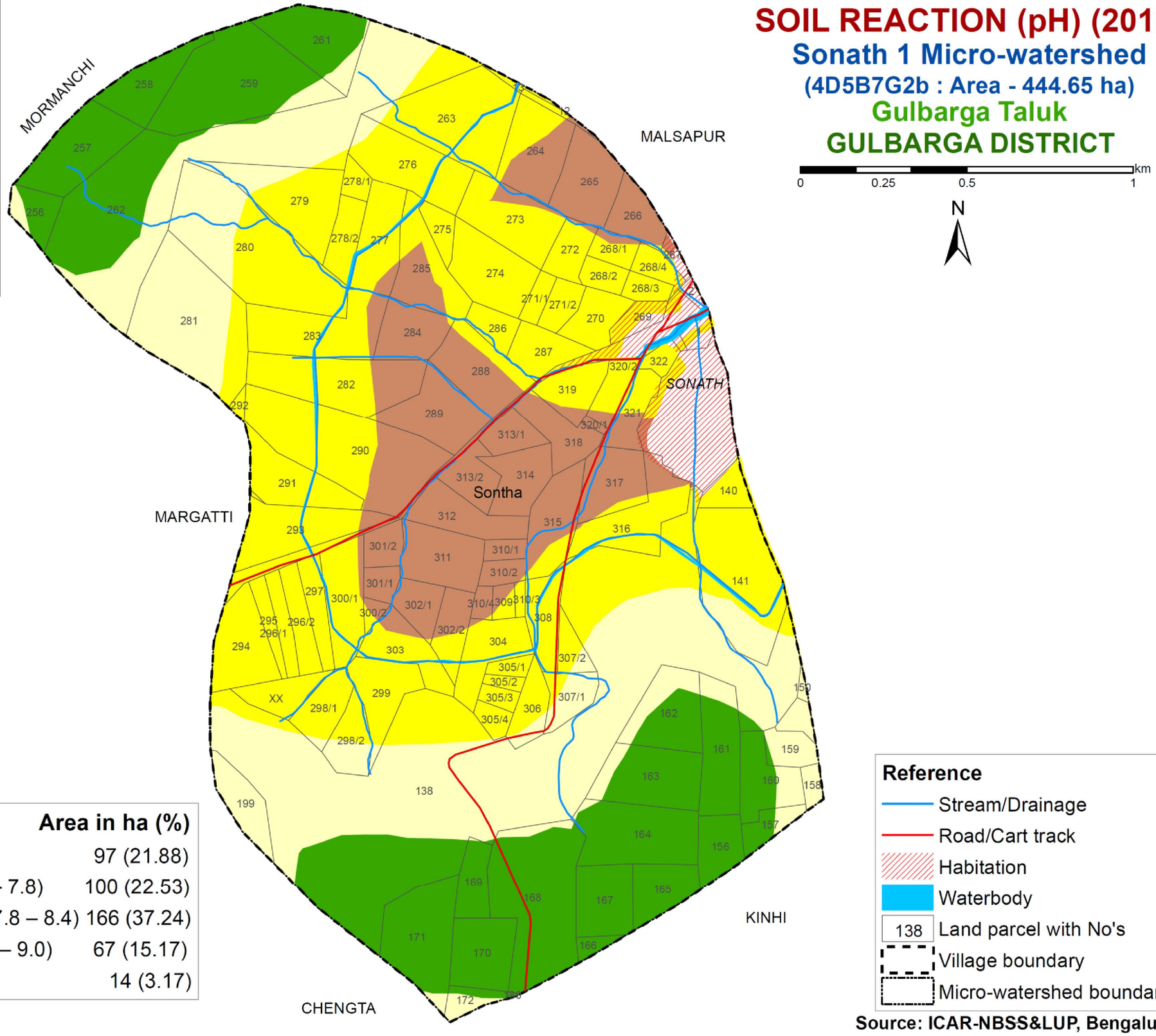
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





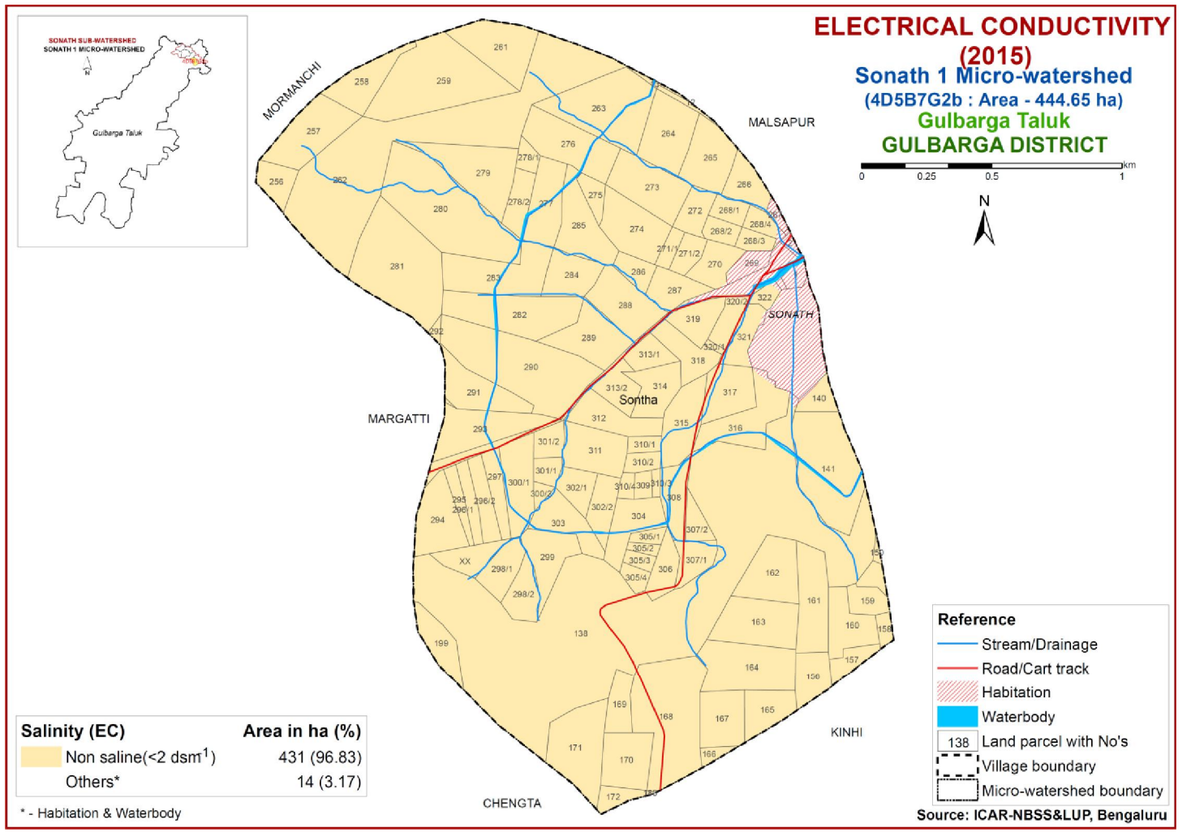
Reaction class	Area in ha (%)
Neutral (pH 6.5 – 7.3)	97 (21.88)
Slightly alkaline (pH 7.3 – 7.8)	100 (22.53)
Moderately alkaline (pH 7.8 – 8.4)	166 (37.24)
Strongly alkaline (pH 8.4 – 9.0)	67 (15.17)
Others*	14 (3.17)

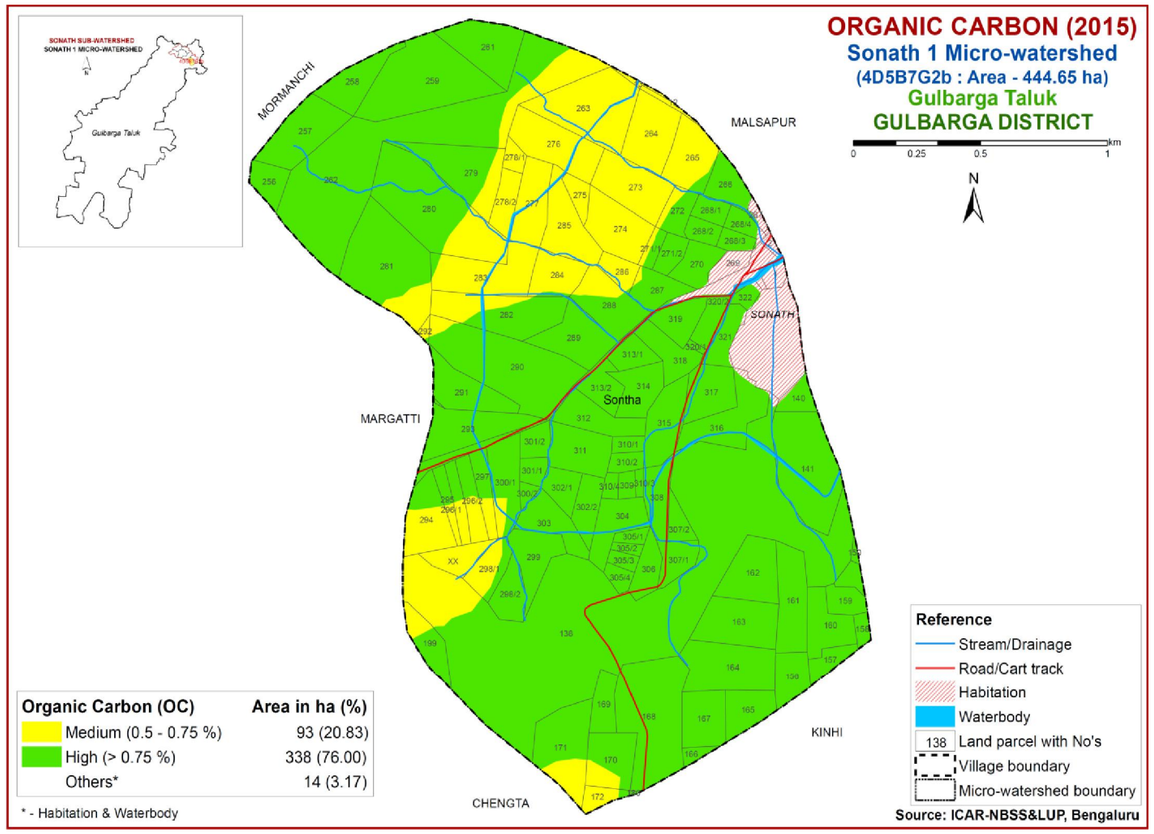
* - Habitation & Waterbody

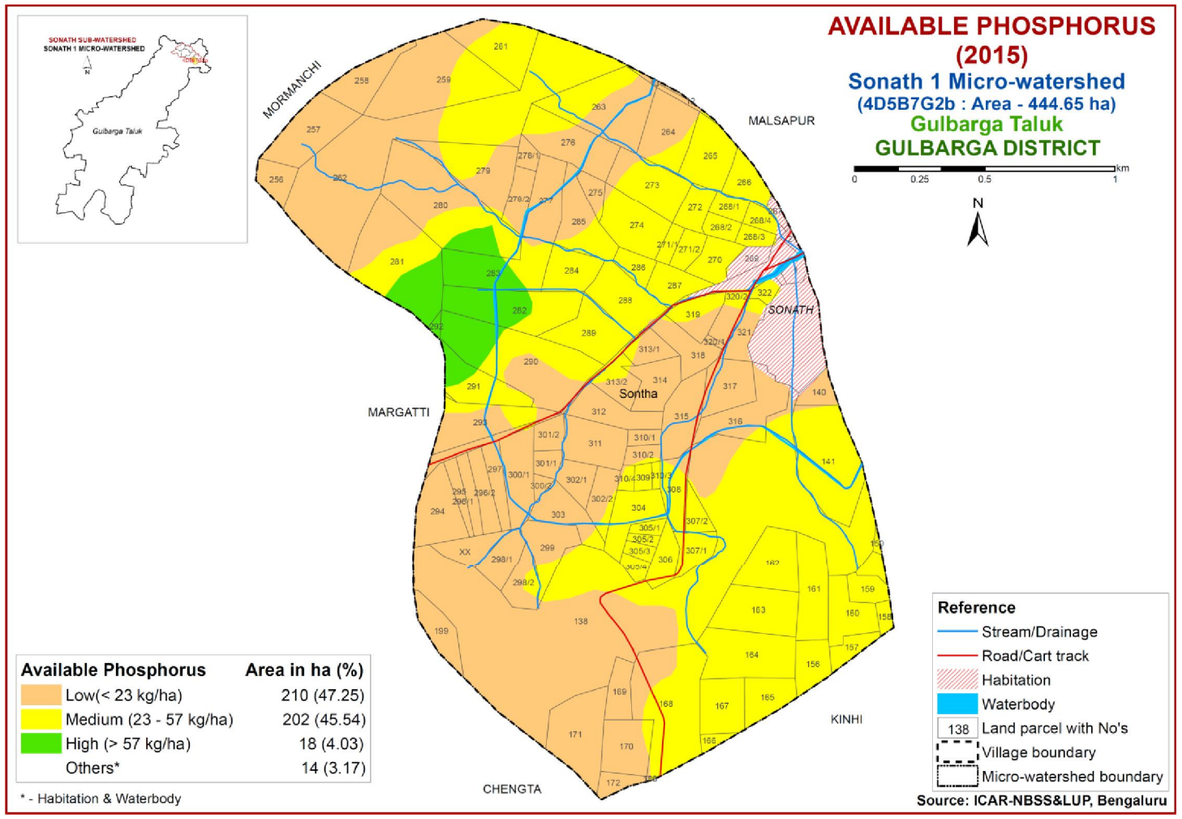
Reference

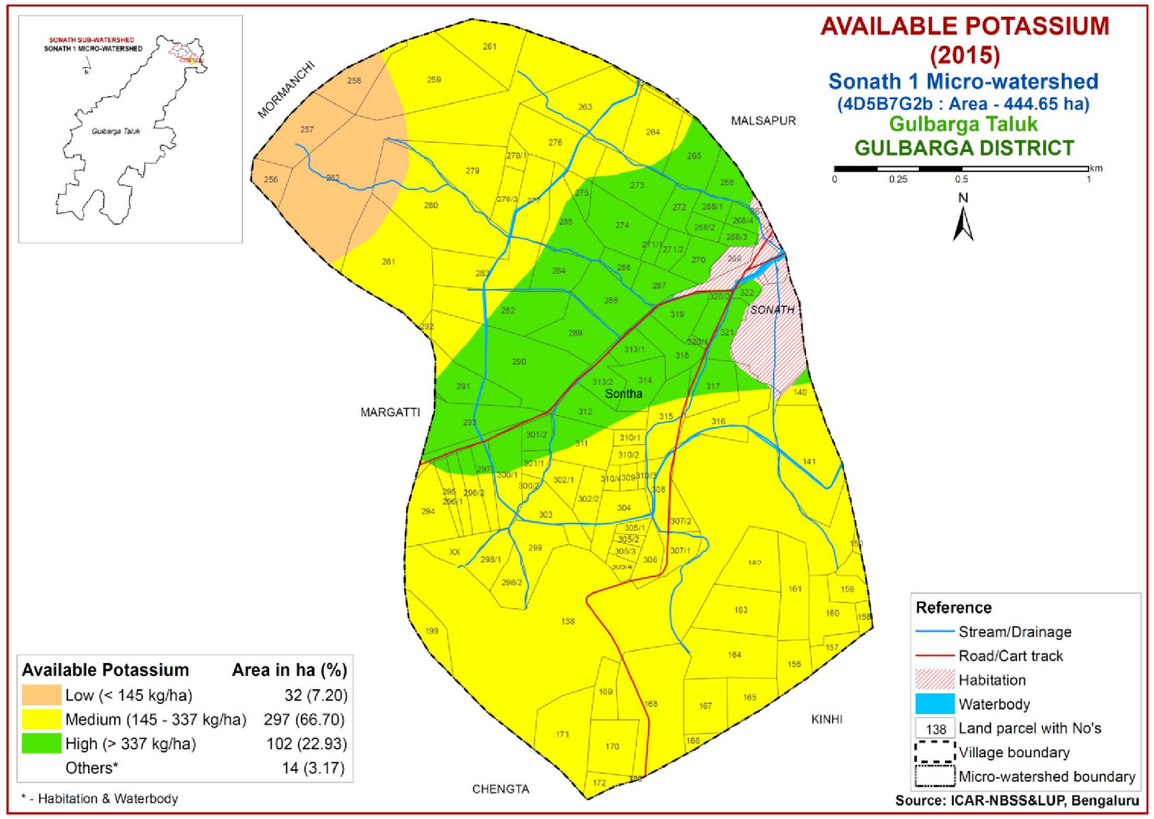
- Stream/Drainage
- Road/Cart track
- Habitation
- Waterbody
- 138 Land parcel with No's
- Village boundary
- Micro-watershed boundary

