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LAND RESOURCE INVENTORY AND SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS FOR WATERSHED PLANNING AND DEVELOPMENT

NARAYANAPET-3 (4D5B1R1e) MICROWATERSHED

Sydhapur Hobli, Yadgir Taluk and District, Karnataka

Karnataka Watershed Development Project – II

SUJALA – III

World Bank funded Project

The World Bank

ICAR – NATIONAL BUREAU OF SOIL SURVEY AND LAND USE PLANNING

ICAR - NBSS & LUP

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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PREFACE

In Karnataka, as in other Indian States, the livelihoods of rural people are intertwined with farming pursuits. The challenges in agriculture are seriously threatening the livelihood of a large number of farmers as they have been practicing farming in contextual factors beyond their control. Climatic factors are the most important ones and have become much more significant in recent times due to rapid climate changes induced by intensive anthropogenic activities affecting our ecosystem in multiple ways. Climate change has become the reality, it is happening and efforts to evolve and demonstrate climate resilient technologies have become essential. Due to the already over stressed scenario of agrarian sector, the climate change is resulting in manifold increase in the complexities, pushing the rural mass to face more and more unpredictable situations. The rising temperatures and unpredictable rainfall patterns are going to test seriously the informed decisions farmers have to make in order to survive in farming and sustain their livelihood.

It is generally recognized that impacts of climate change shall not be uniform across the globe. It is said that impact of climate change is more severe in South Asia. Based on the analysis of meteorological data, it is predicted that in India, there will be upward trend in mean temperature, downward trend in relative humidity, annual rainfall and number of wet days in a year. Also, in general, phenomena like erratic monsoon, spread of tropical diseases, rise in sea levels, changes in availability of fresh water, frequent floods, droughts, heat waves, storms and hurricanes are predicted. Each one of these adverse situations are already being experienced in various parts of India and also at the global level. Decline in agricultural productivity of small and marginal farmers becoming more vulnerable is already witnessed.

In Karnataka, more than 60 per cent of the population live in rural areas and depend on agriculture and allied activities for their livelihood. Though the state has achieved significant progress in increasing the yield of many crops, there is tremendous pressure on the land resources due to the growing and competing demands of various land uses. This is reflected in the alarming rate of land degradation observed. Already more than 50 per cent of the area is affected by various forms of degradation. If this trend continues, the sustainability of the fragile ecosystem will be badly affected. The adverse effects of change in the climatic factors are putting additional stress on the land resources and the farmers dependent on this.

The natural resources (land, water and vegetation) of the state need adequate and constant care and management, backed by site-specific technological interventions and investments particularly by the government. Detailed database pertaining to the nature of the land resources, their constraints, inherent potentials and suitability for various land

based rural enterprises, crops and other uses is a prerequisite for preparing location-specific action plans, which are in tune with the inherent capability of the resources. Any effort to evolve climate resilient technologies has to be based on the baseline scientific database. Then only one can expect effective implementation of climate resilient technologies, monitor the progress, make essential review of the strategy, and finally evaluate the effectiveness of the implemented programs. The information available at present on the land resources of the state are of general nature and useful only for general purpose planning. Since the need of the hour is to have site-specific information suitable for farm level planning and detailed characterization and delineation of the existing land resources of an area into similar management units is the only option.

ICAR-NBSS&LUP, Regional Centre, Bangalore has taken up a project sponsored by the Karnataka Watershed Development Project-II, (Sujala-III), Government of Karnataka funded by the World Bank under Component-1 Land Resource Inventry. This study was taken up to demonstrate the utility of such a database in reviewing, monitoring and evaluating all the land based watershed development programs on a scientific footing. To meet the requirements of various land use planners at grassroots level, the present study on "Land Resource Inventory and Socio-Economic Status of Farm Households for Watershed Planning and Development of Narayanpet-3 Microwatershed, Yadgir Taluk and District, Karnataka" for integrated development was taken up in collaboration with the State Agricutural Universities, IISC, KSRSAC, KSNDMC as Consortia partners. The project provides detailed land resource information at cadastral level (1:7920 scale) for all the plots and socio-economic status of farm households covering thirty per cent farmers randomely selected representing landed and landless class of farmers in the micro-watershed. The project report with the accompanying maps for the Microwatershed will provide required detailed database for evolving effective land use plan, alternative land use options and conservation plans for the planners, administrators, agricutural extention personnel, KVK officials, developmental departments and other land users to manage the land resources in a sustainable manner.

It is hoped that this database will be useful to the planners, administrators and developmental agencies working in the area in not only for formulating location specific developmental schemes but also for their effective monitoring at the village/watershed level.

Nagpur
Date: 20.05.2019

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PART-A

LAND RESOURCE INVENTORY

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EXECUTIVE SUMMARY

The land resource inventory of Narayanpet-3 Microwatershed was conducted using village cadastral maps and IRS satellite imagery on 1:7920 scale. The false colour composites of IRS imagery were interpreted for physiography and the physiographic delineations were used as base for mapping soils. The soils were studied in several transects and a soil map was prepared with phases of soil series as mapping units. Random checks were made all over the area outside the transects to confirm and validate the soil map unit boundaries. The soil map shows the geographic distribution and extent, characteristics, classification, behavior and use potentials of the soils in the microwatershed.

The present study covers an area of 501 ha in Yadgir taluk & district, Karnataka. The climate is semiarid and categorized as drought-prone with an average annual rainfall of 866 mm, of which about 652 mm is received during south-west monsoon, 138 mm during north-east and the remaining 76 mm during the rest of the year. An area of 482 ha (96%) in the microwatershed is covered by soils, 1 ha (0.18%) by railway and 18 ha (4%) by others (habitation and water bodies). The salient findings from the land resource inventory are summarized briefly below.

- *The soils belong to 9 soil series and 15 soil phases (management units) and 4 land management units.*
- *The length of crop growing period is about 120-150 days starting from 1st week of June to 4th week of October.*
- *From the master soil map, several interpretative and thematic maps like land capability, soil depth, surface soil texture, soil gravelliness, available water capacity, soil slope and soil erosion were generated.*
- *Soil fertility status maps for macro and micronutrients were generated based on the surface soil samples collected at every 320 m grid interval.*
- *Land suitability for growing 29 major agricultural and horticultural crops was assessed and maps showing the degree of suitability along with constraints were generated.*
- *Entire area in the microwatershed is suitable for agriculture.*
- *About 32 per cent area of the microwatershed has soils that are deep to very deep (100 to >150 cm), 18 per cent soils are moderately deep (75-100 cm) and 46 per cent soils are shallow to moderately shallow (25-75 cm).*
- *About 3 per cent sandy soils, 42 per cent area in the microwatershed has loamy soils and 51 per cent clayey soils.*
- *Almost area of the microwatershed has non gravelly (<15%) and 1 ha has gravelly (15-35%) at the surface.*

- *About 21 per cent area of the microwatershed is very low (<50 mm/m) in available water capacity, 24 per cent low (51-100 mm/m), 19 per cent medium (101-150 mm/m) and 32 per cent area is very high (>200 mm/m) in available water capacity.*
- *An area of about 2 per cent is nearly level (0-1%) and 94 per cent area in the microwatershed has very gently sloping (1-3% slope) lands.*
- *An area of about 6 per cent are slightly (e1) eroded, 86 per cent are moderately (e2) eroded and 4 per cent area is severely (e3) eroded.*
- *An area of about 6 per cent is neutral (pH 6.5-7.3), 29 per cent is slightly alkaline (pH 7.3-7.8), 35 per cent is moderately alkaline (pH 7.8-8.4),22 per cent is strongly alkaline (pH 8.4-9.0) and 4 per cent is very strongly alkaline (pH >9.0) in reaction.*
- *The Electrical Conductivity (EC) of the soils in the entire area of the microwatershed is <2 dsm^{-1} indicating that the soils are non-saline.*
- *About 3 per cent of soils are low (<0.5%), 53 per cent of soils are medium (0.5-0.75%) and 40 per cent of soils are high (>0.75%) in organic carbon.*
- *About 14 per cent area is low (<23 kg/ha) and 82 per cent area is medium (23-57 kg/ha) in available phosphorus.*
- *About 63 per cent is medium (145-337 kg/ha) and 33 per cent is high (>337 kg/ha) in available potassium.*
- *Available sulphur is low (<10 ppm) in an area of about 42 per cent and 54 per cent of the soils are medium (10 -20 ppm) in the microwatershed.*
- *Available boron is low (<0.5 ppm) in an area of about 36 per cent, medium (0.5-1.0 ppm) in an area of 54 per cent and high (>1.0 ppm) in 6 per cent area of the microwatershed.*
- *Available iron is deficient (<4.5 ppm) in an area of about 19 per cent and sufficient (>4.5 ppm) in 77 per cent area of the microwatershed.*
- *Available manganese is sufficient in all the soils of the microwatershed.*
- *Available copper is sufficient in all the soils of the microwatershed.*
- *Available zinc is deficient (<0.6 ppm) in an area of about 96 per cent area of the microwatershed*
- *The land suitability for 29 major agricultural and horticultural crops grown in the microwatershed was assessed and the areas that are highly suitable (S1) and moderately suitable (S2) are given below. It is however to be noted that a given soil may be suitable for various crops but what specific crop to be grown may be decided by the farmer looking to his capacity to invest on various inputs, marketing infrastructure, market price and finally the demand and supply position.*

Land suitability for various crops in the Microwatershed

Crop	Suitability Area in ha (%)		Crop	Suitability Area in ha (%)	
	Highly suitable (S1)	Moderately suitable (S2)		Highly suitable (S1)	Moderately suitable (S2)
Sorghum	*248(49)*	*126(25)*	*Guava*	-	-
Maize	-	*360(72)*	*Sapota*	-	-
Bajra	-	*374(74)*	*Pomegranate*	-	*248(50)*
Groundnut	-	*13(3)*	*Musambi*	*159(32)*	*89(18)*
Sunflower	*159(32)*	*89(18)*	*Lime*	*159(32)*	*89(18)*
Redgram	-	*248(50)*	*Amla*	*159(32)*	*215(43)*
Bengal gram	*248(50)*	*126(25)*	*Cashew*	-	-
Cotton	*159(32)*	*215(43)*	*Jackfruit*	-	-
Chilli	-	*374(75)*	*Jamun*	-	*159(32)*
Tomato	-	*119(24)*	*Custard apple*	*248(49)*	*126(25)*
Drumstick	-	*248(50)*	*Tamarind*	-	*159(32)*
Brinjal	*88(18)*	*286(57)*	*Mulberry*	-	-
Bhendi	*88(18)*	*286(57)*	*Marigold*	-	*374(74)*
Onion	*88(18)*	*231(46)*	*Chrysanthemum*	-	*374(74)*
Mango	-	-			