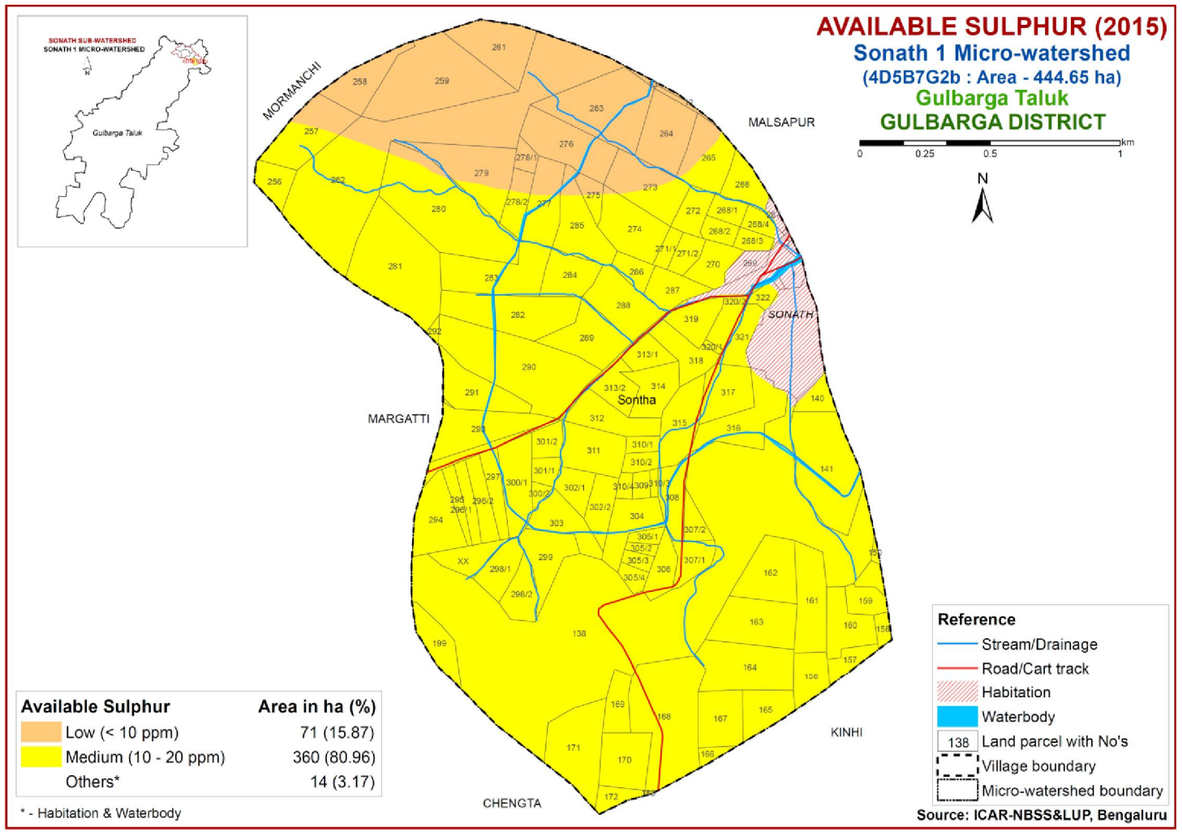
Source: ICAR-NBSS&LUP, Bengaluru

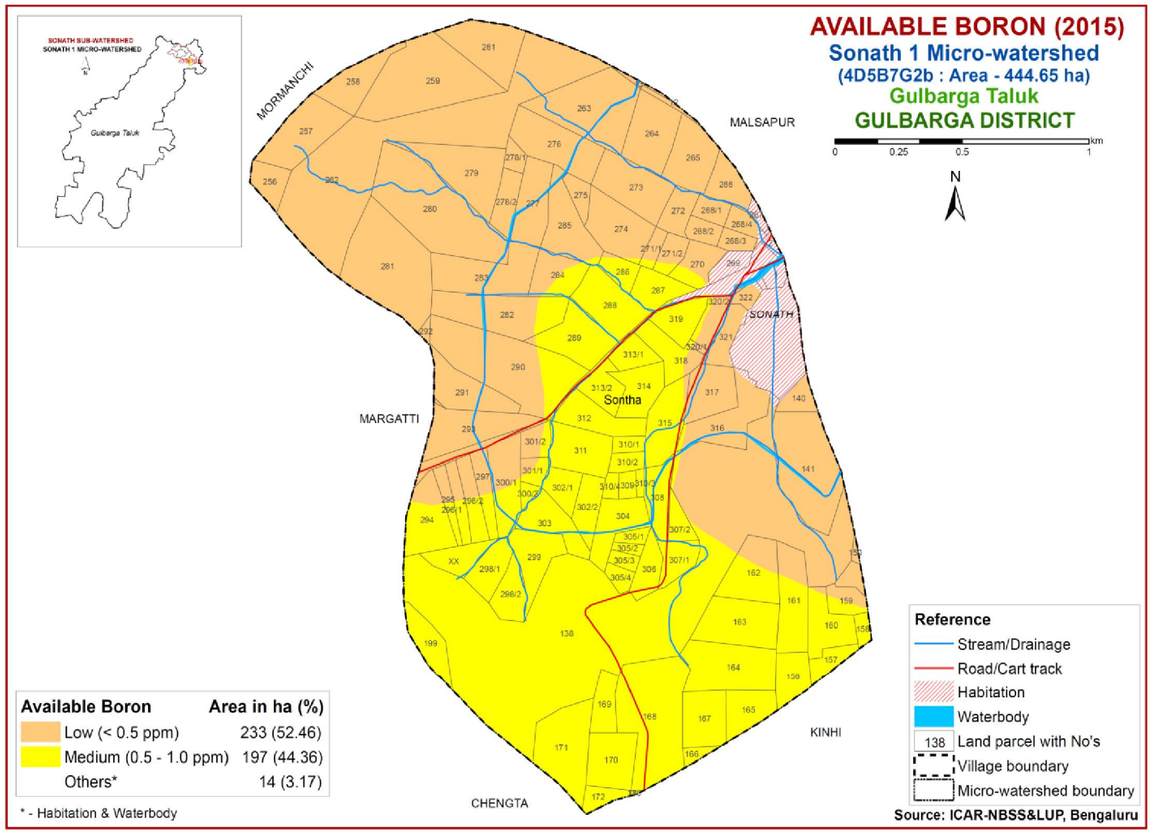

ELECTRICAL CONDUCTIVITY (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Salinity (EC) | Area in ha (%)
Non saline(<2 dsm-1) | 431 (96.83)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

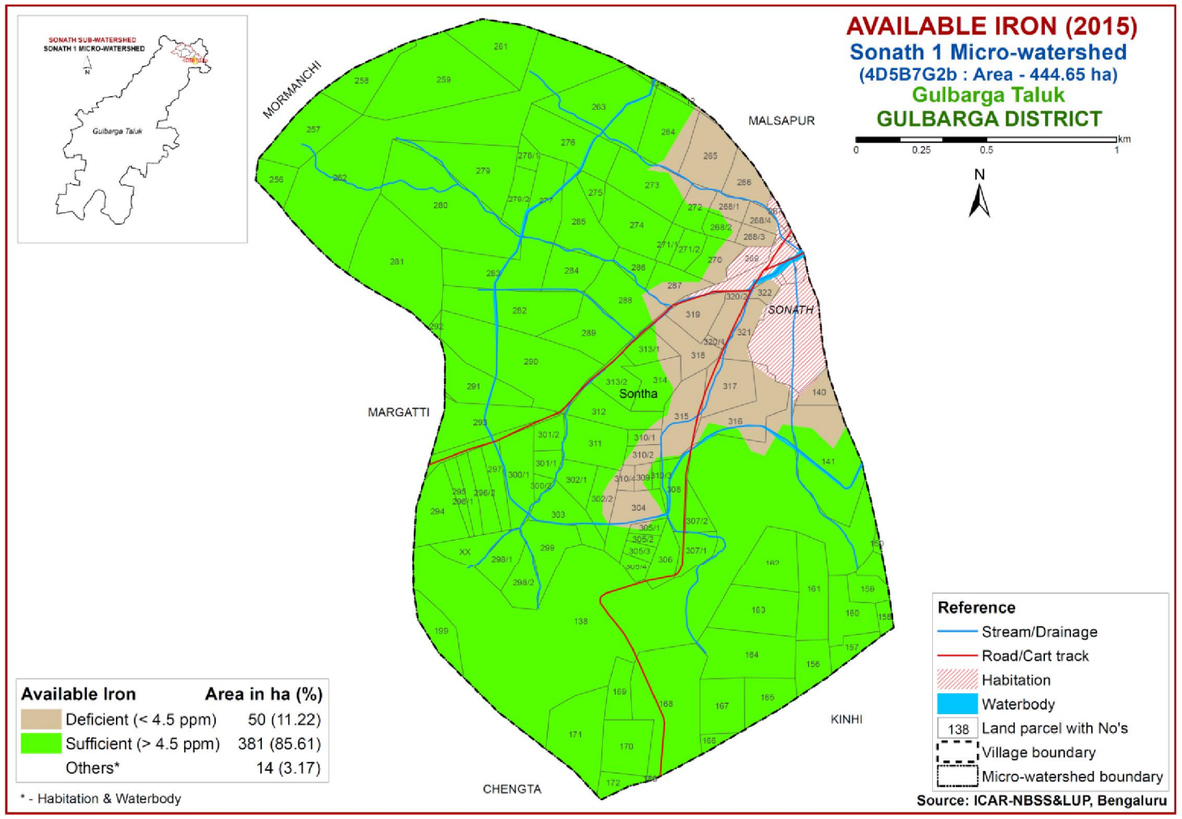

ORGANIC CARBON (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Organic Carbon (OC) | Area in ha (%)
Medium (0.5 - 0.75 %) | 93 (20.83)
High (> 0.75 %) | 338 (76.00)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

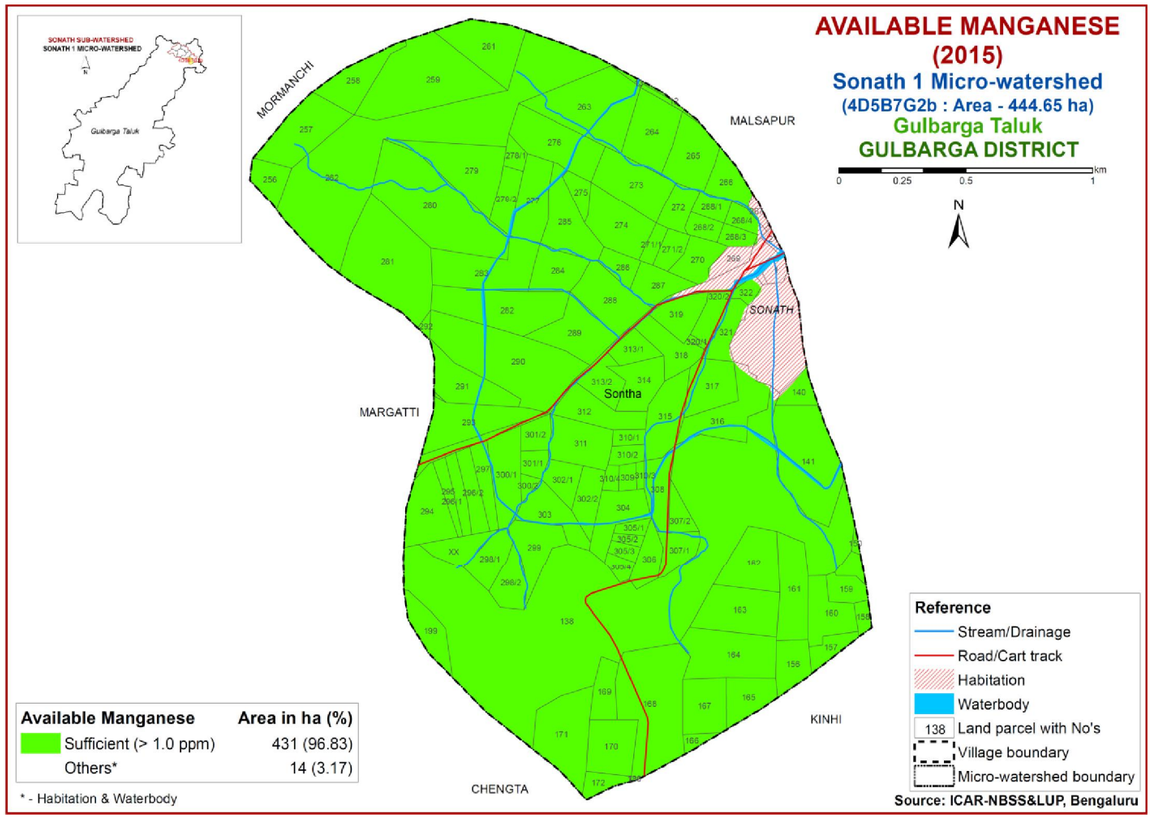

AVAILABLE PHOSPHORUS (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Phosphorus | Area in ha (%)
Low(< 23 kg/ha) | 210 (47.25)
Medium (23 - 57 kg/ha) | 202 (45.54)
High (> 57 kg/ha) | 18 (4.03)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE POTASSIUM (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Potassium | Area in ha (%)
Low (< 145 kg/ha) | 32 (7.20)
Medium (145 - 337 kg/ha) | 297 (66.70)
High (> 337 kg/ha) | 102 (22.93)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE SULPHUR (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Sulphur | Area in ha (%)
Low (< 10 ppm) | 71 (15.87)
Medium (10 - 20 ppm) | 360 (80.96)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE BORON (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Boron | Area in ha (%)
Low (< 0.5 ppm) | 233 (52.46)
Medium (0.5 - 1.0 ppm) | 197 (44.36)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE IRON (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Iron | Area in ha (%)
Deficient (< 4.5 ppm) | 50 (11.22)
Sufficient (> 4.5 ppm) | 381 (85.61)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru


AVAILABLE MANGANESE (2015)
Sonath 1 Micro-watershed
(4D5B7G2b : Area - 444.65 ha)
Gulbarga Taluk
GULBARGA DISTRICT
SONATH SUB-WATERSHED
SONATH 1 MICRO-WATERSHED
Gulbarga Taluk
MORMANCHI
MALSAPUR
SONATH
MARGATTI
Sontha
KINHI
CHENGTA
0 0.25 0.5 1 km
N
Available Manganese | Area in ha (%)
Sufficient (> 1.0 ppm) | 431 (96.83)
Others* | 14 (3.17)
* - Habitation & Waterbody
Reference
Stream/Drainage
Road/Cart track
Habitation
Waterbody
138 Land parcel with No's
Village boundary
Micro-watershed boundary
Source: ICAR-NBSS&LUP, Bengaluru

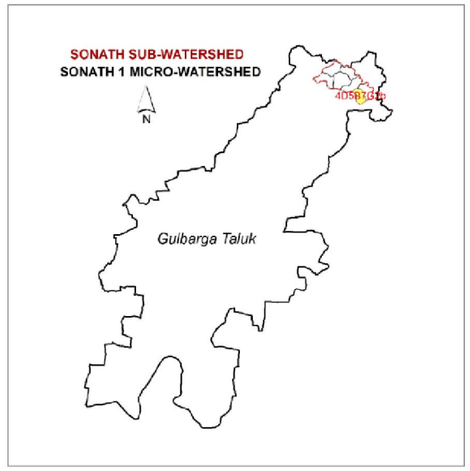
AVAILABLE COPPER (2015)

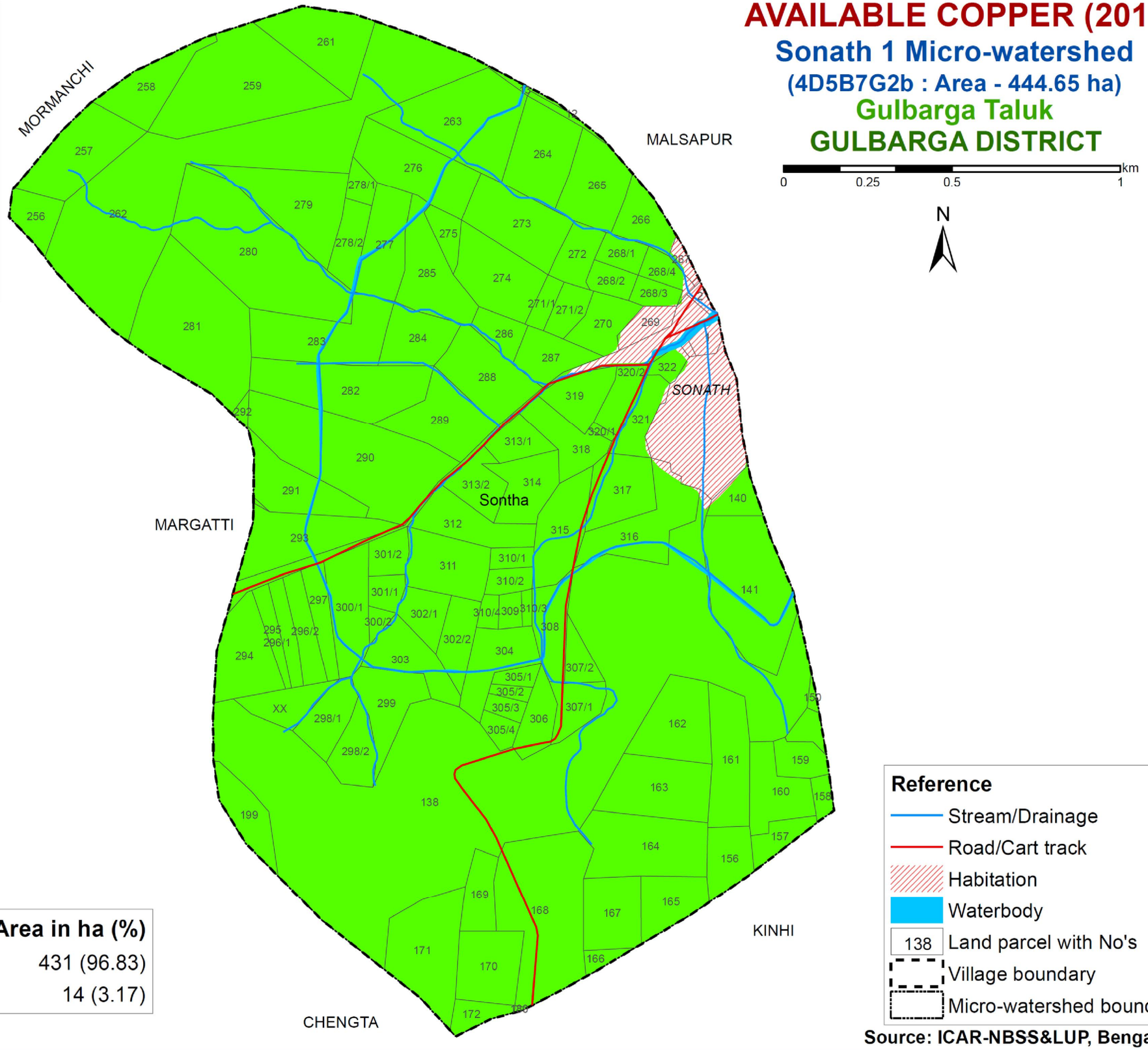
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





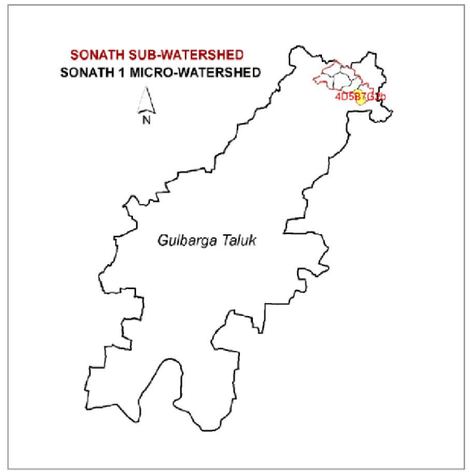
Available Copper	Area in ha (%)
Sufficient (> 0.2 ppm)	431 (96.83)
Others*	14 (3.17)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



AVAILABLE ZINC (2015)

Sonath 1 Micro-watershed

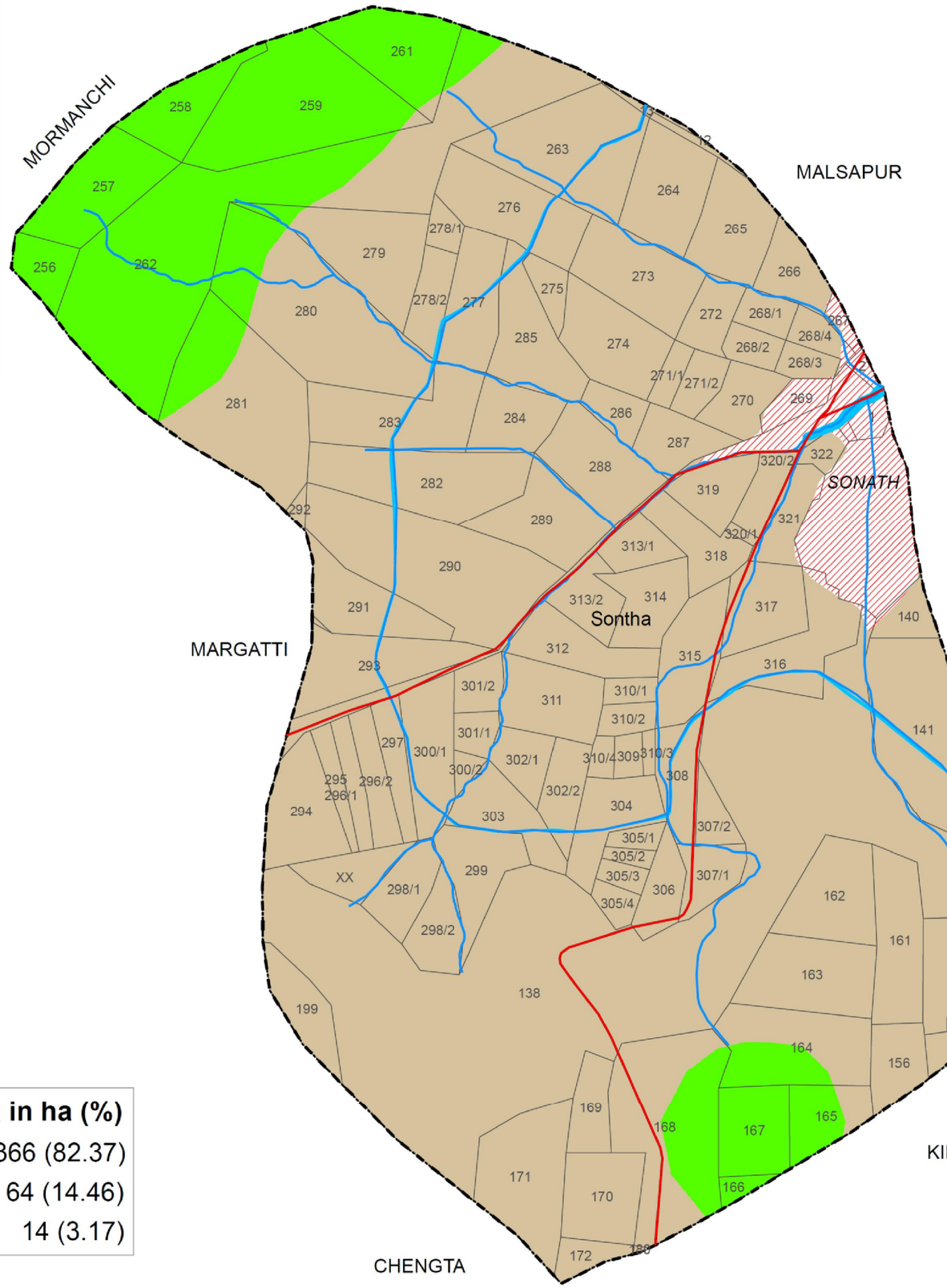
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



Available Zinc	Area in ha (%)
Deficient (< 0.6 ppm)	366 (82.37)
Sufficient (> 0.6 ppm)	64 (14.46)
Others*	14 (3.17)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

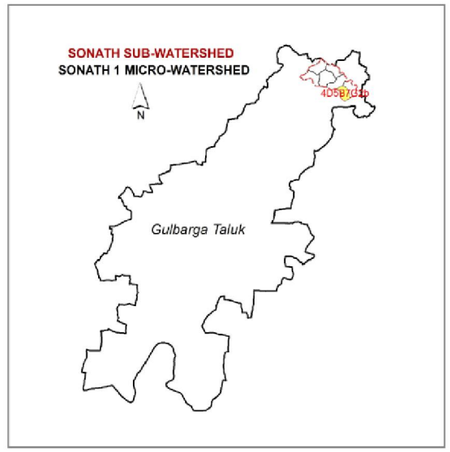
LAND SUITABILITY FOR SORGHUM

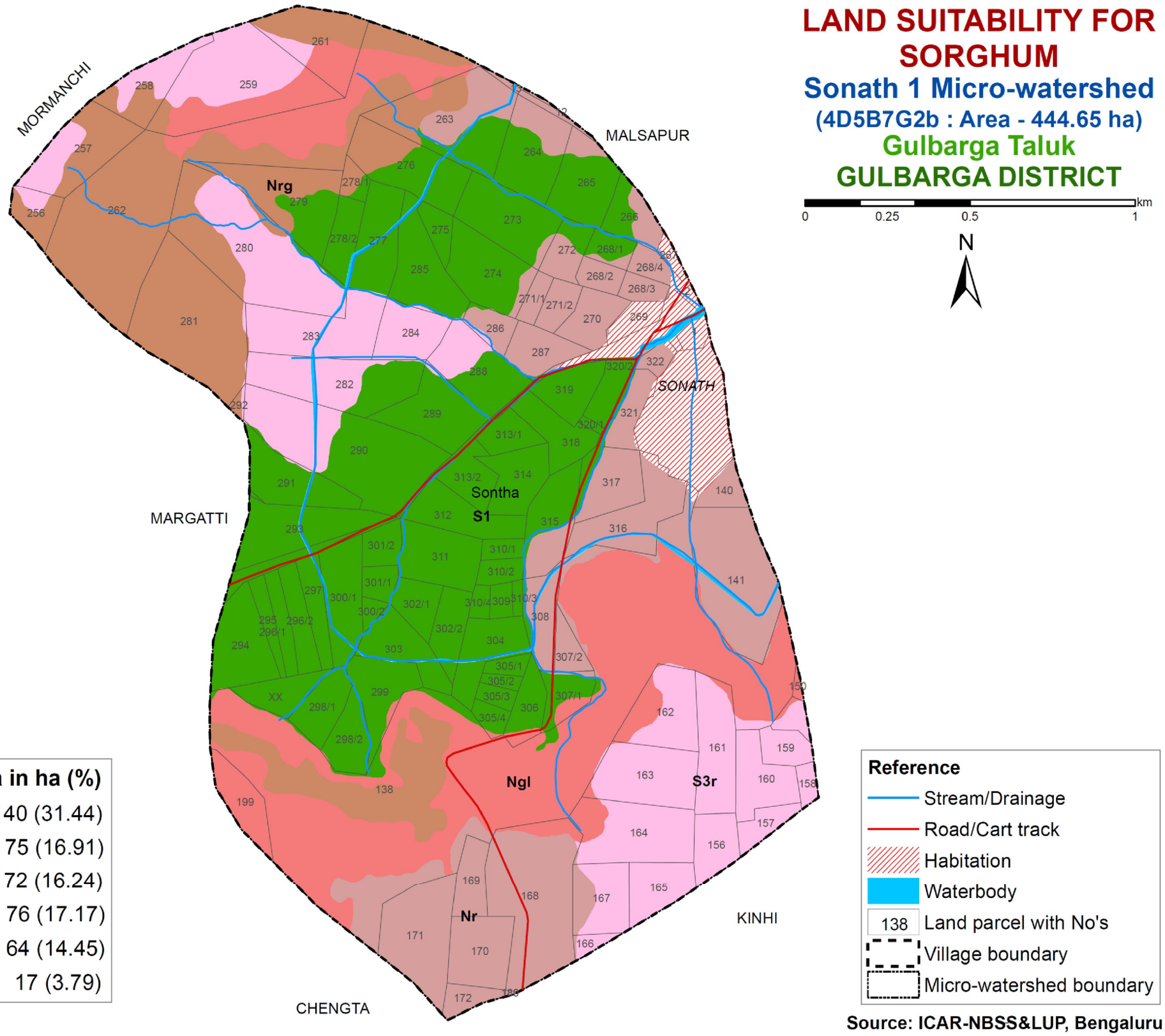
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
S3r	75 (16.91)
Ngl	72 (16.24)
Nr	76 (17.17)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

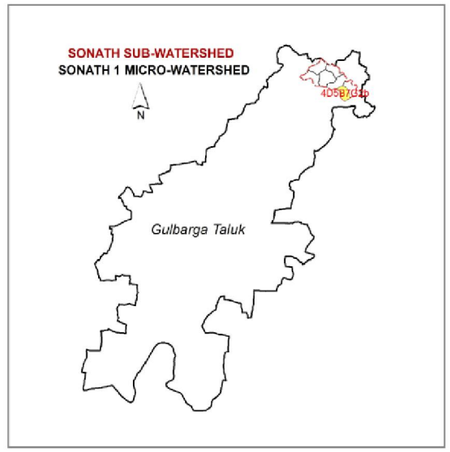
LAND SUITABILITY FOR MAIZE

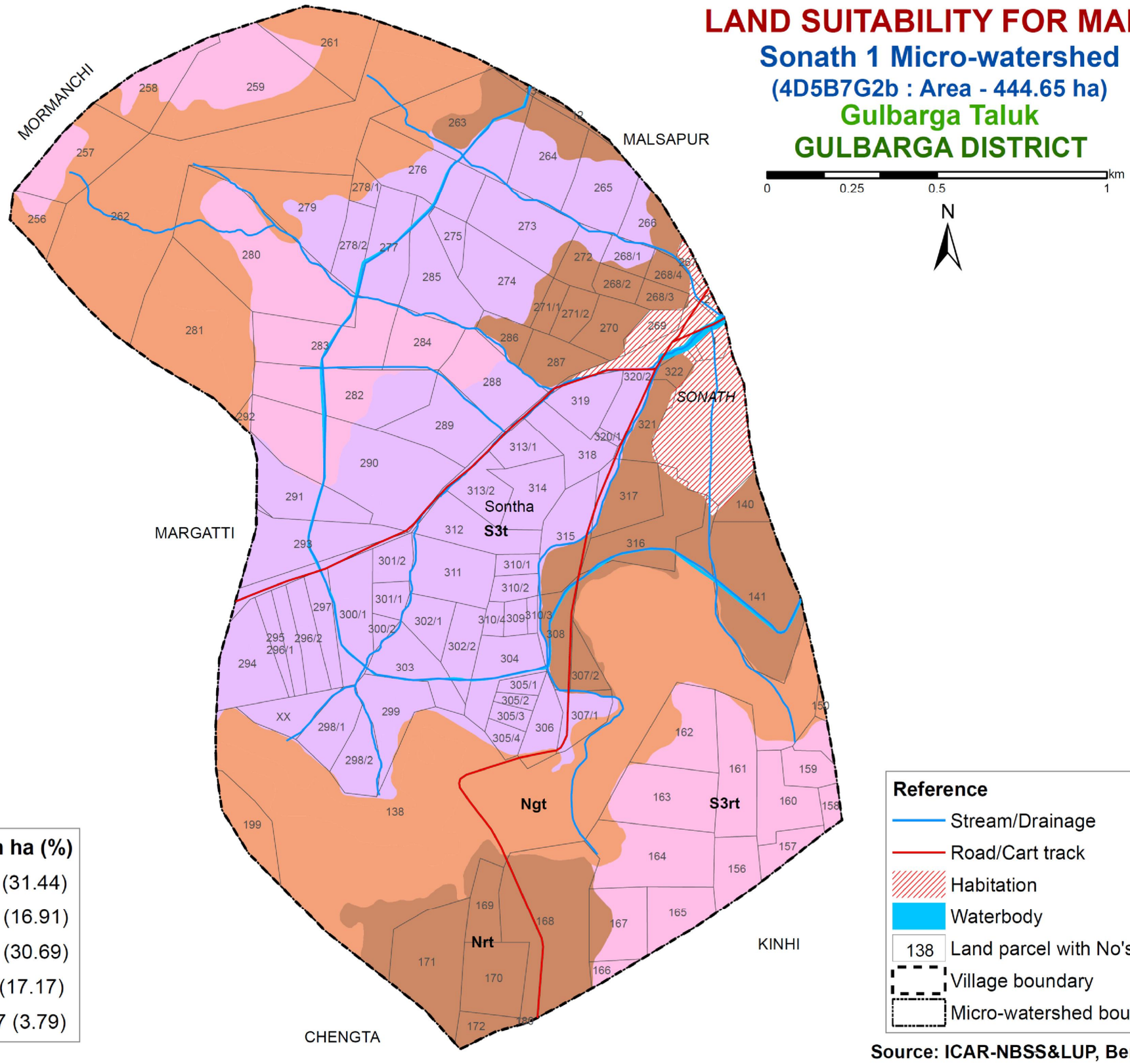
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S3t	140 (31.44)
S3rt	75 (16.91)
Ngt	136 (30.69)
Nrt	76 (17.17)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

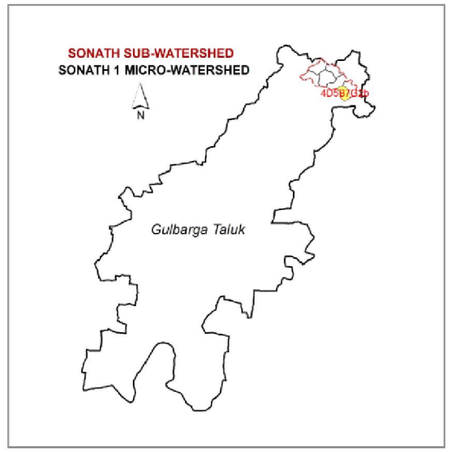
LAND SUITABILITY FOR REDGRAM

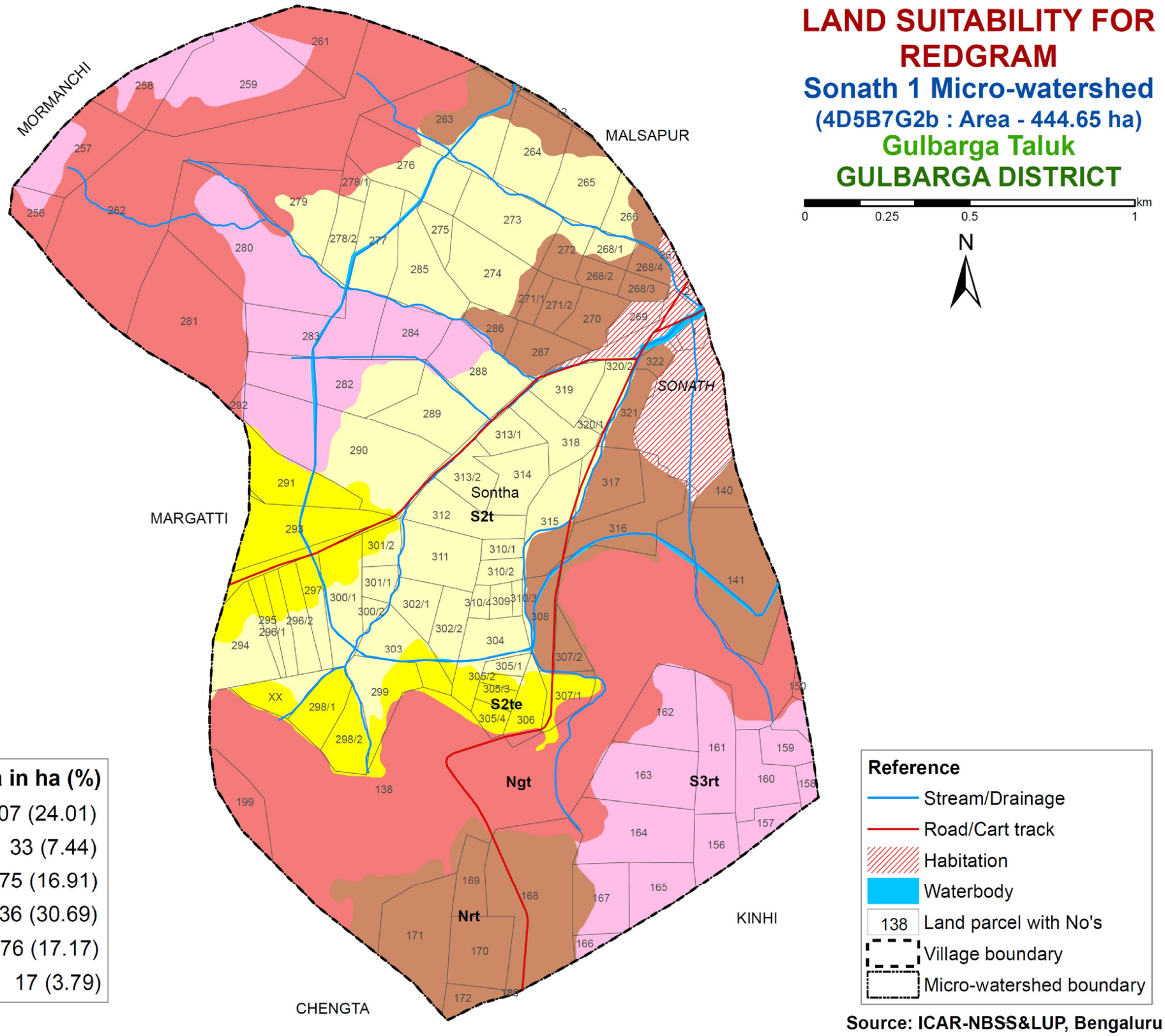
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S2-Moderately Suitable
S3-Marginally Suitable
N-Not Suitable