- *Apart from the individual crop suitability, a proposed crop plan has been prepared for the identified 4 LMUs by considering only the highly and moderately suitable lands for different crops and cropping systems with food, fodder, fibre and other horticulture crops.*
- *Maintaining soil-health is vital for crop production and conserve soil and land resource base for maintaining ecological balance and to mitigate climate change. For this, several ameliorative measures have been suggested for these problematic soils like saline/alkali, highly eroded, sandy soils etc.,*
- *Soil and water conservation and drainage line treatment plans have been prepared that would help in identifying the sites to be treated and also the type of structures required.*
- *As part of the greening programme, several tree species have been suggested to be planted in marginal and submarginal lands, field bunds and also in the hillocks, mounds and ridges. This would help in not only supplementing the farm income but also provide fodder and fuel and generate lot of biomass which would help in maintaining an ecological balance and also contribute to mitigating the climate change.*

Chapter 1

INTRODUCTION

Land is a scarce resource and basic unit for any material production. It can support the needs of the growing population, provided they use the land in a rational and judicious manner. But what is happening in many areas of the state is a cause for concern to everyone involved in the management of land resources at the grassroots level. The area available for agriculture is about 51 per cent of the total geographical area and more than 60 per cent of the people are still dependant 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 use3s. Due to this, every year there is significant diversion of farm lands and water resources for non-agricultural purposes. Apart from this, due to lack of interest in farmers for farming, large tracts of cultivable lands are turning into fallows in many areas and this trend is continuing at an alarming rate.

Further, land degradation has emerged as a serious problem which has already affected about 38 lakh ha of cultivated area in the state. Soil erosion alone has degraded about 35 lakh ha. Almost all the uncultivated areas are facing various degrees of degradation, particularly soil erosion. Salinity and alkalinity has emerged as a major problem in more than 3.5 lakh ha in the irrigated areas of the state. Nutrient depletion and declining factor productivity is common in both rainfed and irrigated areas. The degradation is continuing at an alarming rate and there appears to be no systematic effort among the stakeholders to contain this process. In recent times, an aberration of weather due to climate change phenomenon has added another dimension leading to unpredictable situations to be tackled by the farmers.

In this critical juncture, the challenge before us is not only to increase the productivity per unit area which is steadily declining and showing a fatigue syndrome, but also to prevent or at least reduce the severity of degradation. If the situation is not reversed at the earliest, then the sustainability of the already fragile crop production system and the overall ecosystem will be badly affected in the state.The continued neglect and unscientific use of the resources for a long time has led to the situation observed at present in the state. It is a known fact and established beyond doubt by many studies in the past that the cause for all kinds of degradation is the neglect and irrational use of the land resources. Hence, there is an urgent need to generate a detailed site-specific farm level database on various land resources for all the villages/watersheds in a time bound manner that would help to protect the valuable soil and land resources and also to stabilize the farm production.

Therefore, the land resource inventory required for farm level planning is the one which investigates not only the surface but also consider the other parameters which are critical for productivity *viz.*, soils, climate, water, minerals and rocks, topography, geology, hydrology, vegetation, crops, land use pattern, animal population, socio-economic conditions, infrastructure, marketing facilities and various schemes and developmental works of the government etc. 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.

The Land Resource Inventory is basically done for identifying the potential and problem areas, developing sustainable land use plans, estimation of surface run off and water harvesting potential, preparation of soil and water conservation plans, land degradation/desertification etc. The Bureau is presently engaged in developing an LRI methodology using high resolution satellite remote sensing data and Digital Elevation Model (DEM) data to prepare Landscape Ecological Units (LEU) map representing agro-ecosystem as a whole. The LEU is preferred over landform as the base map for LRI. LEU is the assemblage of landform, slope and land use. An attempt has already been made to upscale the soil resource information from 1:250000 and 1:50000 scale to the LEU map in Goa and other states.

The land resource inventory aims to provide site-specific database for Narayanpet-3 microwatershed in Yadgir Taluk &District, Karnataka State for the Karnataka Watershed Development Department. The database was generated by using cadastral map of the village as a base along with high resolution IRS LISS IV and Cartosat-1 merged satellite imagery. Later, an attempt will be made to uplink this LRI data generated at 1:7920 scaleunder Sujala-III Project to the proposed Landscape Ecological Units (LEUs) map.

The study was organized and executed by the ICAR- National Bureau of Soil Survey and Land Use Planning, Regional Centre, Bangalore under Generation of Land Resource Inventory Data Base Component-1 of the Sujala-III Project funded by the World Bank.

Chapter 2

GEOGRAPHICAL SETTING

2.1 Location and Extent

The Narayanpet-3 microwatershed is located in the northern part of Karnataka in Yadgir Taluk &District, Karnataka State (Fig.2.1). It lies between 16° 33’ and 16° 31’ North latitudes and 77° 14’ and 77° 16’East longitudes covering an area of about 501ha.It is about 33 kmfromYadgir town and is surrounded by Munagala village on the northern side, Sangavara village on the easternand western side and Kondapura village on the southern side.

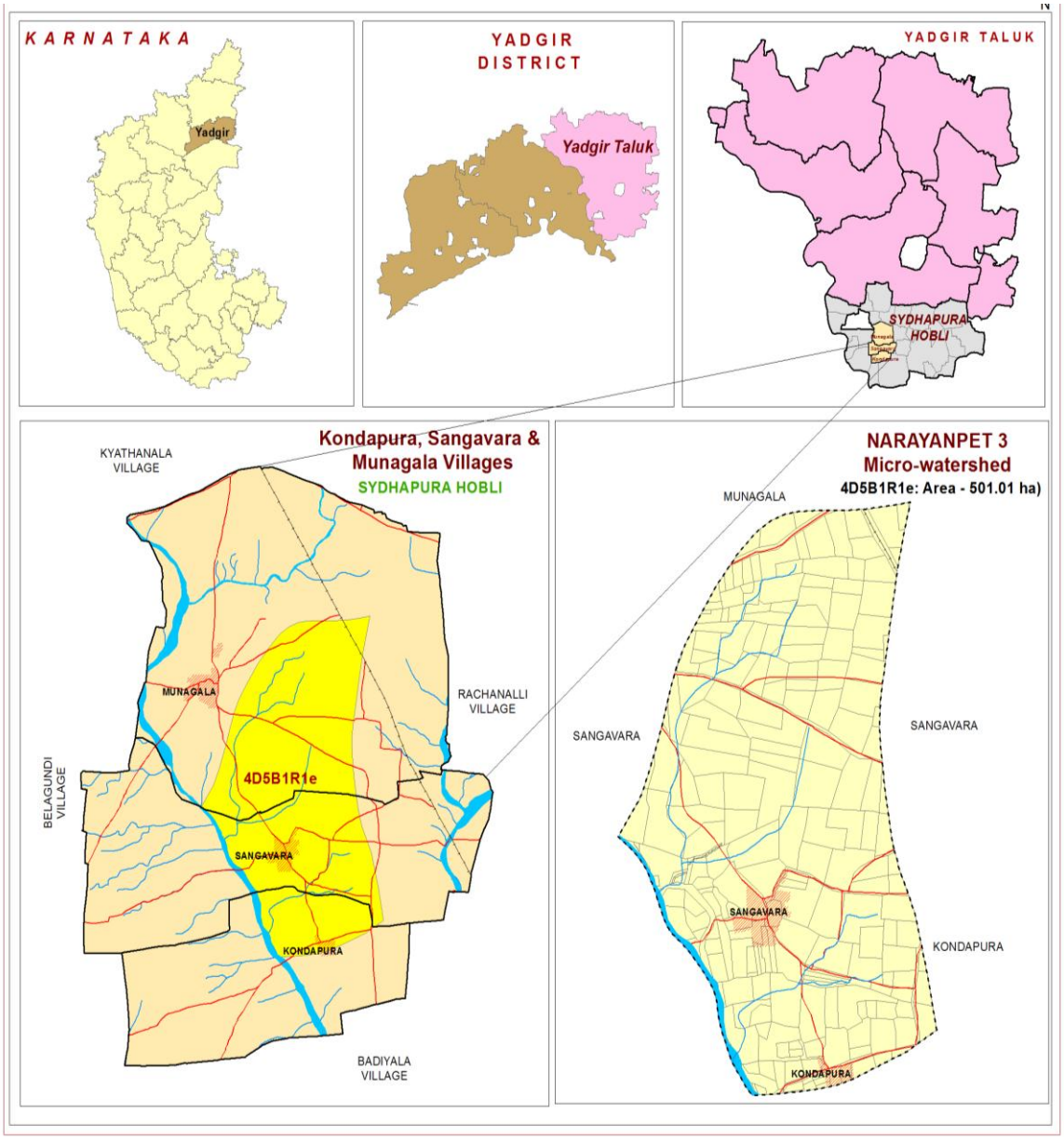


Fig.2.1 Location map of Narayanpet-3Microwatershed

2.2 Geology

Major rock formations observed in the microwatershed aregranite gneiss and alluvium(Figs.2.2aandb). Granite gneisses are essentially pink to gray and are coarse to medium grained. They consist primarily of quartz, feldspar, biotite and hornblende. The gray granite gneisses are highly weathered, fractured and fissured upto a depth of about 10 m. Dolerite dykes and quartz veins are common with variable width and found to occur in Narayanpet-3microwatershed. The most widespread and characteristic development of alluvium in the watershed region lying between the rivers Krishna and Bhima is a wide belt, the underlying formation is gneiss and alluvial soils occur over gneiss, limestone and shale. The thickness of the alluvium generally is limited to less than a meter, except in river valleys where it is very deep extending to tens of meters. Such soils are transported and represent palaeo black soils originally formed at higher elevation, but now occupying river valleys.

Fig.2.2aGranite and granite gneiss rocks

Fig. 2.2b Alluvium

2.3 Physiography

Physiographically, the area has been identified as granite gneiss and alluvial landscapes based on geology. The area has been further subdivided into five landforms, *viz;* mounds/ridges, summits, side slopes and very gently sloping uplands, plains and valleys based on slope and its relief features. The elevation ranges from 363-367 m above MSL. The mounds and ridges are mostly covered by rock outcrops.

2.4 Drainage

The area is drained by several parallelstreams like Bori, Amerja and Kanga which finally join the river Bhima along its course. Though, they are not perennial, during rainy season they carry large quantities of rain water. The microwatershed has only few small tanks which are not capable of storing the water that flows during the rainy season. Due to this, the ground water recharge is very much affected. This is reflected in the failure of many bore wells in the villages. If the available rain water is properly harnessed by constructing new tanks and recharge structures at appropriate places in the villages, then the drinking and irrigation needs of the area can be easily met. The drainage network is parallel to sub parallel and dendritic.