Limitations
e-erosion
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S2t	107 (24.01)
S2te	33 (7.44)
S3rt	75 (16.91)
Ngt	136 (30.69)
Nrt	76 (17.17)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

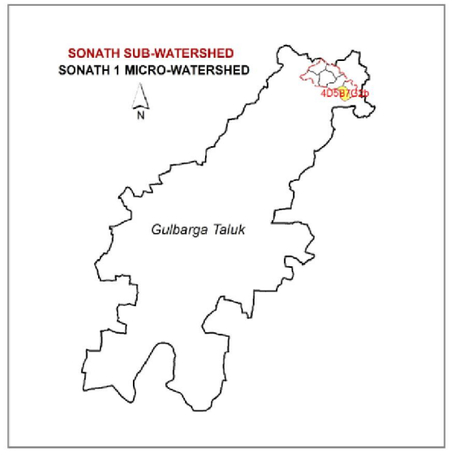
LAND SUITABILITY FOR BENGALGRAM

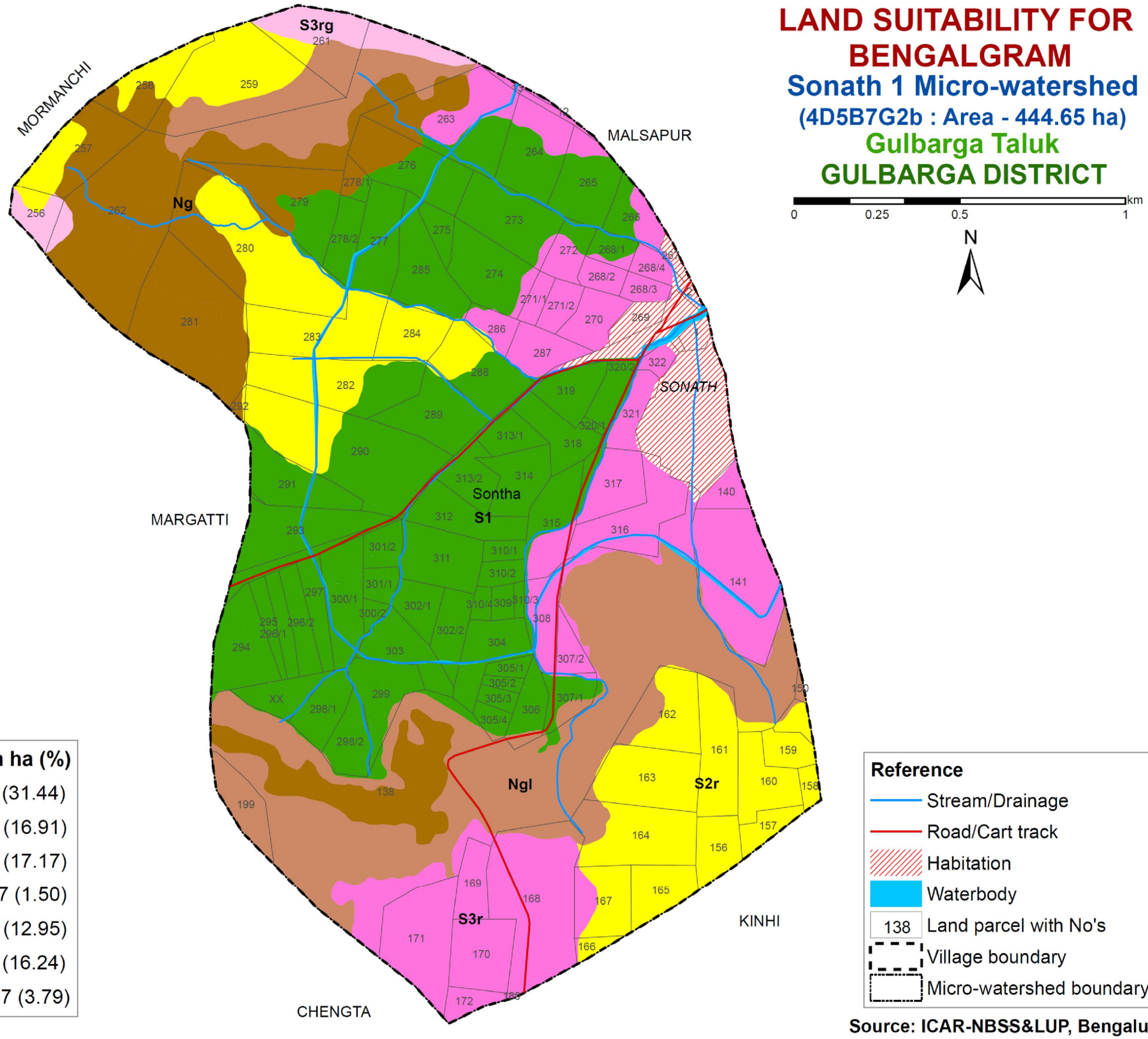
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1- Highly Suitable
S2- Moderately Suitable
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
S2r	75 (16.91)
S3r	76 (17.17)
S3rg	7 (1.50)
Ng	58 (12.95)
Ngl	72 (16.24)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

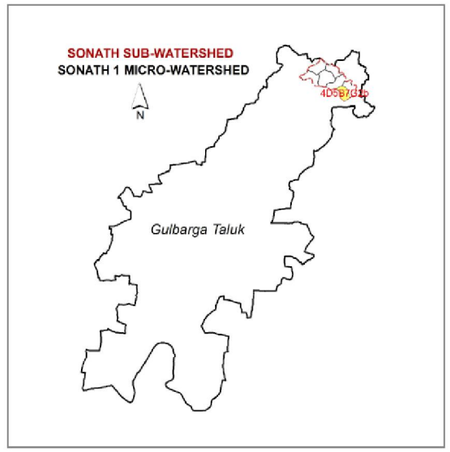
LAND SUITABILITY FOR SUNFLOWER

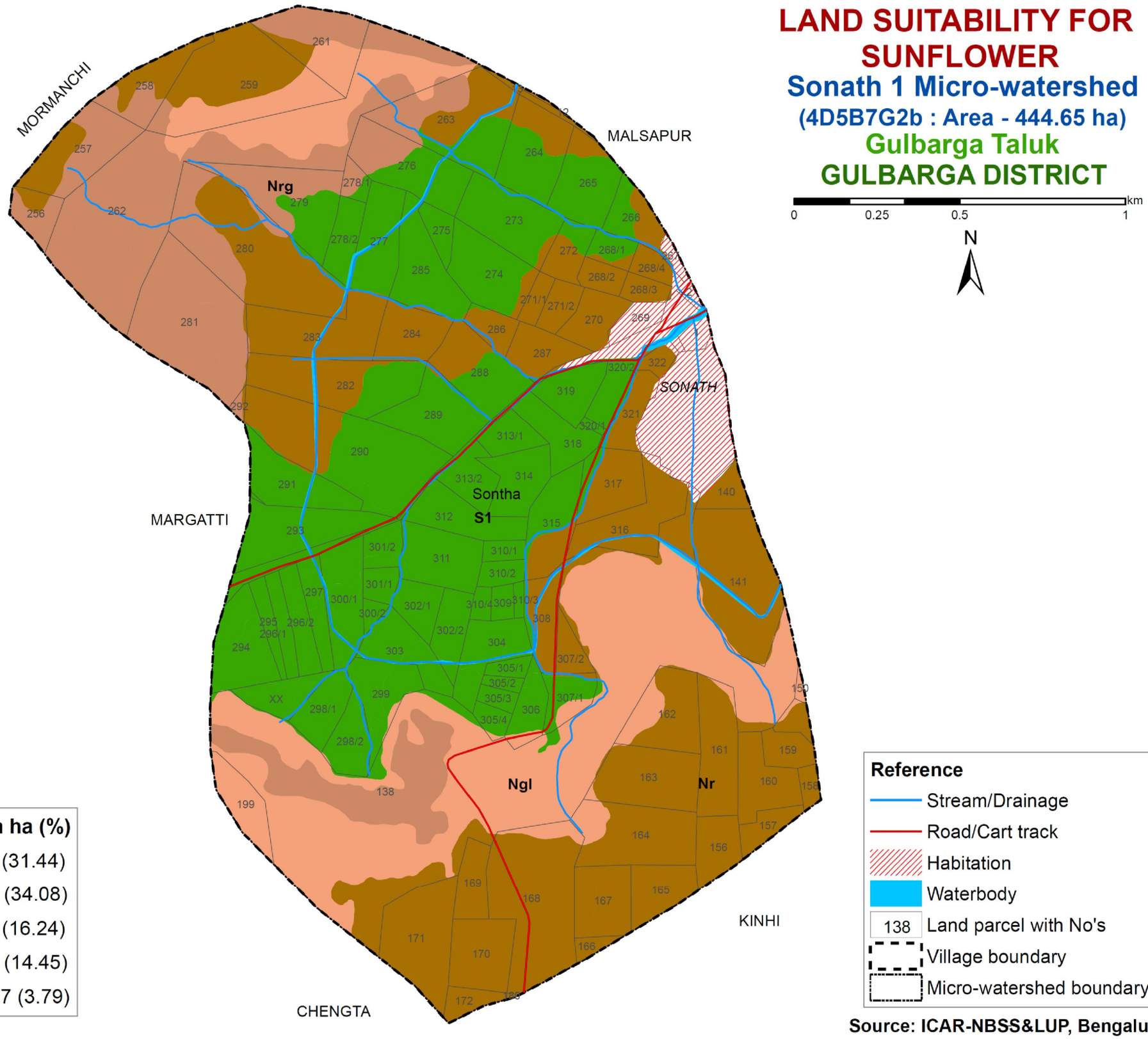
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-HighlySuitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
Nr	152 (34.08)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

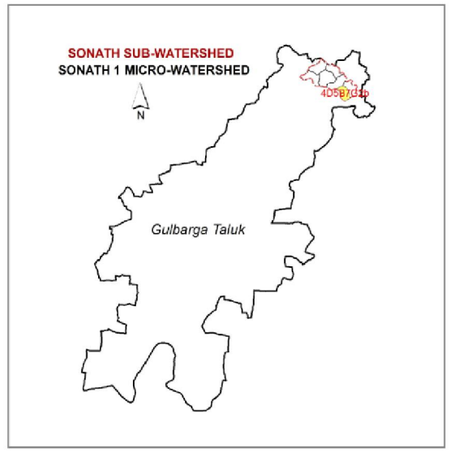
LAND SUITABILITY FOR COTTON

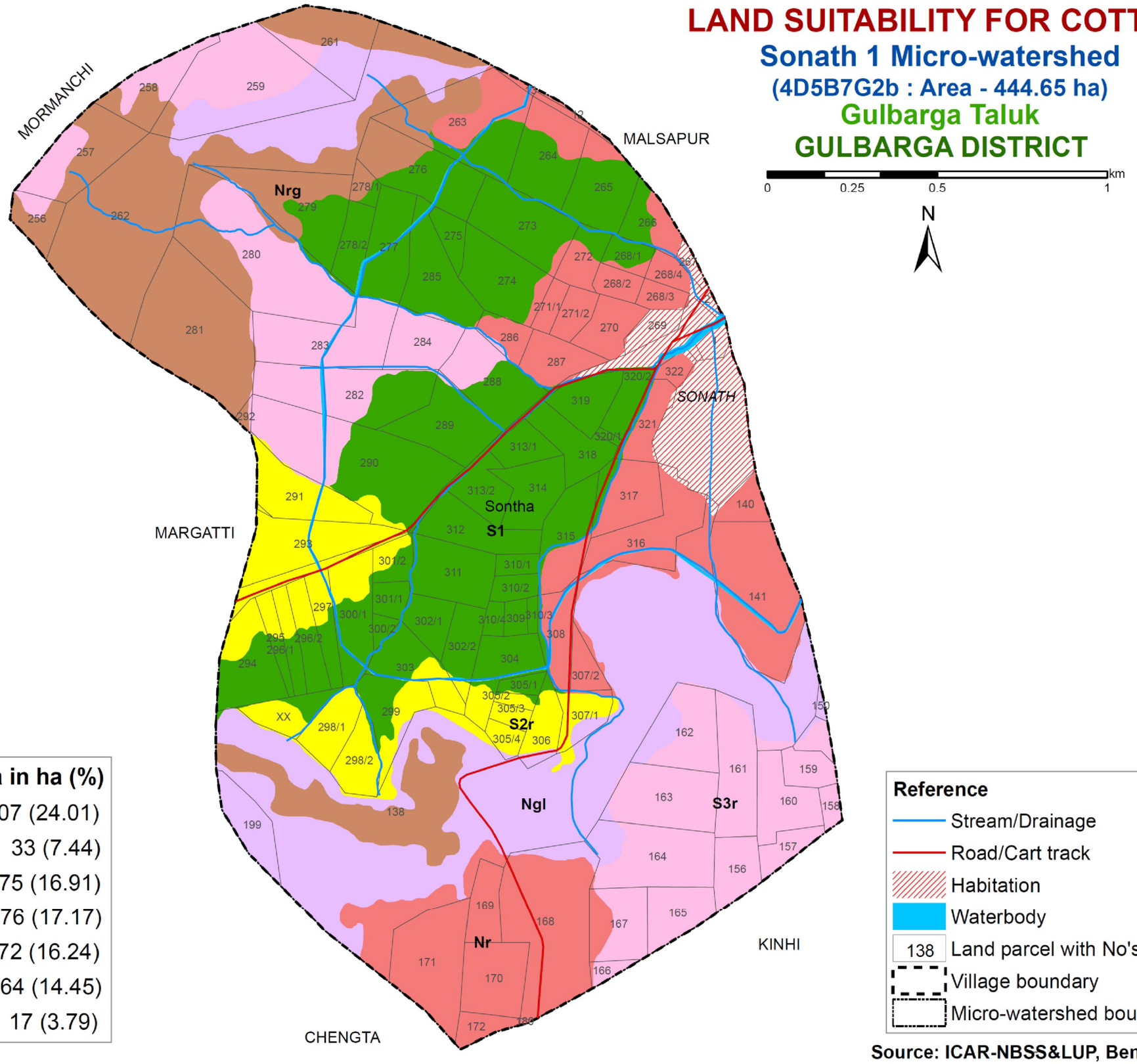
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S2-Moderately Suitable
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	107 (24.01)
S2r	33 (7.44)
S3r	75 (16.91)
Nr	76 (17.17)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

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

Source: ICAR-NBSS&LUP, Bengaluru

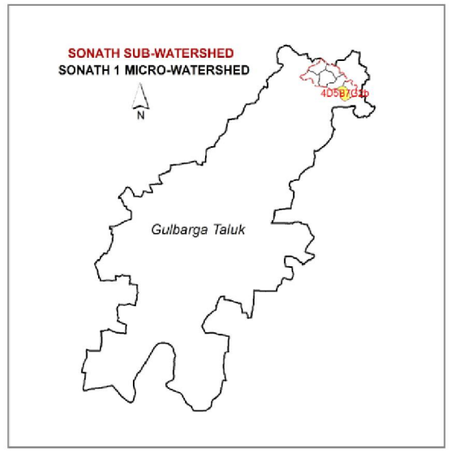
LAND SUITABILITY FOR SUGARCANE

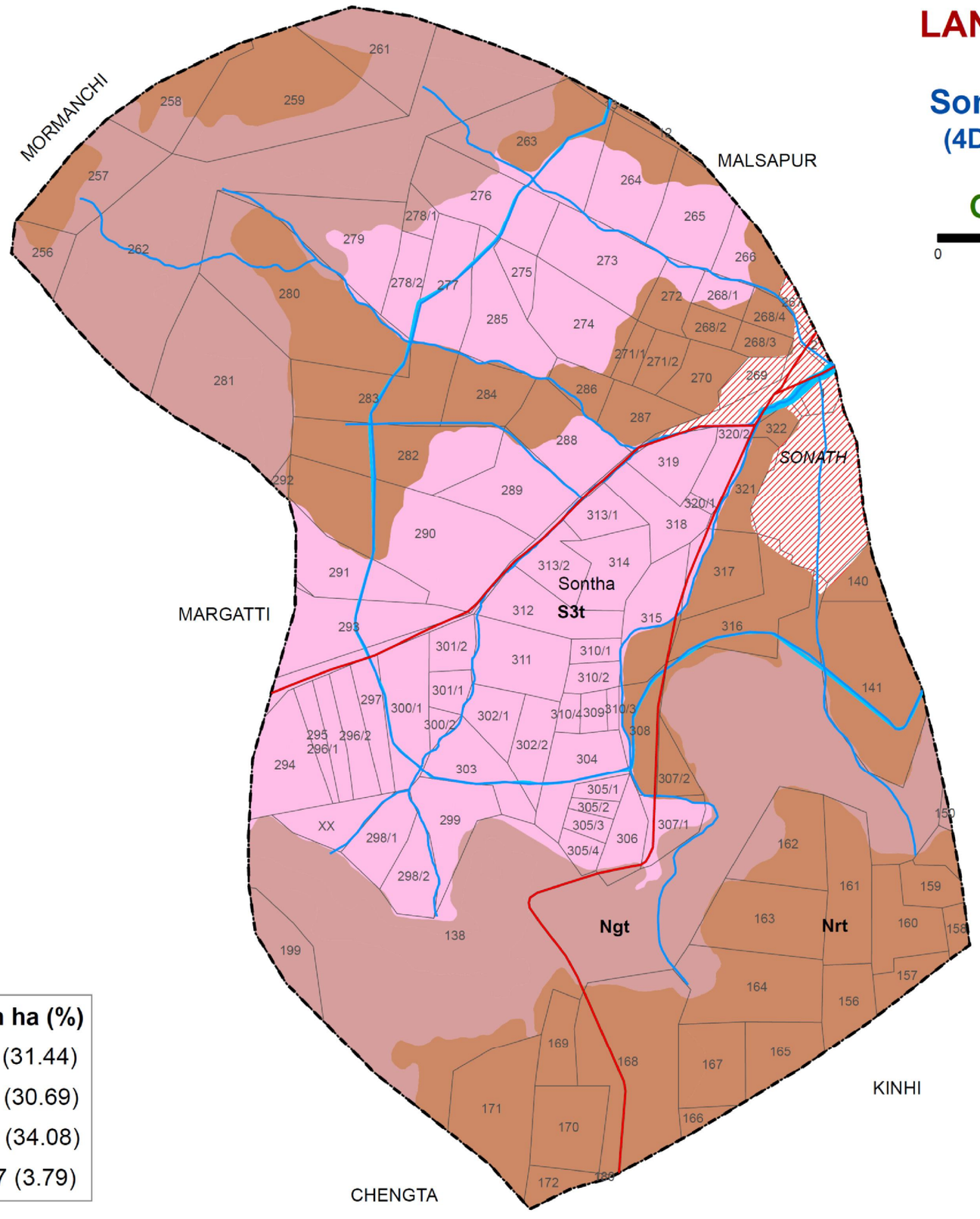
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S3t	140 (31.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