2.5 Climate

The Yadgir district lies in the northern plains of Karnataka and falls under semiarid tract of the state and is categorized as drought- prone with total annual rainfall of 866mm (Table 2.1). Of the total rainfall, maximum of 652 mm is received during the south–west monsoon period from June to September, the north-east monsoon from October to early December contributes about 138 mm and the remaining 76 mm during the rest of the year. The summer season starts during the middle of February and continues up to the first week of June. The period from December to the middle of February is the coldest season. December is the coldest month with mean daily maximum and minimum temperatures being 29.5^0C and 10^0C respectively. During peak summer, temperature shoots up to 45^0C. Relative humidity varies from 26% in summer to 62% in winter. Rainfall distribution is shown in Figure 2.3. The average Potential Evapo-Transpiration (PET) is 141 mm and varies from a low of 81 mm in December to 199 mm in the month of May. The PET is always higher than precipitation in all the months except July, August and September. Generally, the Length of crop Growing Period (LGP) is 120-150 days and starts from 1^{st} week of June to 4^{th}week of October.

Table 2.1 Mean Monthly Rainfall, PET, 1/2 PET at Yadgir Taluk, Yadgir District

Sl. no.	Months	Rainfall	PET	1/2 PET
1	January	4.30	86.0	43.0
2	February	2.30	125.5	62.7
3	March	15.10	166.0	83.0
4	April	18.50	179.8	89.9
5	May	36.0	198.8	97.9
6	June	118.0	175.1	87.5
7	July	171.80	156.3	78.1
8	August	182.9	150.3	75.1
9	September	179.7	142.0	71.0
10	October	105.3	138.5	69.2
11	November	26.4	97.60	48.6
12	December	6.0	80.90	40.4
Total		**866.3**		

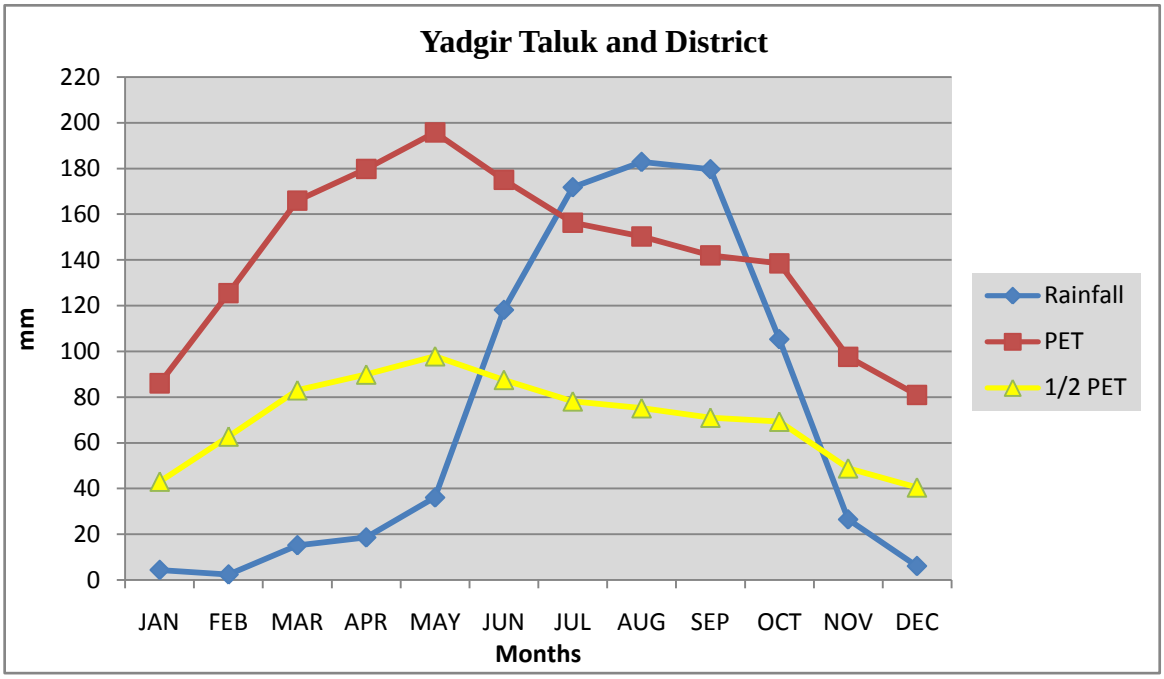


Fig 2.3 Rainfall distribution in Yadgir Taluk, Yadgir District

2.6 Natural Vegetation

The natural vegetation is sparse comprising few tree species, shrubs and herbs. The mounds, ridges and boulders occupy very sizeable area which is under thin to moderately thick forest vegetation. Still, there are some remnants of the past forest cover which can be seen in patches in some ridges and hillocks in the microwatershed.

Apart from the continuing deforestation, the presence of large population of goats, sheep and other cattle in the microwatershedis causing vegetative degradation of whatever little vegetation left in the area. The uncontrolled grazing has left no time for the regeneration of the vegetative cover. This leads to the accelerated rate of erosion on

the hill slopes resulting in the formation of deep gullies in the foot slopes that eventually result in the heavy siltation of tanks and reservoirs in the microwatershed.

2.7 Land Utilization

About 72 per cent area (Table 2.2) in Yadgirdistrict is cultivated at present. An area of about 2 per cent is permanently under pasture, 20 per cent under current fallows and 6 per cent under non-agricultural land, and 5 per cent under currently barren. Forests occupy an area of about 7 per cent and the tree cover is in a very poor state. Most of the mounds, ridges and bouldery areas have very poor vegetative cover. Major crops grown in the area are sorghum, maize, cotton, sunflower, groundnut, red gram, mango, pomegranate, marigold and sapota. The cropping intensity is 120 per cent in the taluk. While carrying out land resource inventory, the land use/land cover particulars are collected from all the survey numbers and a current land use map of the microwatershed is prepared. The current land use map prepared shows the arable and non-arable lands, other land uses and different types of crops grown in the area. The current land use map of Narayanpet-3microwatershed is presented in Fig.2.4. The different crops and cropping systems adopted in the microwatershed is presented in Figures 2.5a & b. Simultaneously, enumeration of existing wells (bore wells and open wells) and conservation structures is made and their location in different survey numbers is marked on the cadastral map. Map showing the location of wells and conservation structures in Narayanpet-3 microwatershed is presented in Fig.2.6.

Table 2.2 Land Utilization in Yadgir District

Sl. no.	Agricultural land use	Area (ha)	Per cent
1.	Total geographical area	516088	-
2.	Total cultivated area	373617	72.4
3.	Area sown more than once	74081	14.3
4.	Cropping intensity	-	119.8
5.	Trees and grooves	737	0.14
6.	Forest	33773	6.54
7.	Cultivable wasteland	2385	0.46
8.	Permanent Pasture land	11755	2.28
9.	Barren land	27954	5.41
10.	Non- Agriculture land	29623	5.73
11.	Current Fallows	105212	20.4

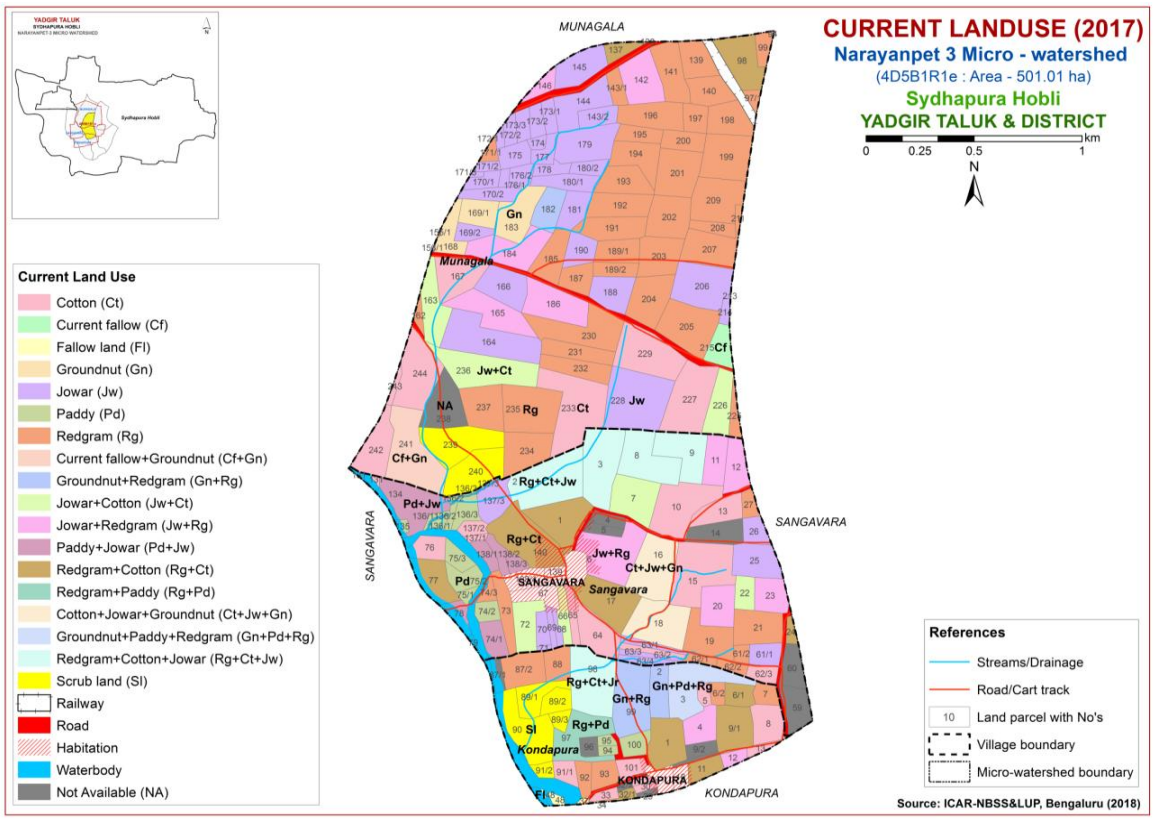


Fig.2.4 Current Land Use map of Narayanpet-3Microwatershed

Fig 2.5 a. Different Crops and Cropping Systems in Narayanpet-3Microwatershed

Fig. 2.5 b. Different Crops and Cropping Systems in Narayanpet-3Microwatershed

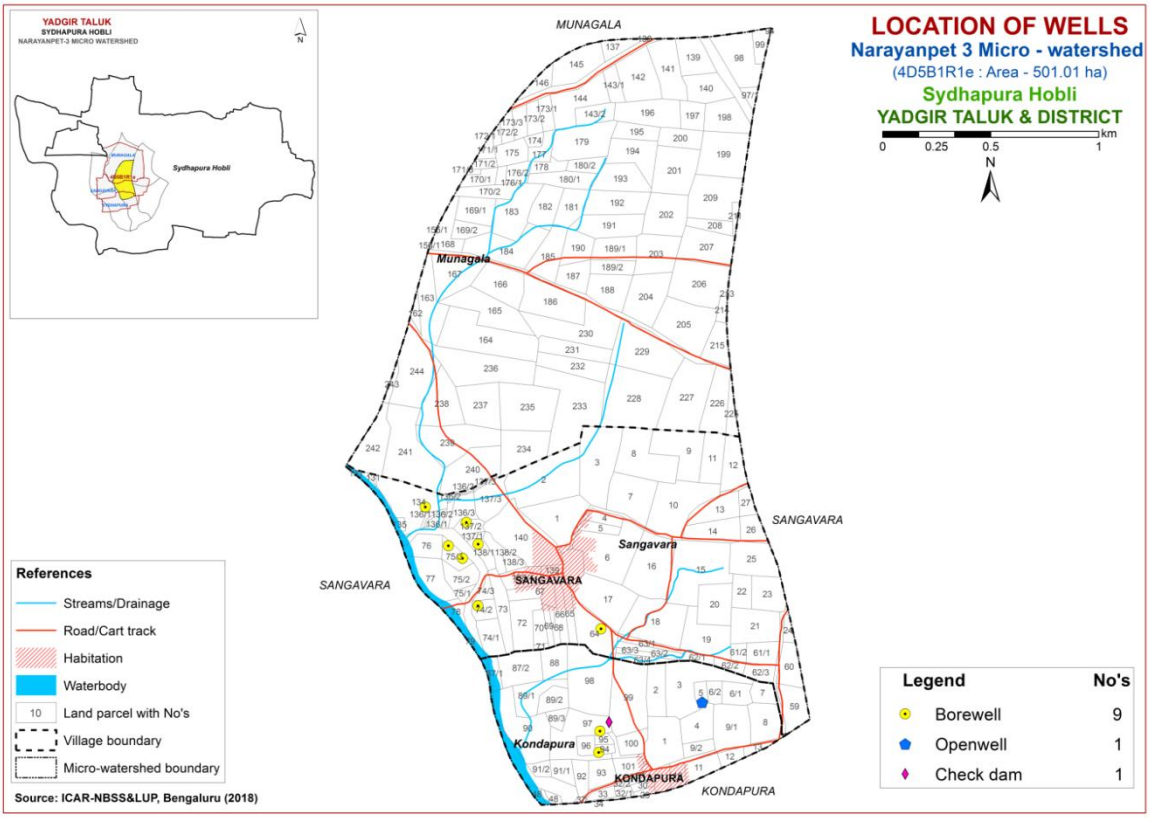


Fig.2.6 Location of Wells and conservation structures map of Narayanpet-3 Microwatershed

Chapter 3

SURVEY METHODOLOGY

The purpose of land resource inventory is to delineate similar areas (soil series and phases), which respond or expected to respond similarly for a given level of management. This was achieved in Narayanpet-3 microwatershed by the detailed study of all the soil characteristics (depth, texture, colour, structure, consistence, coarse fragments, porosity, soil reaction, soil horizons etc.) and site characteristics (slope of the land, erosion, drainage, occurrence of rock fragments etc.) followed by grouping of similar areas based on soil-site characteristics into homogeneous (management units) units, and showing area extent and their geographic distribution on the microwatershed cadastral map. The detailed survey at 1:7920 scale was carried out in an area of 501 ha. The methodology followed for carrying out land resource inventory was as per the guidelines given in Soil Survey Manual (IARI, 1971; Soil Survey Staff, 2006; Natarajan *et al.*, 2015) which is briefly described below.

3.1 Base Maps

The detailed survey of the land resources occurring in the microwatershed was carried out by using digitized cadastral map and satellite imagery as base supplied by KSRSAC. The cadastral map shows field boundaries with their survey numbers, location of tanks, streams and other permanent features of the area (Fig. 3.1). Apart from the cadastral map, remote sensing data products from Cartosat-1 and LISS IV merged at the scale of 1:7920 were used in conjunction with the cadastral map to identify the landscapes, landforms and other surface features. The imagery helped in the identification and delineation of boundaries between hills, uplands and lowlands, water bodies, forest and vegetated areas, roads, habitations and other cultural features of the area (Fig.3.2).The cadastral map was overlaid on the satellite imagery (Fig.3.3) that helps to identify the parcel boundaries and other permanent features. Apart from cadastral maps and images, toposheets of the area (1:50,000 scale) were also used for initial traversing, identification of geology and landforms, drainage features, present land use and also for selection of transects in the microwatershed.

3.2 Image Interpretation for Physiography

False Colour Composites (FCCs) of Cartosat-I and LISS-IV merged satellite data covering microwatershed area was visually interpreted using image interpretation elements and all the available collateral data with local knowledge. The delineated physiographic boundaries were transferred on to a cadastral map overlaid on satellite imagery. Physiographically, the area has been identified as granite gneiss and alluvial landscapes. They were divided into five landforms, *viz;* ridges and mounds, gently and very gently sloping uplands and lowlands based on slope and image characteristics. They

were further subdivided into physiographic/image interpretation units based on image characteristics. The image interpretation legend for physiography is given below.

Image Interpretation Legend for Physiography

G- Granite Gneiss Landscape

G1			**Hills/ Ridges/ Mounds**
	G11		Summits
	G12		Side slopes
		G121	Side slopes with dark grey tones
G2			**Uplands**
	G21		Summits
	G22		Gently sloping uplands
		G221	Gently sloping uplands, yellowish green (eroded)
		G222	Gently sloping uplands, yellowish white (severely eroded)
	G23		Very gently sloping uplands
		G231	Very gently sloping uplands, yellowish green
		G232	Very gently sloping uplands, medium green and pink
		G233	Very gently sloping uplands, pink and green (scrub land)
		G234	Very gently sloping uplands, medium greenish grey
		G235	Very gently sloping uplands, yellowish white (eroded)
		G236	Very gently sloping uplands, dark green
		G237	Very gently sloping uplands, medium pink (coconut garden)
		G238	Very gently sloping uplands, pink and bluish white (eroded)