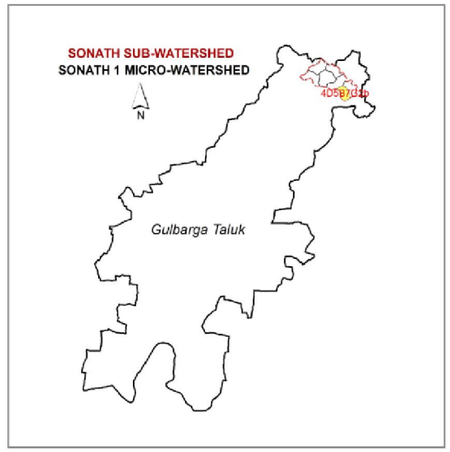
LAND SUITABILITY FOR SOYBEAN

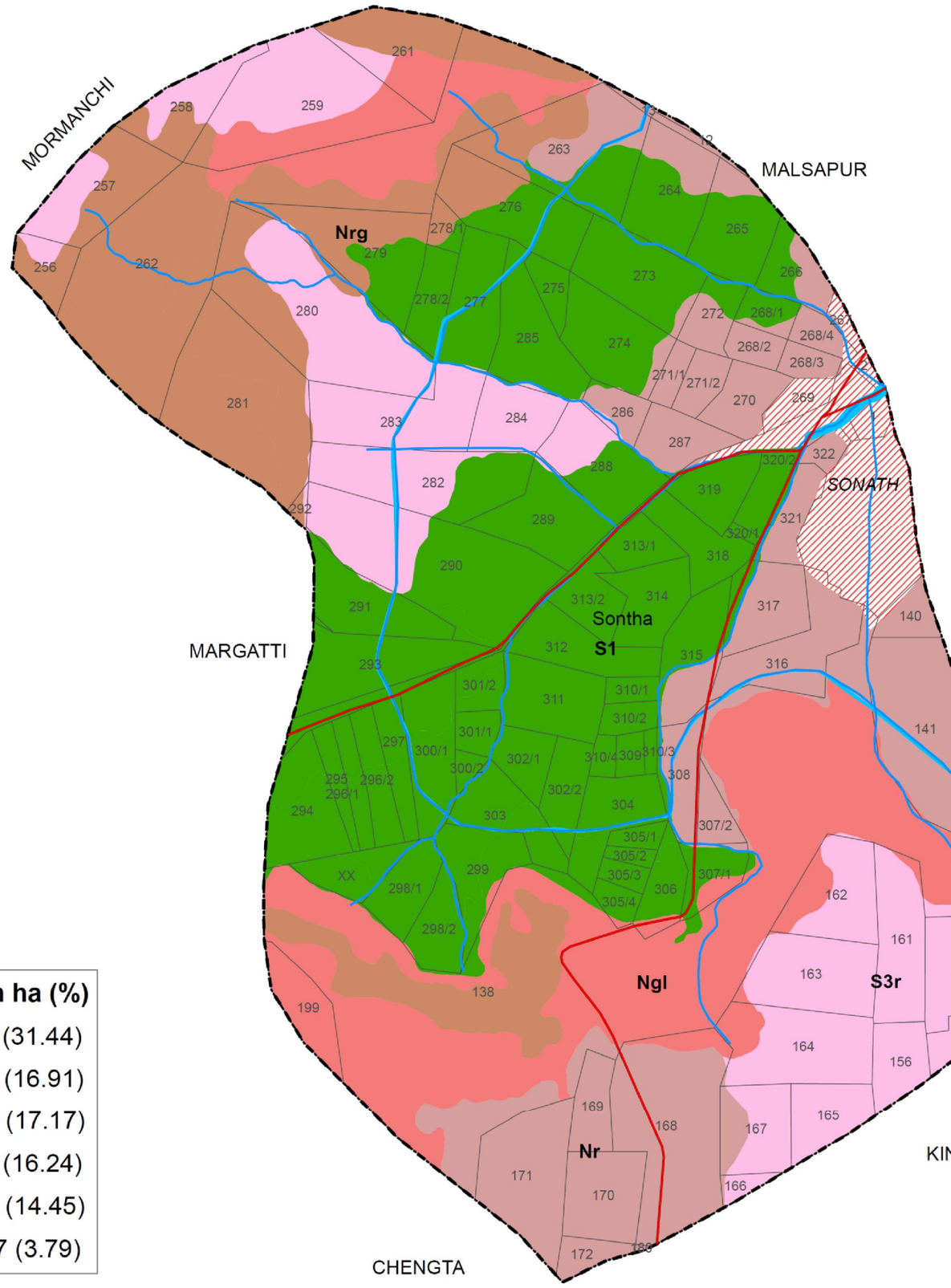
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1- Highly suitable
S3-Marginally Suitable
N-Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
S3r	75 (16.91)
Nr	76 (17.17)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

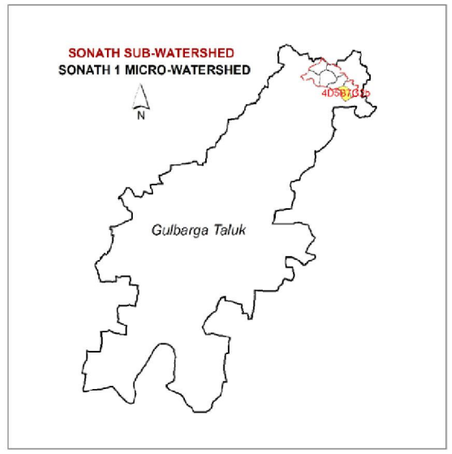
LAND SUITABILITY FOR GUAVA

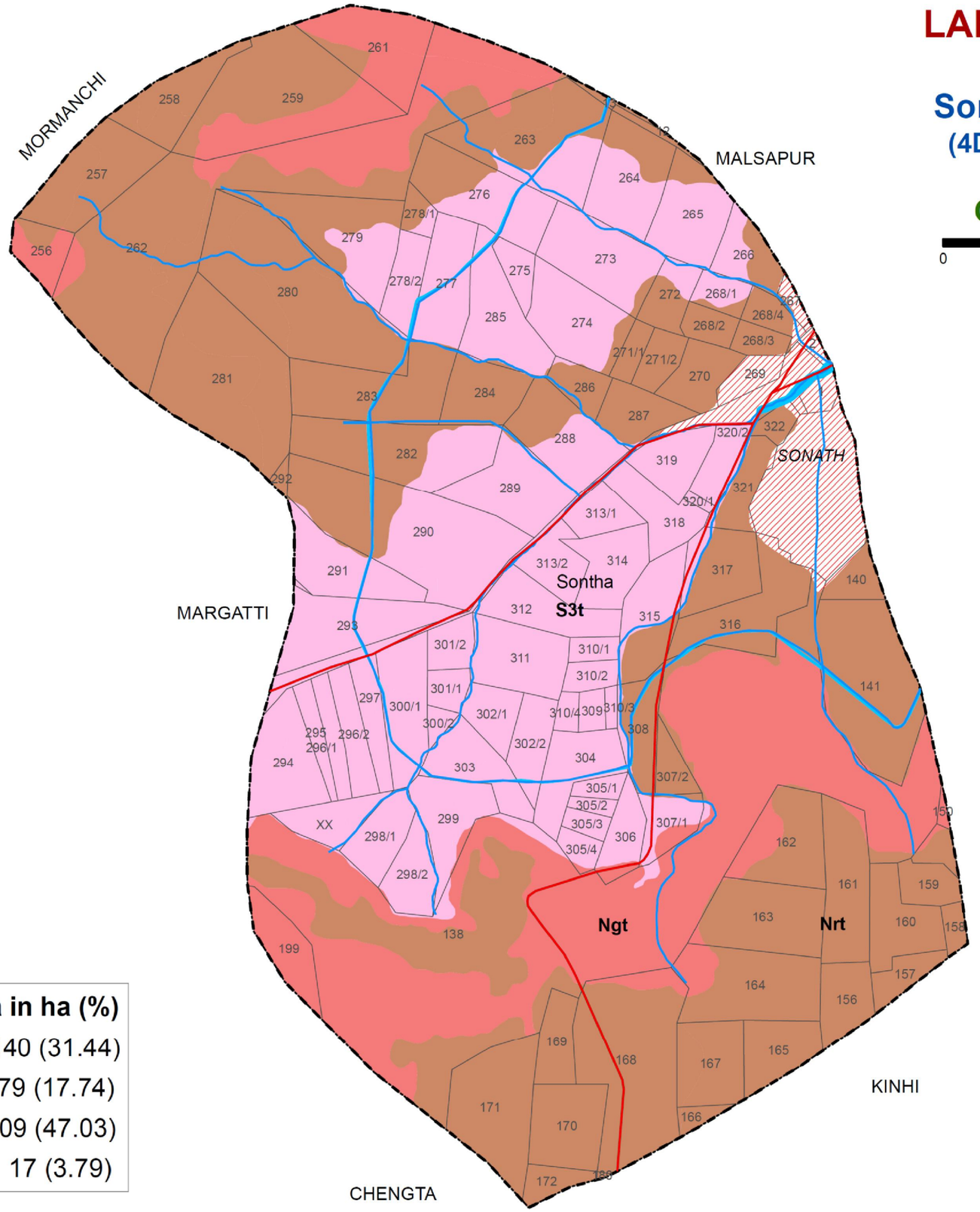
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S3t	140 (31.44)
Ngt	79 (17.74)
Nrt	209 (47.03)
Others*	17 (3.79)

* - Habitation & Waterbody

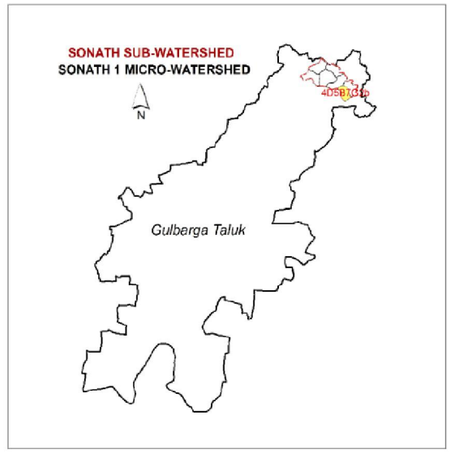
0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



LAND SUITABILITY FOR MANGO

Sonath 1 Micro-watershed

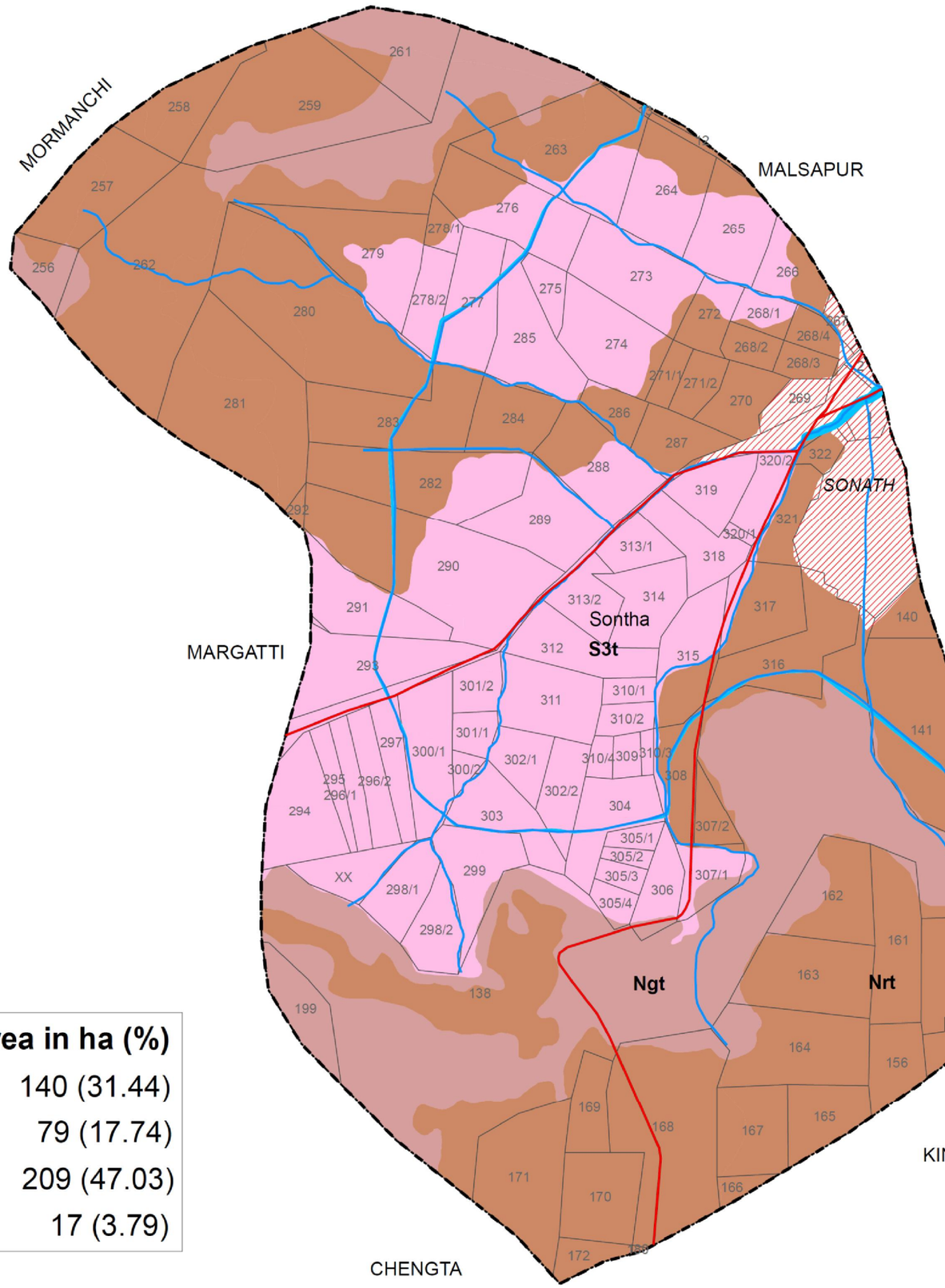
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



Key
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S3t	140 (31.44)
Ngt	79 (17.74)
Nrt	209 (47.03)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

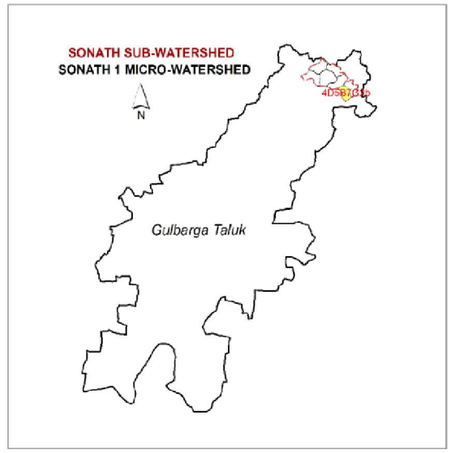
LAND SUITABILITY FOR SAPOTA

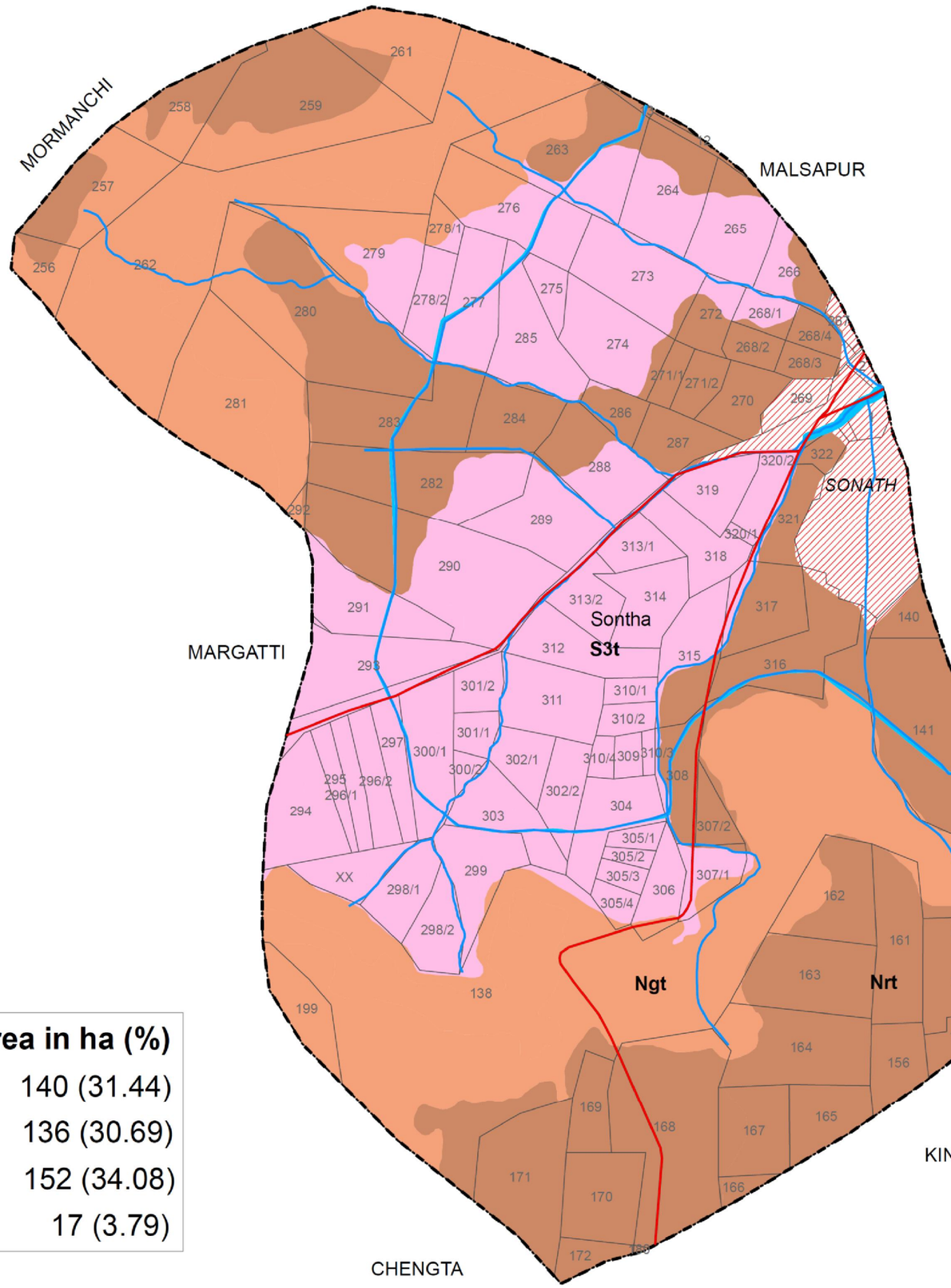
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S3t	140 (31.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