DSe – Alluvial Landscape

DSe1 – Summit

DSe11 –

DSe12 –

DSe2 – Very genetly sloping

DSe21 – Very gently sloping, dark gray tone

DSe22 – Very gently sloping, medium gray tone

DSe23 – Very gently sloping, yellowish grey tone

DSe24 – Very gently sloping, whitish grey tone

DSe25 – Very gently sloping, whitish/ eroded/ calcareous tone

DSe 26- Very gently sloping, medium pink

DSe3 – Valley/ Lowland

DSe31 – Whitish gray/Calcareous

DSe32 – Gray with pink patches

DSe 33 – Medium gray tone

DSe 34 – Lightish gray tone

DSe 35 – Dark gray tone

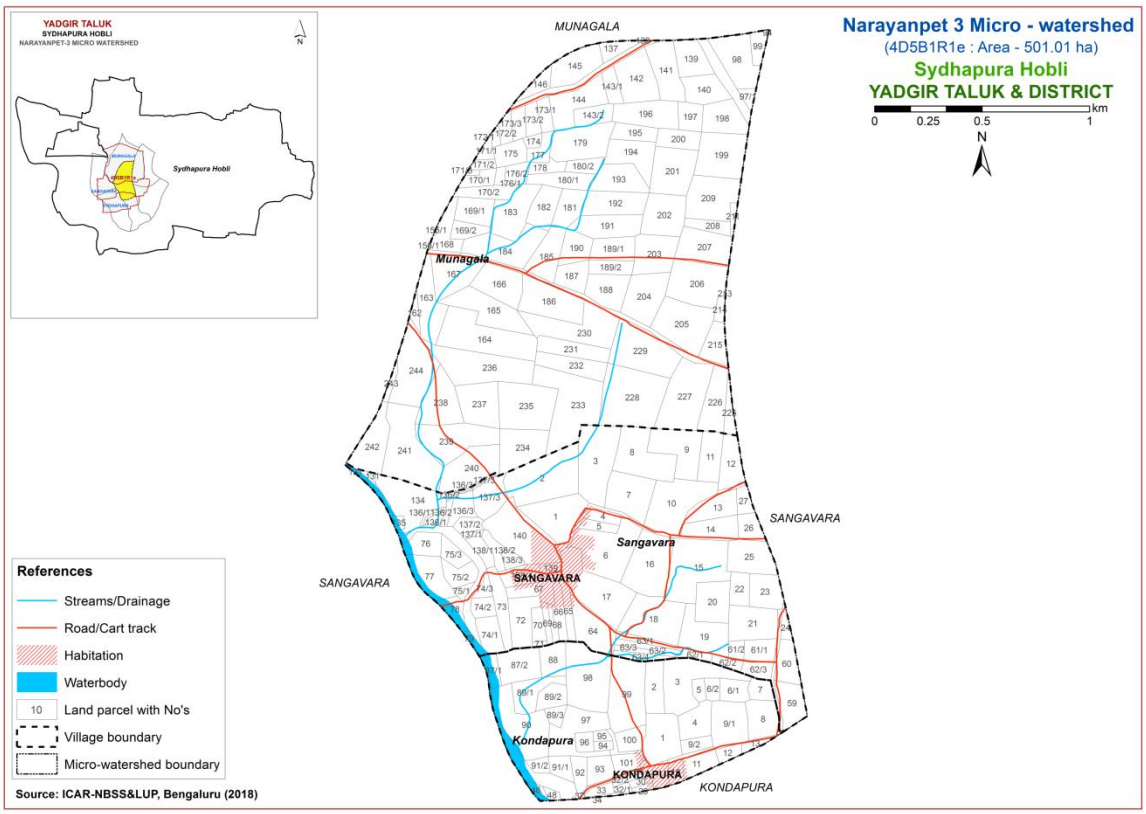


Fig 3.1 Scanned and Digitized Cadastral map of Narayanpet-3Microwatershed

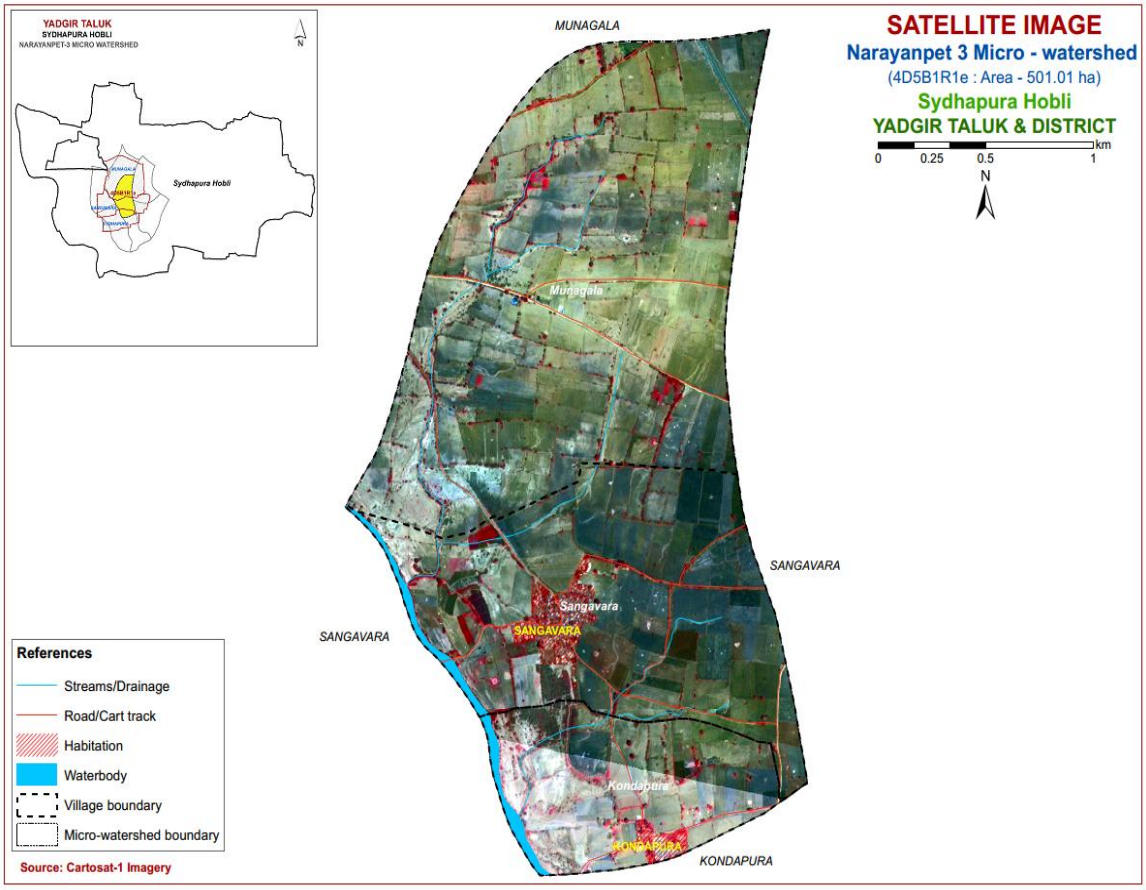


Fig.3.2 Satellite Image of Narayanpet-3Microwatershed

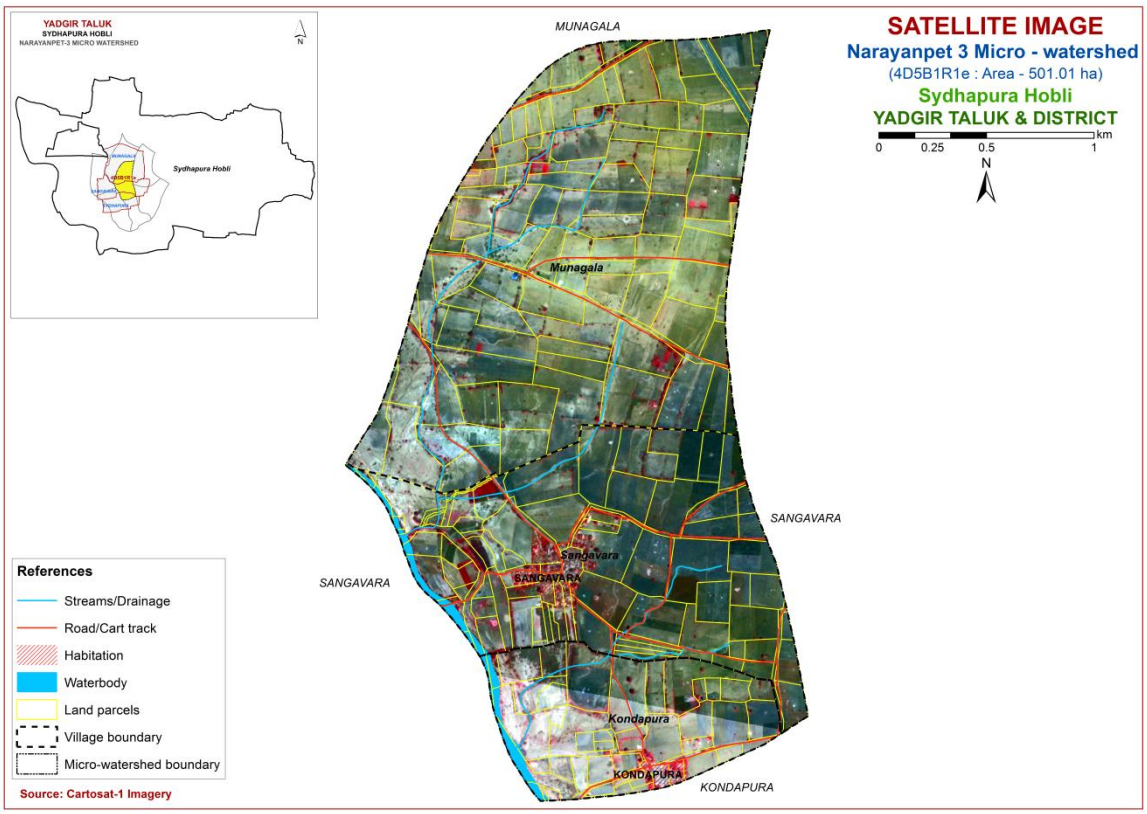


Fig.3.3Cadastral map overlaid on IRS PAN+LISS IV merged imagery of Narayanpet-3 Microwatershed

3.3 Field Investigation

The field boundaries and survey numbers given on the cadastral sheet were located on the ground by following permanent features like roads, cart tracks, *nallas,* streams, tanks etc., and wherever changes were noticed, they were incorporated on the microwatershed cadastral map. Preliminary traverse of the microwatershed was carried out with the help of cadastral map, imagery and toposheets. While traversing, landforms and physiographic units identified were checked and preliminary soil legend was prepared by studying soils at few selected places. Then, intensive traversing of each physiographic unit like hills, ridges, uplands and valleys was carried out. Based on the variability observed on the surface, transects (Fig. 3.4) were selected across the slope covering all the landform units in the microwatershed (Natarajan and Dipak Sarkar, 2010).

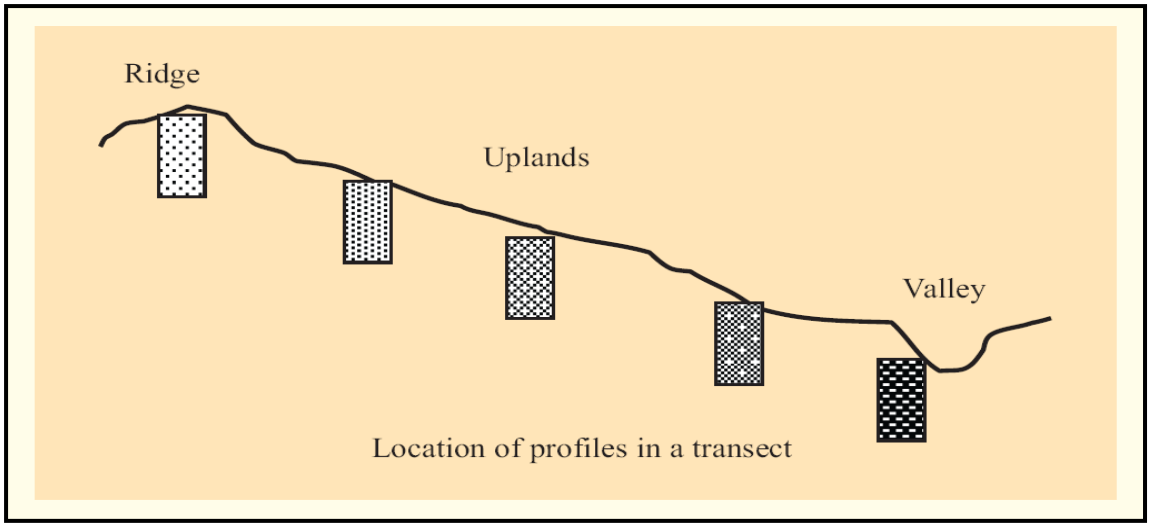


Fig: 3.4. Location of profiles in a transect

In the selected transect, soil profiles were located (Fig. 3.4) at closely spaced intervals to take care of any change in the land features like break in slope, erosion, gravel, stones etc. In the selected sites, profiles (vertical cut showing the soil layers from surface to the rock) were opened upto 200 cm or to the depth limited by rock or hard substratum and studied in detail for all their morphological and physical characteristics. The soil and site characteristics were recorded for all profile sites on a standard proforma as per the guidelines given in USDA Soil Survey Manual (Soil Survey Staff, 2012). Apart from the transect study, profiles were also studied at random, almost like in a grid pattern, outside the transect areas.

Based on the soil characteristics, the soils were grouped into different soil series. Soil series is the most homogeneous unit having similar horizons and properties and behaves similarly for a given level of management. Soil depth, texture, colour, kind of horizon and horizon sequence, calcareousness, amount and nature of gravel present, nature of substratum etc, were used as the major differentiating characteristics foridentifying soil series occurring in the area. The differentiating characteristics used for identifying the soil series are given in Table 3.1. Based on the above characteristics, 9soil series were identified in the Narayanpet-3microwatershed.