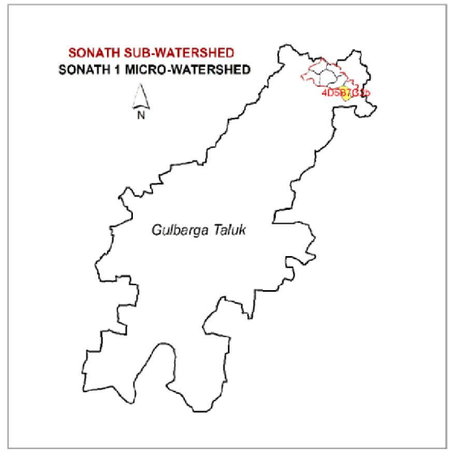
* - Habitation & Waterbody

km
0 0.25 0.5 1

N

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

Source: ICAR-NBSS&LUP, Bengaluru



LAND SUITABILITY FOR JACKFRUIT

Sonath 1 Micro-watershed

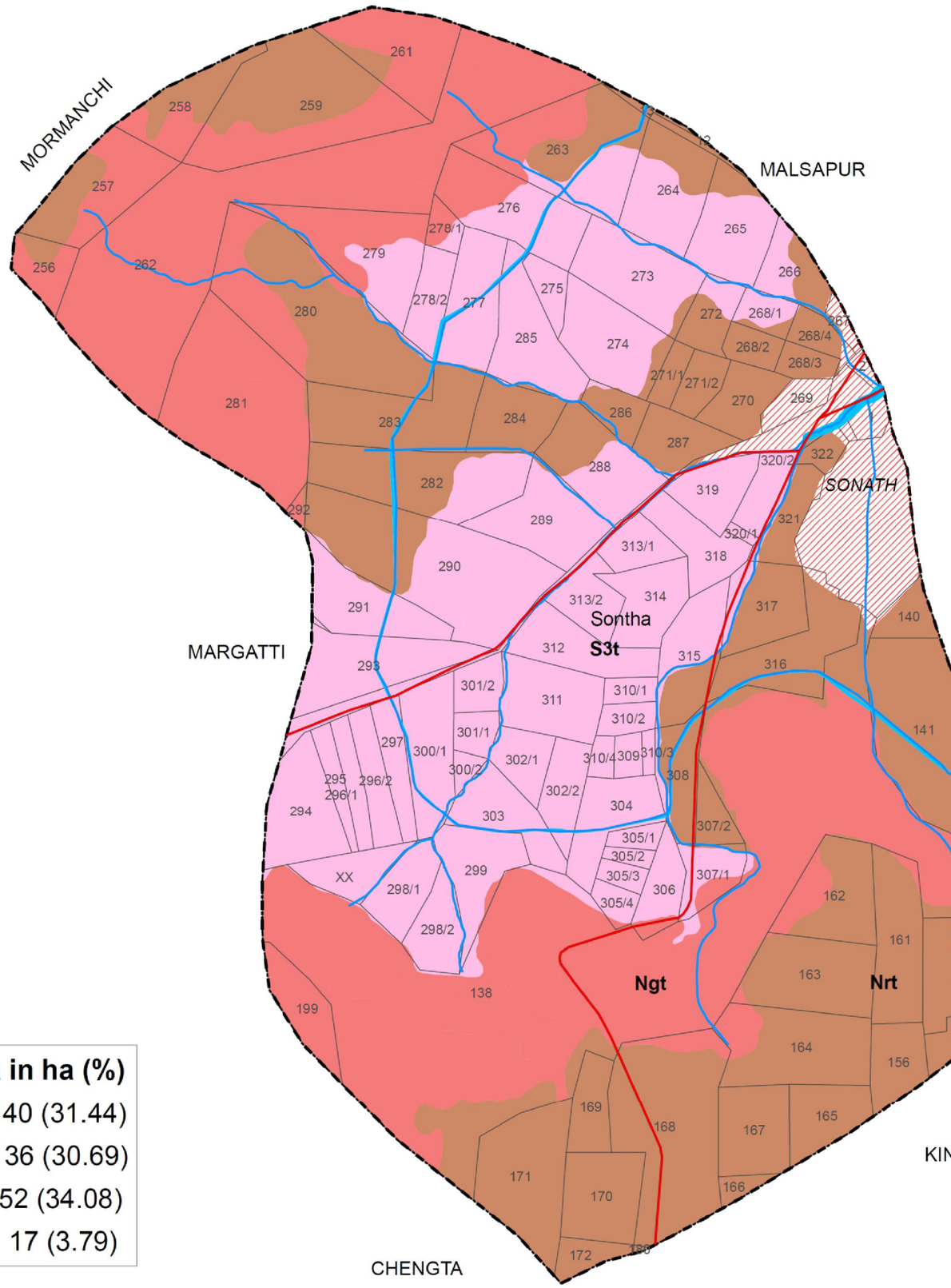
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



Key
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

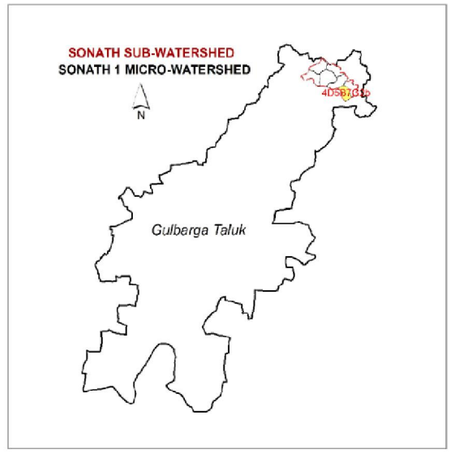
Suitability subclass	Area in ha (%)
S3t	140 (31.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



LAND SUITABILITY FOR JAMUN

Sonath 1 Micro-watershed

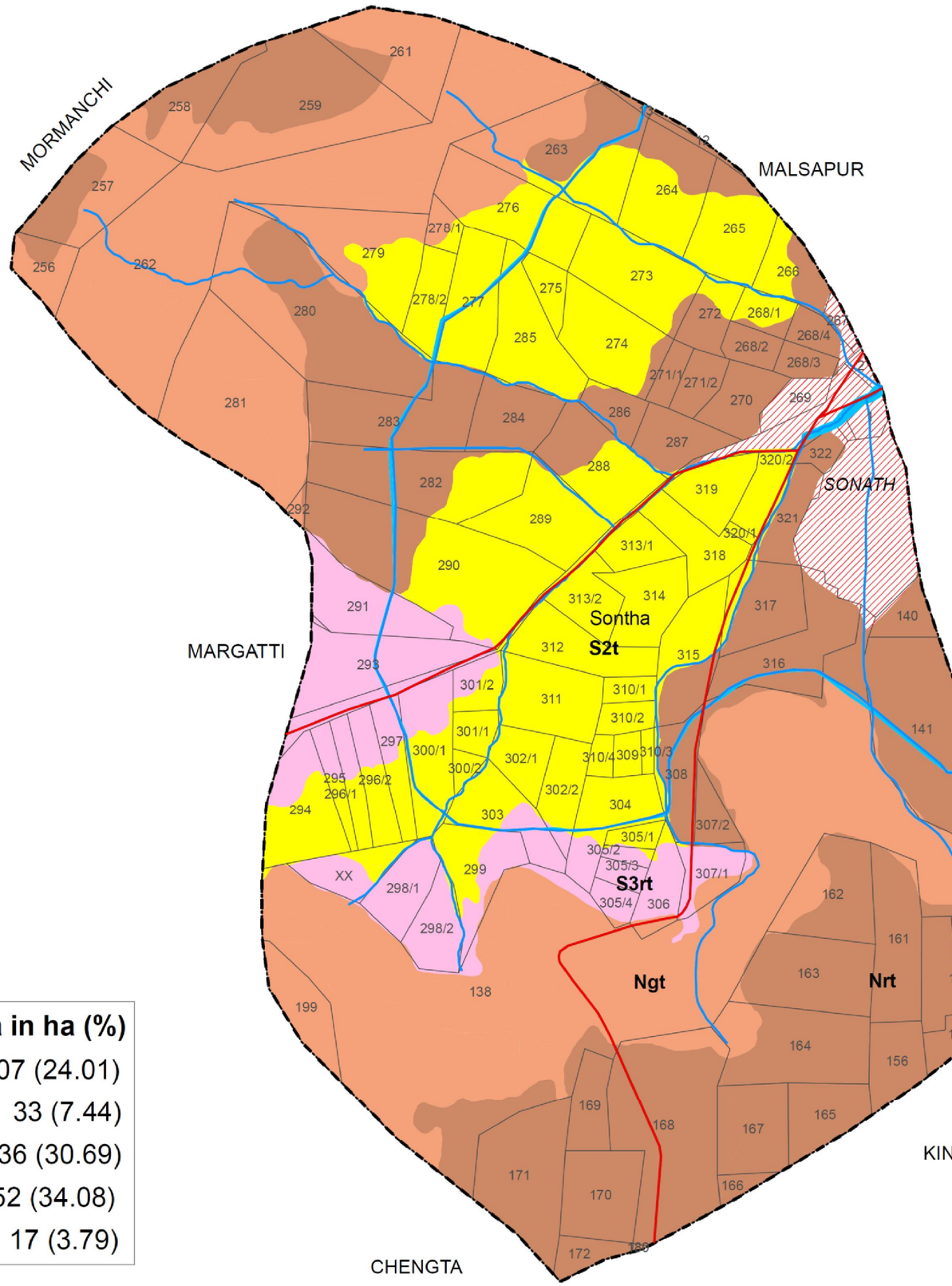
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

km
0 0.25 0.5 1

N



Key
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S2t	107 (24.01)
S3rt	33 (7.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

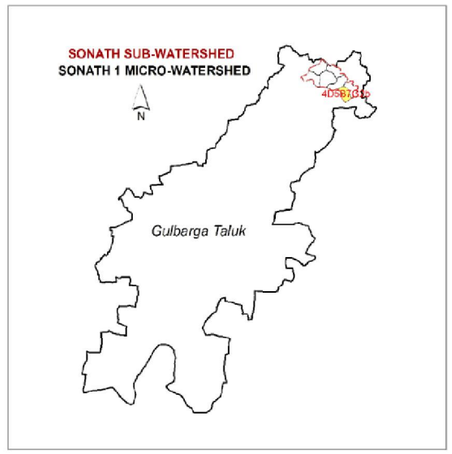
LAND SUITABILITY FOR MUSAMBI

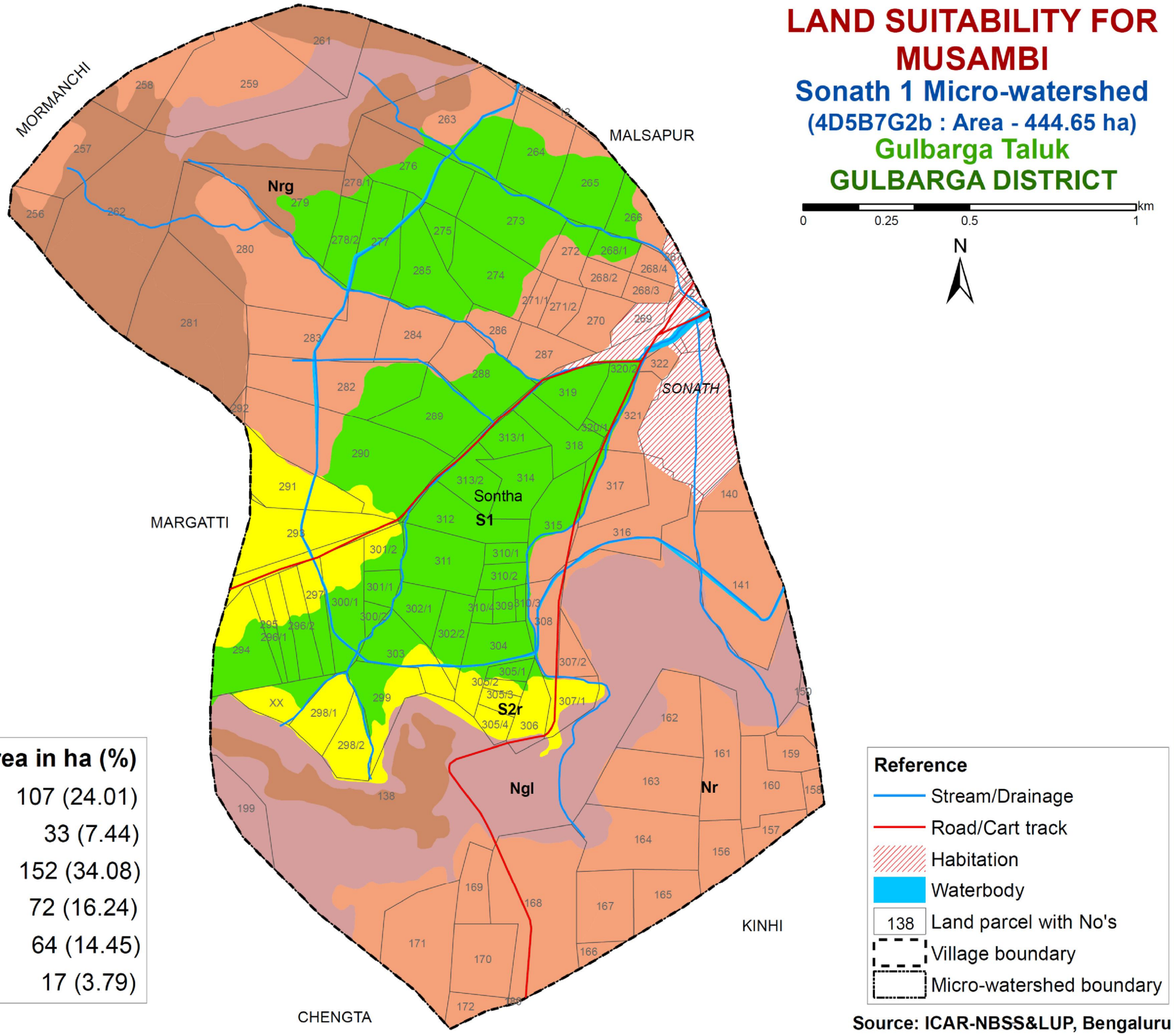
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S2-Moderately Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
l- topography

Suitability subclass	Area in ha (%)
S1	107 (24.01)
S2r	33 (7.44)
Nr	152 (34.08)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