Table 3.1 Differentiating Characteristics used for identifying Soil Series

(Characteristics are of Series Control Section)

Sl. no.	Soil Series	Depth (cm)	Colour (moist)	Texture	Gravel (%)	Horizon sequence	Calcare ousness
Soils of Granite Gneiss Landscape							
1	YLR (Yalleri)	50-75	2.5 YR 3/4, 4/4 5 YR 3/4 7.5 YR 4/4	c	15-35	Ap-Bt	-
2	JNK (Jinkera)	50-75	10 YR 3/1, 3/2 7.5 YR 3/4	scl	-	Ap-Bw	e
Soils of Alluvial Landscape							
3	KYT (Kyathanala)	25-50	7.5YR4/4,5/6 5YR 3/3,4/4	scl	-	Ap-Bt-C	-
4	BLD (Balched)	50-75	10 YR3/2,2/1	cl	-	Ap-Bw	e
5	MGL (Mungala)	75-100	10 YR3/1,4/1	c	-	Ap-BA-Bss	e
6	KDR (Kudlura)	100-150	10 YR 3/1, 3/2, 4/1,5/2	c	-	Ap-Bw	es
7	RHN (Rachanalli)	75-100	10 YR3/2,4/3	scl	-	Ap-Bw	e
8	SWR (Sowrashtrahalli)	100-150	10YR4/1,3/2,3/1	c	-	Ap-Bss	es
9	HGN (Hegganakera)	>150	10 YR4/2,4/1,3/1, 4/1	c	-	Ap-BA-Bss	e

3.4 Soil Mapping

The area under each soil series was further separated into soil phases and their boundaries delineated on the cadastral map based on the variations observed in the texture of the surface soil, slope, erosion, presence of gravel, stoniness etc. A soil phase is a subdivision of soil series based mostly on surface features that affect its use and management. The soil mapping units are shown on the map (Fig.3.5) in the form of symbols. During the survey many profile pits, few minipits and a few auger bores representing different landforms occurring in the microwatershed were studied. In addition to the profile study, spot observations in the form of minipits, road cuts, terrace cuts etc., were studied to validate the soil map unit boundaries on the soil map. The soil map shows the geographic distribution of 15soil mapping units representing 9 soil series occurring in the microwatershed. The soil map unit (soil legend) description is presented in Table 3.2.The soil phase map (management units) shows the distribution of soil phases mapped in the microwatershed. Each mapping unit (soil phase) delineated on the map has similar soil and site characteristics. In other words, all the farms or survey numbers included in one soil phase will have similar management needs and have to be treated accordingly.

3.5 Land Management units (LMU's)

The 15 soil phases identified and mapped in the microwatershed were grouped into 4Land Management units (LMU's) for the purpose of preparing a Proposed Crop Plan for sustained development of the microwatershed. The database (soil phases) generated under LRI was utilized for identifying Land Management units (LMU's) based on the management needs. One or more than one soil site characteristic having influence on the management have been choosen for identification and delineation of LMUs. For Narayanpet-3 microwatershed, five soil and site characteristics, namely soil depth, soil texture, slope, erosion and gravel content have been considered for defining LMUs. The Land Management units are expected to behave similarly for a given level of management.

3.6 Laboratory Characterization

Soil samples for each soil series were collected from representative master profiles for laboratory characterization by following the methods outlined in the Laboratory Manual (Sarma *et al*, 1987). Surface soil samples collected from farmer's fields (50 samples) for fertility status (major and micronutrients) at 320 m grid interval in the year 2017 were analyzed in the laboratory (Katyal and Rattan, 2003). By linking the soil fertility data to the survey numbers through GIS, soil fertility maps were generated using Krigingmethod for the microwatershed.

Table 3.2 Soil map unit description of Narayanpet-3 Microwatershed

Soil No*	Soil Series	Soil Phase	Mapping Unit Description	Area in ha (%)
Soils of Granite Gneiss Landscape				
	YLR	Yalleri soils are moderately shallow (50-75 cm), well drained, have brown to reddish brown and dark reddish brown, gravelly clay red soils occurring on very gently to gently sloping uplands under cultivation		**13(2.66)**
27		YLRbB2	Loamy sand surface, slope 1-3%, moderate erosion	13(2.66)
	JNK	Jinkera soils are moderately shallow (50-75 cm), well drained, have dark brown to very dark grayish brown, slightly calcareous, sandy clay loam black soils occurring on very gently sloping uplands under cultivation		**106(21.15)**
20		JNKcB2	Sandy loam surface, slope 1-3%, moderate erosion	106(21.15)
Soils of Alluvial Landscape				
	KYT	Kyathanala soils are shallow (25-50 cm), well drained, have brown to strong brown and reddish to dark reddish brown, sandy clay loam soils occurring on very gently sloping plains under cultivation		**108(21.6)**
68		KYTcB2	Sandy loam surface, slope 1-3%, moderate erosion	87(17.37)
69		KYTmB1	Clay surface, slope 1-3%, slight erosion	21(4.23)

	BLD	Balched soils are moderately shallow (50-75 cm), moderately well drained, have very dark gray to very dark grayish brown, slightly calcareous, clay loam soils occurring on very gently sloping plains under cultivation		**7(1.34)**
75		BLDiB1g1	Sandy clay surface, slope 1-3%, slight erosion, gravelly (15-35%)	1(0.18)
76		BLDmB2	Clay surface, slope 1-3%, moderate erosion	6(1.16)
	MGL	Mungala soils are moderately deep (75-100 cm), moderately well drained, have dark gray to very dark gray, slightly calcareous, cracking clay black soils occurring on very gently sloping plains under cultivation		**1.1(0.22)**
80		MGLcB2	Sandy loam surface, slope 1-3%, moderate eroison	1(0.2)
81		MGLcB3	Sandy loam surface, slope 1-3%, severe erosion	0.10 (0.02)
	KDR	Kudlura soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous, cracking clay soils occurring on nearly level to very gently sloping plains under cultivation		**105(20.96)**
86		KDRhA1	Sandy clay loam surface, slope 0-1%, slight erosion	8(1.67)
87		KDRiB2	Sandy clay surface, slope 1-3%, moderate erosion	78(15.54)
88		KDRiB3	Sandy clay surface, slope 1-3%, severe erosion	19(3.75)
	RHN	Rachanalli soils are moderately deep (75-100 cm), moderately well drained, have brown to very dark grayish brown, slightly calcareous, cracking sandy clay loam soils occurring on very gently sloping plains under cultivation		**88(17.61)**
77		RHNcB2	Sandy loam surface, slope 1-3%, moderate erosion	7(1.4)
79		RHNmB2	Clay surface, slope 1-3%, moderate erosion	81(16.21)
	SWR	Sowrashtrahalli soils are deep (100-150 cm), moderately well drained, have dark gray to very dark grayish brown, calcareous, cracking clay black soils occurring on very gently sloping plains under cultivation		**0.003(0.0007)**
91		SWRmB2	Clay surface, slope 1-3%, moderate erosion	0.003(0.0007)
	HGN	Hegganakera soils are very deep (>150 cm), moderately well drained, have dark gray to very dark grayish brown and brown, slightly calcareous, cracking clay black soils occurring on very gently sloping plains under cultivation		**54(10.78)**
95		HGNmB2	Clay surface, slope 1-3%, moderate erosion	54(10.78)
992	Railway			**1 (0.18)**
1000	Others		Habitation and waterbody	**18(3.52)**

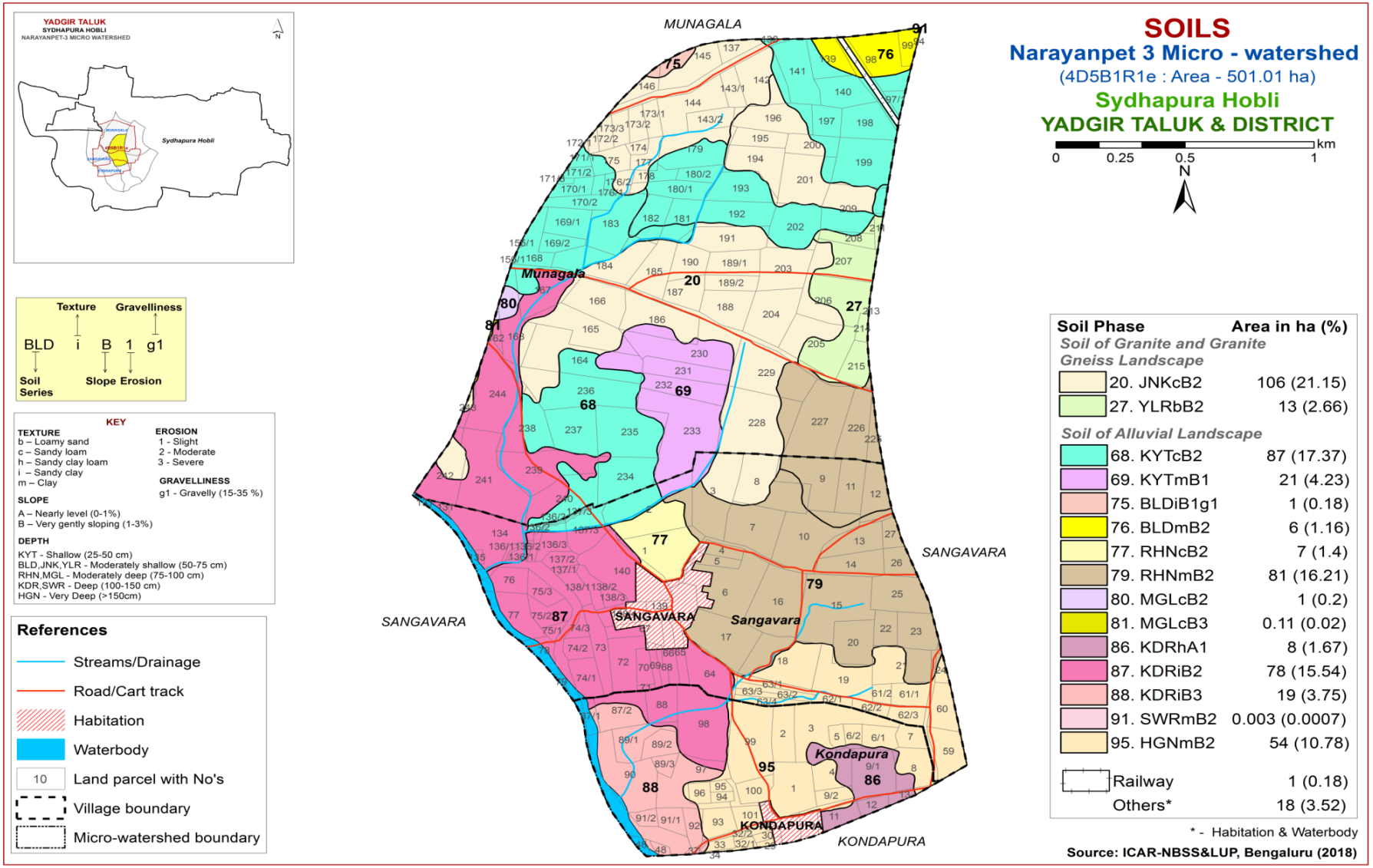


Fig 3.5 Soil Phase or Management Units- Narayanpet-3Microwatershed

Chapter 4

THE SOILS

Detailed information pertaining to the nature, extent and their distribution of different kinds of soils occurring in Narayanpet-3microwatershed is provided in this chapter. The microwatershed area has been identified as granite gneiss and alluvial landscapes based on geology. In all, 9 soil series are identified. Soil formation is the result of the combined effect of environmental and terrain factors that are reflected in soil morphology. In these landscapes, it is by parent material, relief, time and climate.

A brief description of each of the 9 soil series identified followed by 15 soil phases (management units) mapped are furnished below. The physical and chemical characteristics of soil series identified in Narayanpet-3 microwatershed are given in Table 4.1 along with soil classification. The soils in any one map unit differ from place to place in their depth, texture, slope, gravelliness, erosion or any other site characteristic that affect management. The soil phase map can be used for identifying the suitability of areas for growing specific crops or for other alternative uses and also for deciding the type of conservation structures needed. The detailed information on soil and site-characteristics like soil depth, surface soil texture, slope, erosion, gravelliness, AWC, LCC etc, with respect to each of the soil phase identified is given village/survey number wise for the microwatershed in Appendix-I.

4.1 Soils of granite gneiss landscape

In this landscape, 2 soil series are identified and mapped. Of these, JNK series occupies an area of 106 ha (21%) followed by YLR13 ha (3%). Brief description of each series identified and number of soil phases mapped is given below.

4.1.1 Yalleri (YLR) Series: Yalleri soils are moderately shallow (50-75 cm), well drained, have very dark reddish brown to dark brown, gravelly clay soils. They are developed from weathered granite gneiss and occur on very gently to gently sloping uplands under cultivation. The Yalleri series has been classified as a member of the fine, mixed, isohyperthermic family of Typic Haplustalfs.

The thickness of the solum ranges from 50 to 74 cm. The thickness of A horizon ranges from 10 to 13 cm. Its colour is in 7.5 YR and 5 YR hue with value and chroma 2 to 4. The texture is sandy loam, loamy sand, and sandy clay loam. The thickness of B horizon ranges from 45 to 64 cm. Its colour is in 10 YR, 7.5 YR and 5 YR hue with value 2 to 4 and chroma 2 to 4. Its texture is clay with gravel content of 15-35 per cent. The available water capacity is low (51-100 mm/m).Only one soil phase was identified and mapped.

Landscape and Soil Profile characteristics of Yalleri (YLR)Series

4.1.2 Jinkera (JNK) Series: Jinkera soils are moderately shallow (50-75 cm), well drained, have very dark gray to very dark grayish brown and dark brown,slightly calcareous sandy clay loam soils. They are developed from weathered granite gneiss and occur on very gently sloping uplands under cultivation. The Jinkera series has been classified as a member of the fine-loamy, mixed, isohyperthermic family of Typic Haplustepts.

Landscape and Soil Profile characteristics of Jinkera (JNK)Series

The thickness of the solum ranges from 51-75 cm. Thickness of A horizon ranges from 6 to 11 cm. Its colour is in hue 10 YR and 7.5 YR with value and chroma of 3 to 4. The texture varies from sandy loam to sandy clay. The thickness of B horizon ranges from 53 to 66 cm. Its colour is in 10 YR and 7.5 YR hue with value and chroma of 2 to 4. The texture varies fromsandy clay loam to sandy clay and is slightly calcareous. The

available water capacity is low (51-100 mm/m). Only one soil phase was identified and mapped.

4.2 Soils of Alluvial landscape

In this landscape, 7 soil series are identified and mapped. Of these, KYTseries occupies an area of 108ha (22%) followed by KDR 105 ha (21%), RHN 88 ha (17%), HGN 54 ha (11%), BLD 7 ha (1%), MGL 1 ha (0.22%) and SWR 0.003 ha (0.0007%).Brief description of each series identified and number of soil phases mapped is given below.

4.2.1Kyathanala (KYT) Series: Kyathanala soils are shallow (25-50 cm), well drained, have dark brown to strong brown and dark reddish brown sandy clay loam soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Kyathanala series has been classified as a member of the loamy, mixed, isohyperthermic family of Paralithic Haplustalfs.

The thickness of the solum ranges from 25 to 49 cm. The thickness of A horizon ranges from 5 to 11 cm. Its colour is in 5YR hue with value and chroma of 3 to 4. The texture is sandy clay. The thickness of B horizon range from 20 to 44 cm. Its colour is in 5 YR and 7.5 YR hue with value 3 to 4 and chroma 4 to 6. Its texture is sandy loam to sandy clay loam and sandy clay. The available water capacity is very low (<50 mm/m). Two soil phases were identified and mapped.

Landscape and Soil Profile characteristics of Kyathanala (KYT)Series

4.2.2Balched (BLD) Series: Balched soils are moderately shallow (50-75 cm), moderately well drained, have black to very dark grayish brown,slightly calcareous clay loam soils. They are developed from alluvium and occur on very gently to gently sloping plains under cultivation. The Balched series has been classified as a member of the fine, mixed,isohyperthermicfamily of Typic Haplustepts.

The thickness of the solum ranges from 50-75 cm. Thickness of A horizon ranges from 5 to 10 cm. Its colour is in hue 10 YR and 7.5 YR with value 3 to 4 and chroma 1to 3. The texture varies from sandy clay to clay. The thickness of B horizon ranges from 41 to 69 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. The texture is clay loam and is slightly calcareous. The available water capacity is medium (101-150 mm/m).Two soil phases were identified and mapped.

Landscape and Soil Profile characteristics of Balched (BLD)Series

4.2.3Mungala (MGL) Series: Mungala soils are moderately deep (75-100 cm), moderately well drained, very dark gray to dark gray,slightly calcareous cracking clay black soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Mungala series has been classified as a member of the fine, smectitic,isohyperthermicfamily of Typic Haplusterts.

The thickness of the solum ranges from 75 to 100 cm. The thickness of A horizon ranges from 9 to 12 cm. Its colour is in hue 10 YR with value 3 to 4and chroma 2. Its texture is clay and is calcareous. The thickness of B horizon ranges from 64 to 89 cm. Its colour is in hue 10 YR with value 3 and chroma 1 to 3. Its texture is clay and is slightly calcareous. The available water capacity is medium (101-150 mm/m). Two soil phases were identified and mapped.

Landscape and Soil Profile characteristics of Mungala (MGL)Series

4.2.4Kudlura (KDR) Series: Kudlura soils are deep (100-150 cm), moderately well drained, have very dark gray to grayish brown, calcareous cracking clay soils. They have developed from alluvium and occur on nearly level to very gently sloping plains under cultivation. The Kudlura series has been classified as a member of the fine, mixed, (calcareous), isohyperthermicfamily of Fluventic Haplustepts.

The thickness of the solum ranges from 110 to 149 cm. The thickness of A horizon ranges from 6 to 22 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 2. The texture ranges from sandy loam, sandy clay loam, sandy clay and clay. The thickness of B horizon ranges from 115 to 143 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 3. Texture is sandy clay loam, sandy clay to clay and is calcareous in nature. The available water capacity is very high (>200 mm/m).Three soil phases were identified and mapped.

Landscape and Soil Profile characteristics of Kudlura (KDR)Series

4.2.5 Rachanalli (RHN) Series: Rachanalli soils are moderately deep (75-100 cm), well drained, have very dark grayish brown to dark brown,slightly calcareous sandy clay loam soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Rachanalli series has been classified as a member of the fine-loamy, mixed,isohyperthermicfamily of Typic Haplustepts.

The thickness of the solum ranges from 76 to 100 cm. The thickness of A horizon ranges from 6 to 13 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 2 to 4. Its texture varies from sandy loam to sandy clay loam and sandy clay. The thickness of B horizon ranges from 66 to 92 cm. Its colour is in hue 10 YR with value 3 to 4 and chroma 1 to 3. Its texture varies from sandy loam to sandy clay loam and is slightly calcareous. The available water capacity is medium (101-150 mm/m).Two soil phases were identified and mapped.

Landscape and Soil Profile characteristics of Rachanalli (RHN)Series

4.2.6 Sowrashtrahalli (SWR) Series: Sowrashtrahalli soils are deep (100-150 cm), moderately well drained,have very dark gray to dark gray, calcareous cracking clay black soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Sowrashtrahalli series has been classified as a member of the fine, smectitic (calcareous), isohyperthermic family of Typic Haplusterts.

The thickness of the solum ranges from 107 to 150 cm. The thickness of A horizon ranges from 7 to 13 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. The texture varies from sandy clay to clay. The thickness of B horizon ranges from 104 to 142 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 2. The texture is clay and is calcareous. The available water capacity is very high (>200 mm/m).Only one soil phase was identified and mapped.

Landscape and Soil Profile characteristics of Sowrashtrahalli (SWR)Series

4.2.7 Hegganakera (HGN) Series: Hegganakera soils are very deep (>150 cm), moderately well drained, have very dark gray to dark grayish brown,slightly calcareous cracking clayblack soils. They have developed from alluvium and occur on very gently sloping plains under cultivation. The Hegganakera series has been classified as a member of the fine, smectitic,isohyperthermicfamily of Typic Haplusterts.

The thickness of the solum is more than 150 cm. The thickness of A horizon ranges from 7 to 9 cm. Its colour is in 10 YR hue with value 3 to 4 and chroma 1 to 3 with clay texture. The thickness of B horizon ranges from 152 to 175 cm. Its colour is in 10 YR hue with value 2 to 4 and chroma 1 to 3. Its texture is clay and is slightly calcareous. The available water capacity is very high (>200 mm/m).Only one soil phase was identified and mapped.