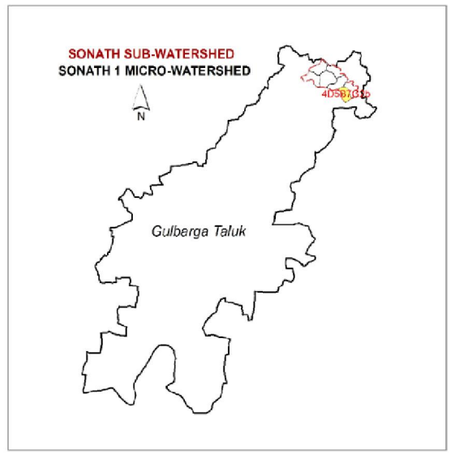
LAND SUITABILITY FOR LIME

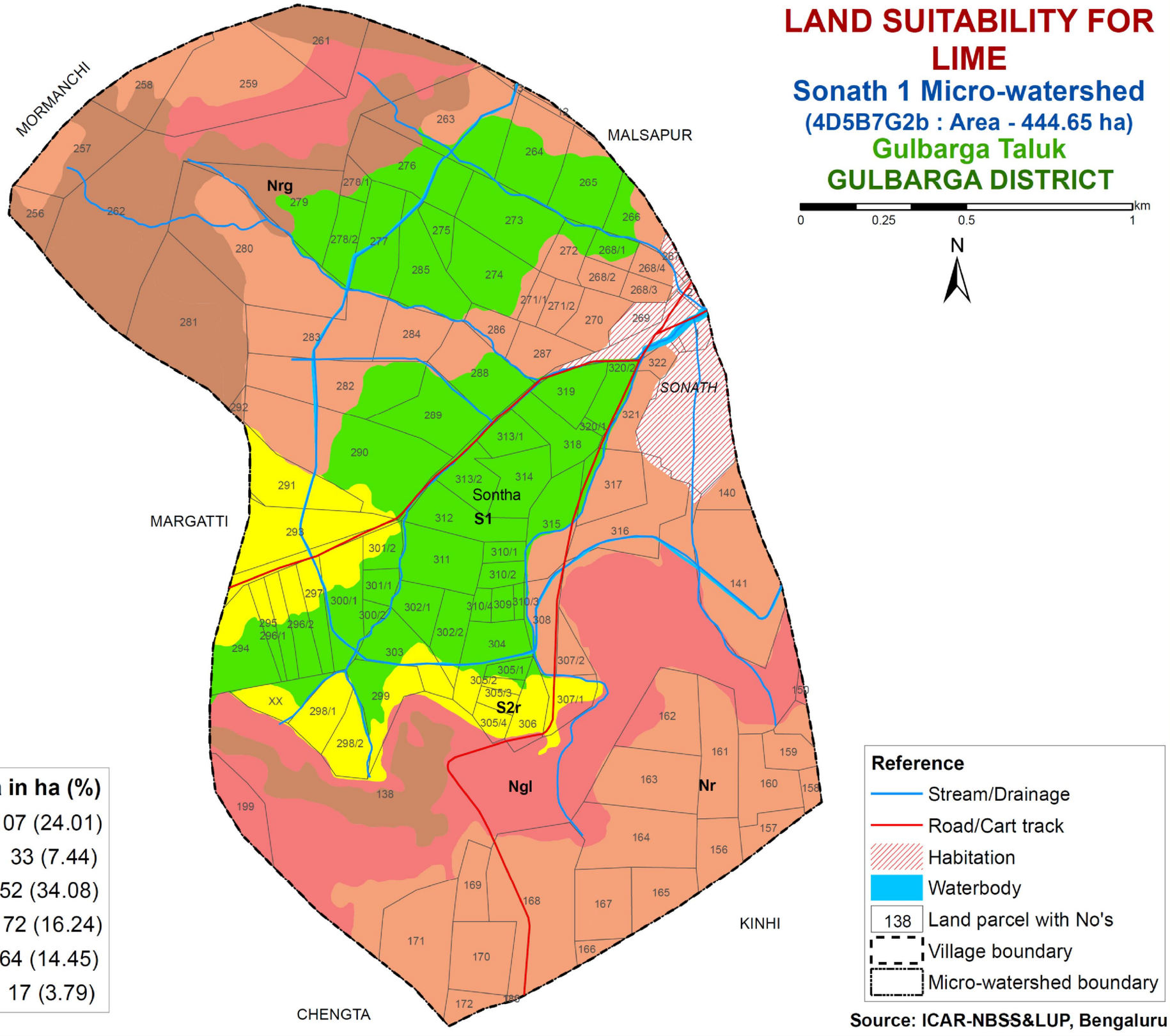
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S2-Moderately Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	107 (24.01)
S2r	33 (7.44)
Nr	152 (34.08)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

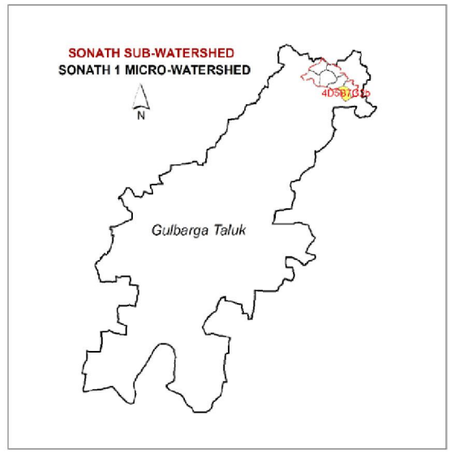
LAND SUITABILITY FOR CASHEW

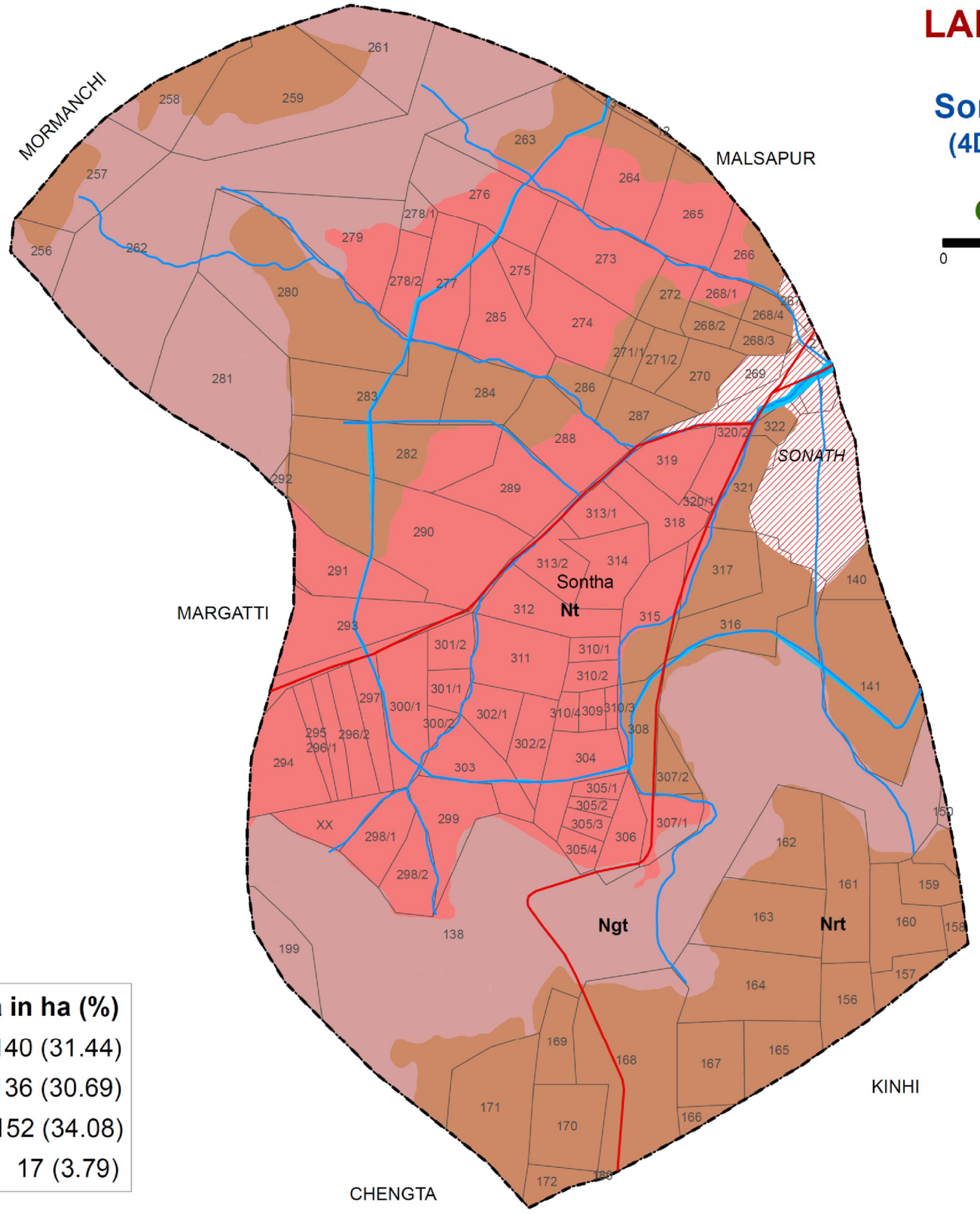
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
Nt	140 (31.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

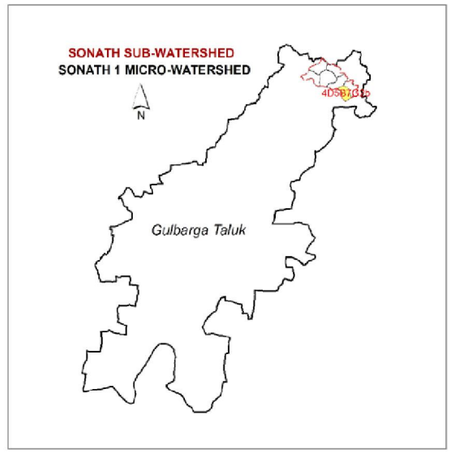
LAND SUITABILITY FOR CUSTARD APPLE

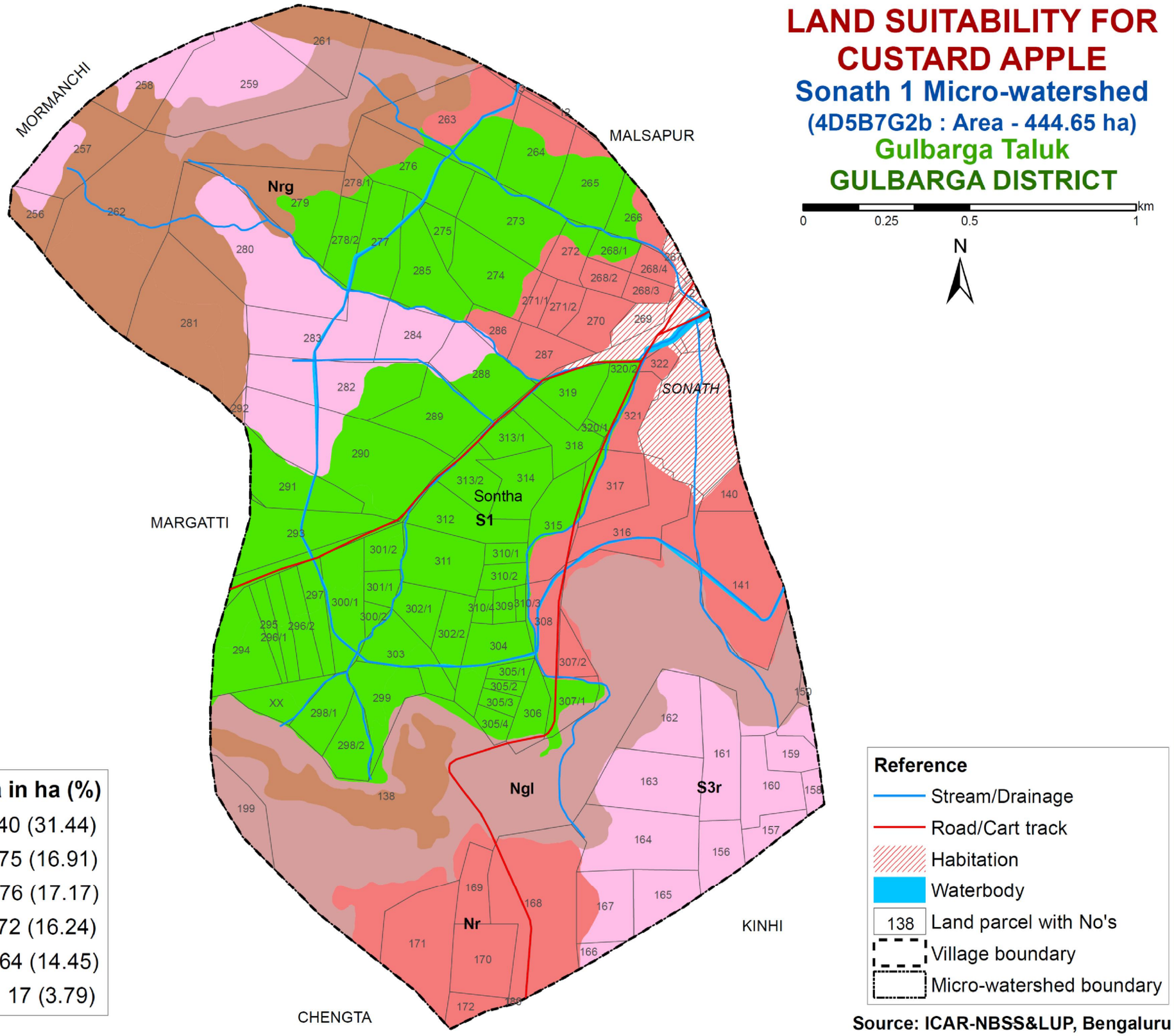
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
S3r	75 (16.91)
Nr	76 (17.17)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

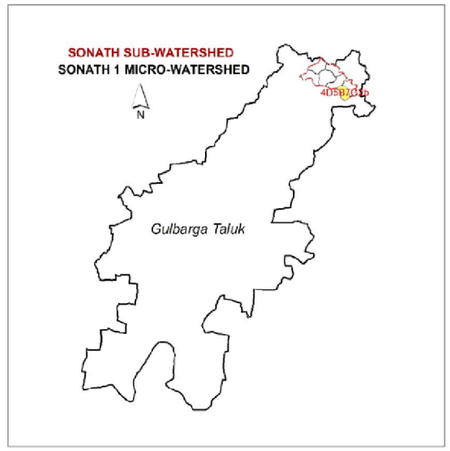
LAND SUITABILITY FOR AMLA

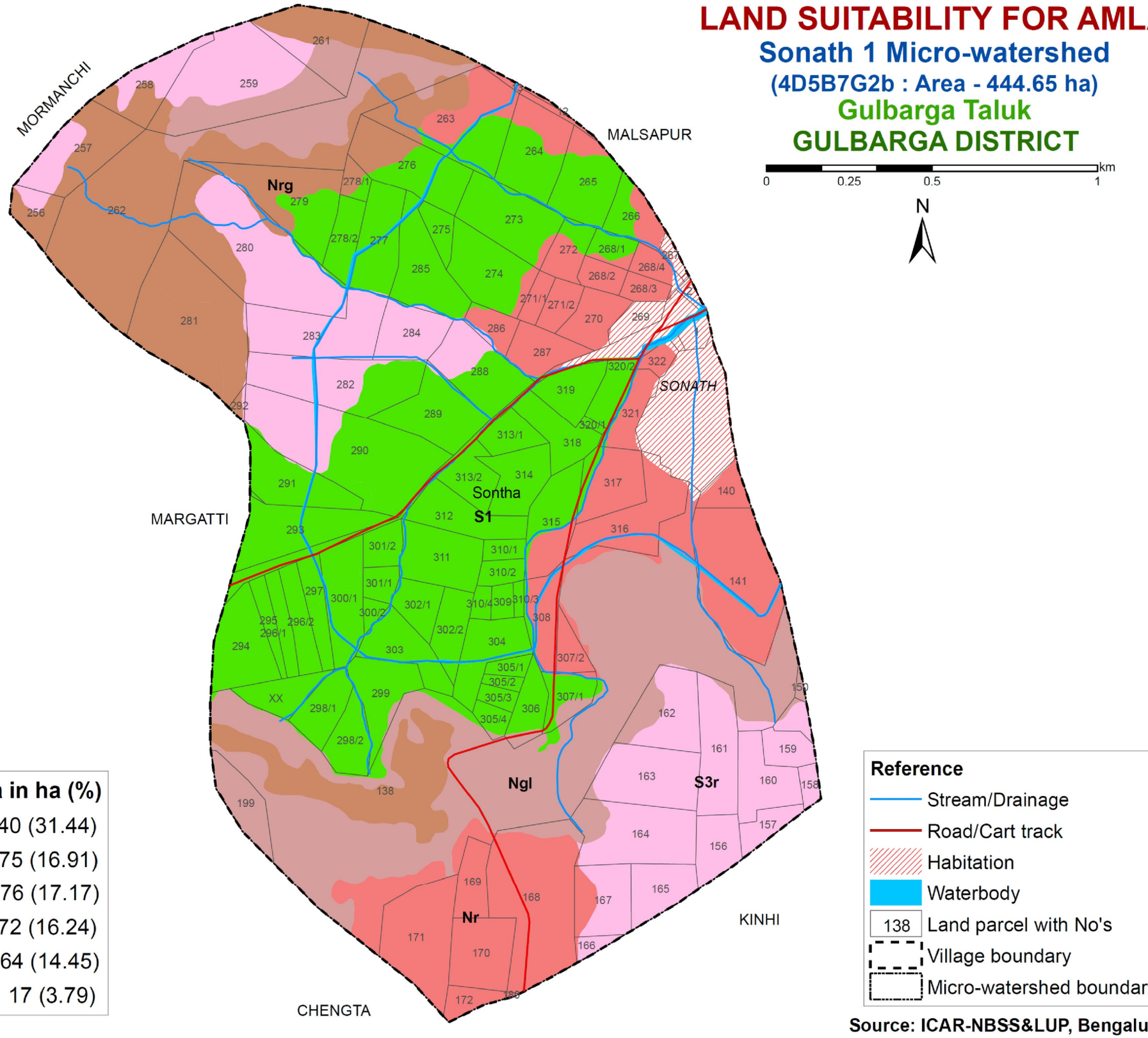
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Key
S1-Highly Suitable
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
l- topography
r- rooting condition

Suitability subclass	Area in ha (%)
S1	140 (31.44)
S3r	75 (16.91)
Nr	76 (17.17)
Ngl	72 (16.24)
Nrg	64 (14.45)
Others*	17 (3.79)

* - Habitation & Waterbody

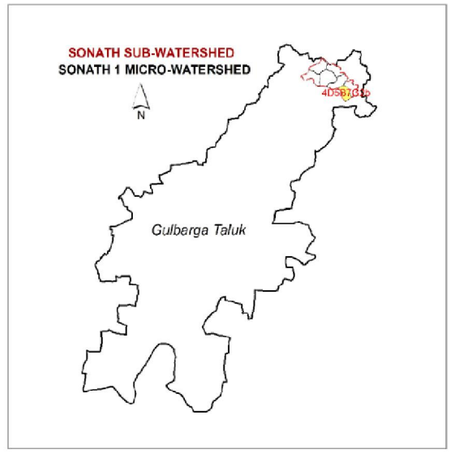
0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



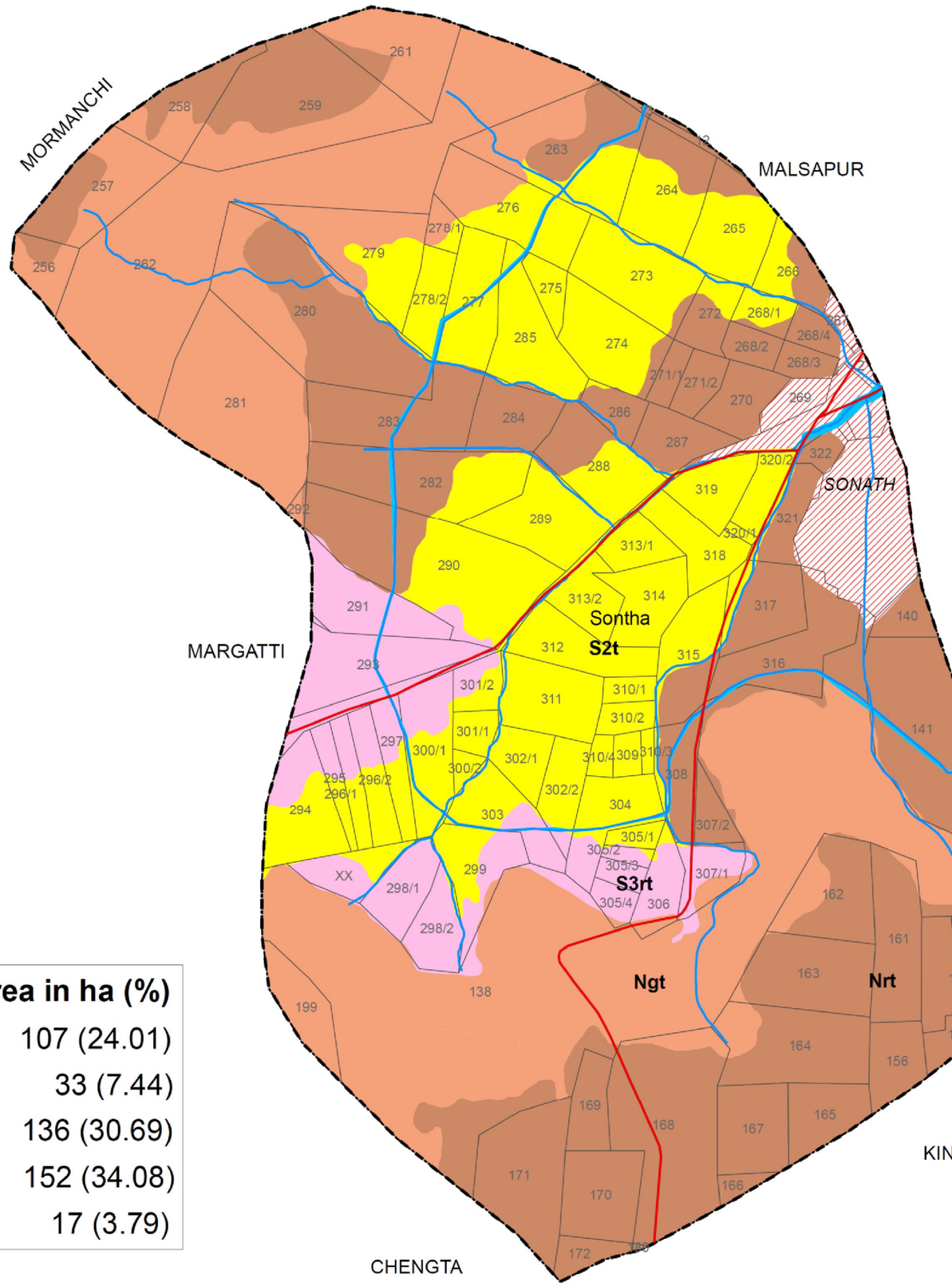
LAND SUITABILITY FOR TAMARIND

Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT



Key
S2-Moderately Suitable
S3-Marginally Suitable
N- Not Suitable

Limitations
g- gravelliness/stoniness
r- rooting condition
t- texture

Suitability subclass	Area in ha (%)
S2t	107 (24.01)
S3rt	33 (7.44)
Ngt	136 (30.69)
Nrt	152 (34.08)
Others*	17 (3.79)

* - Habitation & Waterbody

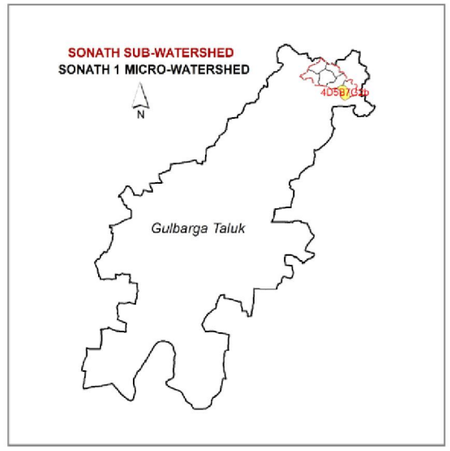
0 0.25 0.5 1 km

N

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru



LAND MANAGEMENT UNITS

Sonath 1 Micro-watershed

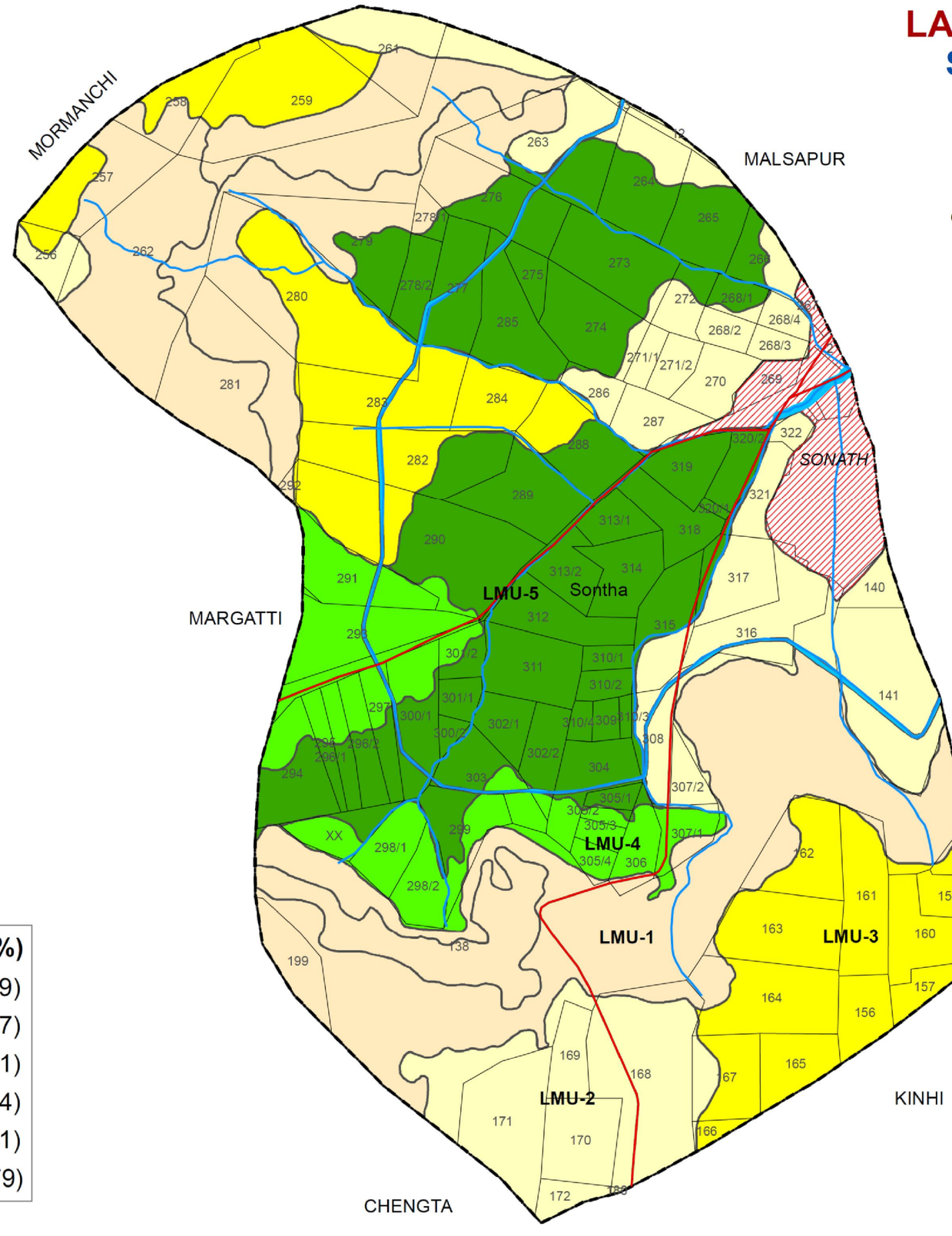
(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT

0 0.25 0.5 1 km

N



LMU	Area in ha (%)
LMU-1	130 (29.19)
LMU-2	83 (18.67)
LMU-3	75 (16.91)
LMU-4	33 (7.44)
LMU-5	107 (24.01)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru

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

Table. Proposed Crop Plan for Sonath-1 Micro-watershed, Sonath Sub-watershed Gulbarga Taluk and Gulbarga District based on soil-site–crop suitability Assessment

LMU	Mapping unit	Survey No	Characters	Crops proposed				Suitable intervention
				Field crops	Forestry Crop/Grasses	Horticulture crops (Rainfed Condition)	Horticulture crops with suitable intervention	
1	1 MGThC3g3 2 MGThD3g3 4 MGTiC3g3 9 MAThD3g3	Sonatha: 138,150,199,257, 262,278/1,279,281, 292	Very shallow Depth (<25 cm) extremely gravelly, severe erosion	-	Neem, Glyricydia, Silviculture, Agave, Simaroba	-	-	Crescent bunds
2	3 MGTiB2g1 5 MGTmB1 6 MGTmB2 7 MGTmB2g1 8 MGTmB2g2	Sonatha: 12,13,140,141,168, 169,170,171,172,180, 256,261,263,268/2, 268/3,268/4,270, 271/1,271/2,272, 286,287,307/2,308, 316, 317,321,322	Very shallow black soil, depth (<25 cm), nil to highly gravelly slight to moderate erosion.	Horse gram, Green gram, chick pea	Neem, Glyricydia , Silviculture, Agave, Simaroba	-	-	Crescent bunds
3	10 NHAmB1 11 NHAmB2 12 NHAmB2g1	Sonatha: 156,157,158,159,160, 161,162,163,164,165, 166,167,258,259,280, 282,283,284	Shallow black soil (25-50 cm),1-3 % slope, nil to slight gravelly, slight to moderate erosion	Bajra, Linseed, Green gram, Black gram, Chick pea	Subabhul, Neem, Teak	Custard apple, Charoli, Ber, Amla Vegetable: Ladies finger, Brinjal, Cowpea. Flower: Marigold, Chrysanthemum	Custard apple, Charoli, Ber, Amla Vegetable: Onion, Tomato, Brinjal, Chillies, Bhendi Flower: Marigold, Chrysanthemum	Drip irrigation, suitable soil and water conservations like cultivation on raised beds with mulches and drip

To be continued….

LMU	Mapping unit	Survey No	Characters	Crops Proposed				Suitable intervention
				Field crops	Forestry Crop/Grasses	Horticulture crops (Rainfed Condition)	Horticulture crops with suitable intervention	
4	13 NIRmB2	Sonatha: 291,293,295,298/1, 298/2,305/2,305/3,305/4, 306,307/1,XX	Moderately shallow black soil (50-75 cm) 1-3 % slope, moderate erosion	Sorghum, Cotton, Red Gram, Black gram, Green gram, Soybean, Sesame, Sunflower, Safflower Rabi: Sorghum, Chickpea	Subabhul, Neem, Teak	Custard apple, Charoli, Ber, Amla Vegetable: Ladies finger, Brinjal, Cowpea, Flower: Marigold, Chrysanthemum	Custard apple, Charoli, Ber, Amla, Papaya, Banana, Lime, Citrus Vegetable: Onion, Tomato, Brinjal, Chillies, Bhendi Flower:Marigold,Chrysanthemum	Drip irrigation, suitable soil and water conservations like cultivation on raised beds with mulches and drip, Graded bunds, Strengthening of field bunds
5	14 MARmB1	Sonatha: 264,265,266,268/1, 273,274,275,276, 277,278/2,285,288, 289,290,294,296/1, 296/2,297,299, 300/1,300/2,301/1, 301/2,302/1,302/2, 303,304,305/1,309, 310/1,310/2,310/3, 310/4,311,312, 313/1,313/2,314, 315,318,319,320/1, 320/2	Deep to very deep black soil (>150 cm),1-3 % slope, slight erosion.	Sorghum, Cotton, Red Gram,Black gram, Green gram, Soybean, Sesame, Sunflower,Safflower, Rabi: Sorghum, Chickpea	-	Vegetable: Ladies finger, Brinjal, Cowpea, coriander Field crops: Sorghum, Cotton, Red Gram, Sunflower, Safflower, Perennial component: Guava, Tamarind, Sapota, Lime, Mosambi Flower: Marigold, Chrysanthemum	Banana, Papaya, Lime. Mosambi, Guava, Tamrind Vegetable: Onion, Tomato, Brinjal, Chillies, Bhendi Flower: Marigold, Chrysanthemum	Drip irrigation, suitable soil and water conservations like cultivation on raised beds with mulches and drip, graded bunds, strengthening of field bunds

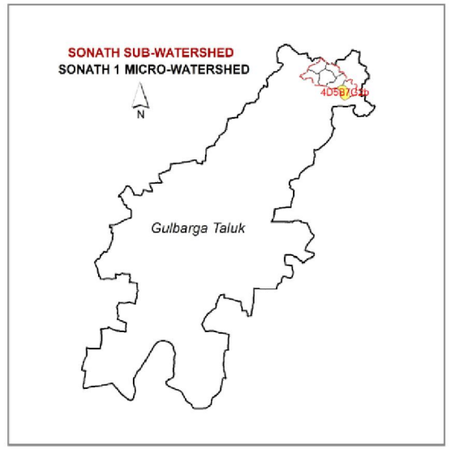
SOIL & WATER CONSERVATION PLAN

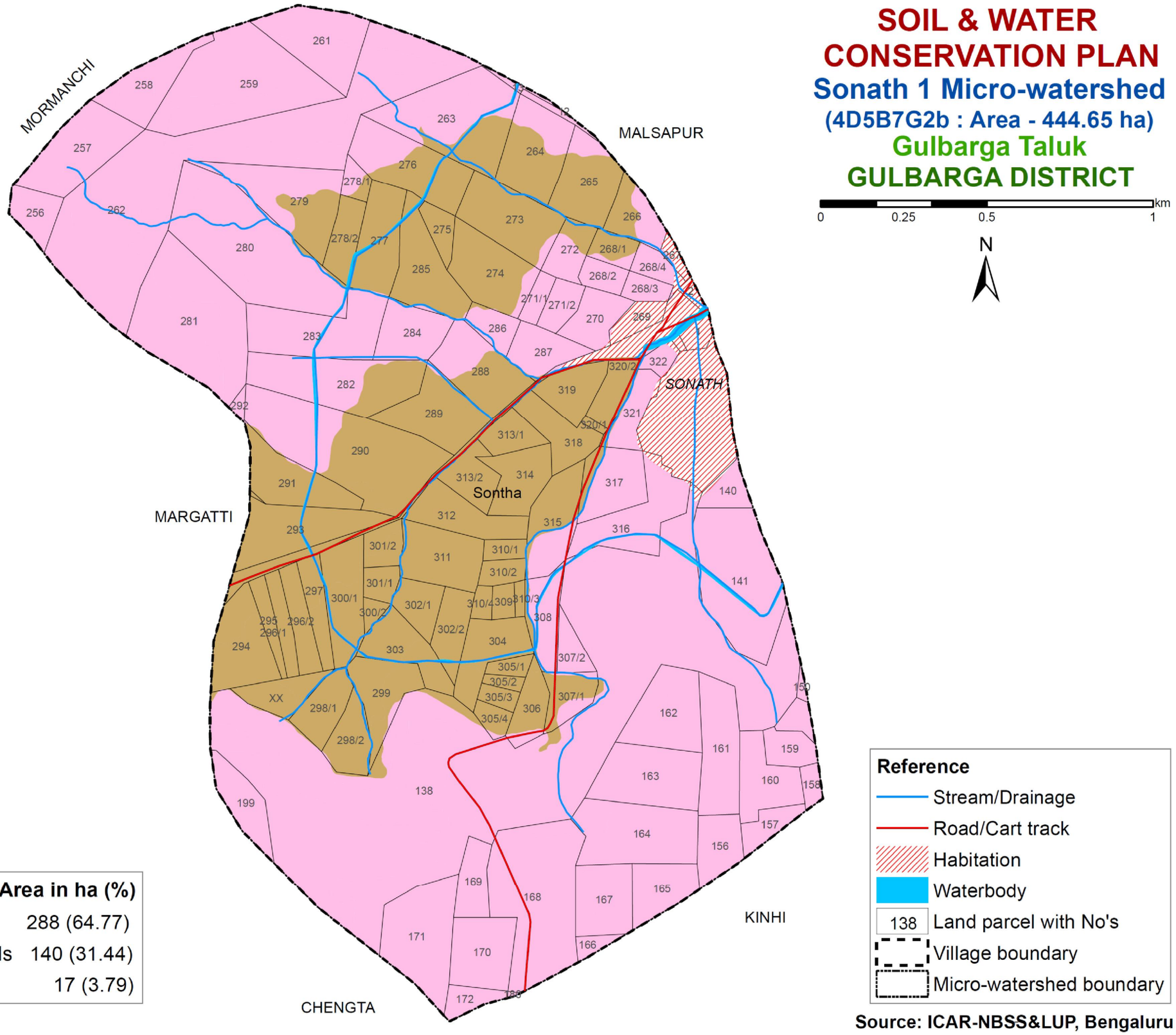
Sonath 1 Micro-watershed

(4D5B7G2b : Area - 444.65 ha)

Gulbarga Taluk

GULBARGA DISTRICT





Legend	Area in ha (%)
Crescent bund/TCB	288 (64.77)
GB/strengthening of Bunds	140 (31.44)
Others*	17 (3.79)

* - Habitation & Waterbody

Reference

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

Source: ICAR-NBSS&LUP, Bengaluru