Landscape and Soil Profile characteristics of Hegganakera (HGN)Series

Table: 4.1 Physical and Chemical characteristics of soil series identified in Narayanpet-3microwatershed

Soil Series: Yalleri (YLR) **Pedon:** R-16

Location: $16^0$32'54.3"N $77^0$22'71.2"E, Duppalli village, Sydhapura hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:**Fine, mixed, isohyperthermic Typic Haplustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-5	Ap	81.69	5.44	12.87	6.10	8.65	33.88	21.57	11.50	-	sl	8.60	3.37
5-34	Bt1	38.78	6.73	54.49	3.38	9.91	12.42	8.93	4.14	-	c	25.33	15.82
34-75	Bt2	40.35	2.90	56.75	12.91	6.83	10.30	7.48	2.82	35-60	c	24.49	16.20

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-5	6.91	-	-	0.069	0.70	0.00	5.29	1.37	0.28	0.03	6.96	6.90	0.54	100	0.45
5-34	7.05	-	-	0.053	0.62	0.00	16.43	3.89	0.26	0.09	20.67	21.60	0.40	96	0.42
34-75	7.25	-	-	0.058	0.59	0.00	15.22	3.46	0.25	0.14	19.06	19.90	0.35	96	0.69

Contd…

Soil Series: Jinkera **(**JNK) **Pedon:** R-1

Location: $16^0$45'13.5"N $77^0$10'59.8"E, Varkanahalli village, Yadgir hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:**Fine-loamy, mixed, isohyperthermic Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-15	Ap	66.84	13.62	19.54	12.15	21.22	11.23	12.56	9.68	10	sl	14.42	7.70
15-38	Bw1	59.08	12.11	28.81	12.53	12.42	17.85	8.77	7.52	20	scl	18.21	12.23
38-50	Bw2	68.21	11.68	20.11	17.90	21.81	10.60	10.80	7.10	10	scl	14.54	8.96

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-15	8.42	-	-	0.148	0.70	0.65	-	-	0.15	0.03	-	14.50	0.74	100	0.18
15-38	8.38	-	-	0.226	0.31	2.21	-	-	0.09	0.23	-	21.70	0.75	100	1.05
38-50	8.40	-	-	0.195	0.25	1.17	-	-	0.07	0.19	-	15.90	0.79	100	1.23

Contd…

Soil Series: Kyathanala (KYT) **Pedon:** R-4

Location: $16^0$32'22.9"N $77^0$15'35.4"E, Mungala village, Sydhapura hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Loamy, mixed, isohyperthermic Paralithic Haplustalfs

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-5	Ap	82.54	8.12	9.34	20.10	23.15	16.14	16.24	6.90	-	ls	13.51	4.10
5-17	Bt	53.13	10.20	36.66	23.91	12.65	6.80	5.53	4.25	-	sc	26.61	13.69
17-32	Cr	79.51	9.41	11.08	16.63	24.04	15.42	17.24	6.19	-	sl	12.95	4.45

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-5	7.07	-	-	0.12	0.77	0.00	6.00	1.74	0.33	0.01	8.08	8.20	0.88	99	0.17
5-17	6.74	-	-	0.13	0.66	0.00	17.96	2.78	0.16	0.15	21.05	22.40	0.61	94	0.65
17-32	6.78	-	-	0.06	0.48	0.00	6.15	1.32	0.14	0.07	7.68	9.00	0.81	85	0.75

Contd…

Soil Series: Balched (BLD) **Pedon:** R-40

Location: $16^0$44'19.4"N $77^0$19'40.9"E Yaleri village, Balichakra hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed,isohyperthermic Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-7	Ap	38.19	26.03	35.79	2.32	6.22	9.60	14.87	5.17	15	cl	22.13	11.07
7-28	Bw1	37.87	23.59	38.54	3.30	6.06	9.15	12.77	6.60	-	cl	23.75	14.43
28-54	Bw2	35.71	28.94	35.36	4.10	2.16	10.46	11.76	7.23	-	cl	25.47	16.56

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-7	8.19	-	-	0.22	0.54	2.32	27.16	6.43	0.38	0.31	34.28	38.20	1.07	90	0.80
7-28	8.56	-	-	0.14	0.42	3.18	29.26	6.83	0.14	0.51	36.75	39.91	1.04	92	1.27
28-54	8.70	-	-	0.16	0.38	3.92	29.79	7.14	0.08	0.91	37.92	42.91	1.21	88	2.13

Contd…

Soil Series: Mungala (MGL) **Pedon:** R-31

Location: $16^0$43'23.3"N 77^{0-}21'07.7"E, Yaleri village, Balichakra hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, smectitic,isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-9	Ap	31.82	22.28	45.90	3.13	4.10	7.34	11.43	5.83	-	c	28.62	18.29
9-24	BA	27.18	20.72	52.10	2.87	3.20	5.64	9.72	5.75	-	c	29.01	20.46
24-41	Bss1	21.90	23.49	54.61	3.58	3.24	4.25	6.03	4.80	-	c	34.49	24.32
41-84	Bss2	20.13	22.62	57.24	1.68	3.13	4.36	6.38	4.59	-	c	37.07	25.99

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-9	8.25	-	-	0.23	0.46	1.92	-	-	0.58	0.36	-	49.11	1.07	100	0.74
9-24	8.47	-	-	0.14	0.42	4.56	-	-	0.30	0.30	-	50.83	0.98	100	0.59
24-41	8.59	-	-	0.14	0.42	5.64	-	-	0.13	0.35	-	56.18	1.03	100	0.62
41-84	8.58	-	-	0.15	0.35	4.44	-	-	0.17	0.56	-	60.13	1.05	100	0.93

Contd…

Soil Series: Kudlura (KDR) **Pedon:** T_1/P_2

Location: $16^0$34'03.1"N $77^0$14'71.7"E, Kyathanala village, Sydhapura Hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine, mixed(calcareous), isohyperthermicFluventic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-6	Ap	49.52	14.58	35.90	5.71	7.41	14.81	15.66	5.93	-	sc	26.86	12.10
6-26	BA	50.79	13.31	35.90	7.41	9.10	15.56	13.12	5.61	-	sc	25.65	12.24
26-67	Bw1	43.49	15.97	40.54	5.86	7.38	13.56	10.85	5.86	-	c	31.22	16.48
67-115	Bw2	37.42	18.93	43.66	6.51	6.83	10.95	8.68	4.45	-	c	36.13	22.34
115-144	Bw3	39.74	18.88	41.38	8.16	7.84	10.63	8.70	4.40	-	c	35.83	20.57

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-6	8.34	-	-	0.15	0.72	3.55	-	-	0.42	0.07	-	33.20	0.92	100	0.22
6-26	8.55	-	-	0.11	0.85	4.90	-	-	0.33	0.25	-	32.70	0.91	100	0.76
26-67	9.08	-	-	0.17	0.60	5.02	-	-	0.18	1.34	-	36.20	0.89	100	3.69
67-115	9.44	-	-	0.37	0.52	6.61	-	-	0.25	6.72	-	39.30	0.90	100	17.09
115-144	9.53	-	-	0.43	0.56	6.10	-	-	0.26	7.85	-	33.70	0.81	100	23.29

Contd…

Soil Series: Rachanalli (RHN) **Pedon:** R-2

Location: 16^{0}44'40.9"N 77^{0}17'35.0"E, Gopalpura village, Gurumitkal hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:** Fine-loamy, mixed,isohyperthermic Typic Haplustepts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-8	Ap	77.72	14.09	8.19	6.31	13.12	18.82	27.16	12.31	-	sl	10.76	3.53
8-43	Bw1	76.00	10.38	13.62	13.29	17.92	16.99	20.60	7.21	-	sl	21.48	7.91
43-87	Bw2	52.64	19.95	27.41	2.69	4.66	16.79	16.89	11.61	-	scl	40.80	16.55

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-8	8.16	-	-	0.22	0.38	1.20	5.43	2.49	0.16	0.79	8.87	8.99	1.10	99	8.81
8-43	9.63	-	-	0.26	0.19	0.60	6.25	4.72	0.09	4.31	15.37	14.66	1.08	105	29.43
43-87	10.09	-	-	1.01	0.15	5.76	-	-	0.21	11.77	-	24.08	0.88	100	48.87

Contd…

Soil Series: Sowrashtrahalli (SWR) **Pedon:** R-8

Location: $16^0$38'49.0"N $77^0$16'56.1"E, Killanakera village, Balichakra hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:**Fine, smectitic, calcareous, isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-9	Ap	32.07	21.06	46.87	2.72	4.78	8.37	10.43	5.76	-	c	33.69	16.51
9_34	BA	32.29	20.37	47.35	3.90	5.20	8.56	9.10	5.53	-	c	37.43	16.65
34-67	Bss1	30.11	23.13	46.76	4.18	5.05	8.13	8.13	4.62	-	c	38.02	19.44
67-124	Bss2	19.93	23.40	56.66	2.46	3.14	5.04	5.71	3.58	-	c	42.55	23.92

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-9	8.44	-	-	0.18	0.77	7.47	-	-	0.79	0.21	-	47.70	1.02	100	0.45
9_34	8.57	-	-	0.14	0.81	6.86	-	-	0.51	0.23	-	47.80	1.01	100	0.49
34-67	8.73	-	-	0.12	0.81	6.48	-	-	0.28	0.44	-	50.60	1.08	100	0.88
67-124	8.71	-	-	0.16	0.77	7.56	-	-	0.42	0.91	-	51.20	0.90	100	1.78

Contd…

Soil Series: Hegganakera (HGN) **Pedon:** R-12

Location: $16^0$46'19.9"N $77^0$04'34.0"E, Thumakura village, Yadgir hobli, Yadgir taluk and district

Analysis at: NBSS&LUP, Regional Centre, Bengaluru **Classification:**Fine, smectitic,isohyperthermic Typic Haplusterts

Depth (cm)	Horizon	Size class and particle diameter (mm)								Coarse fragments w/w (%)	Texture Class (USDA)	% Moisture	
		Total			Sand								
		Sand (2.0-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Very coarse (2.0-1.0)	Coarse (1.0-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)			1/3 Bar	15 Bar
0-8	Ap	20.20	25.22	54.58	2.32	2.76	3.53	8.17	3.42	-	c	42.47	25.59
8-24	BA	21.18	21.70	57.12	2.07	3.28	4.69	7.31	3.82	-	c	41.88	24.67
24-50	Bss1	18.76	21.67	59.57	1.20	2.51	3.93	7.09	4.03	-	c	40.46	23.34
50-86	Bss2	16.74	22.24	61.02	0.88	1.53	4.27	6.02	4.05	-	c	42.18	24.76
86-146	Bss3	18.64	20.20	61.16	2.30	2.41	3.73	6.36	3.84	-	c	40.03	28.61
146-170	Bss4	16.08	19.33	64.59	0.88	2.75	3.41	5.95	3.08	-	c	40.28	29.90

Depth (cm)	pH (1:2.5)			E.C. (1:2.5)	O.C.	$CaCO_3$	Exchangeable bases					CEC	CEC/ Clay	Base saturation	ESP
							Ca	Mg	K	Na	Total				
	Water	$CaCl_2$	M KCl	dS m^{-1}	%	%	cmol kg^{-1}							%	%
0-8	8.77	-	-	1.33	1.16	8.19	-	-	1.10	5.21	-	36.23	0.66	100	14.38
8-24	8.93	-	-	1.11	0.64	5.46	-	-	0.87	4.23	-	35.50	0.62	100	11.93
24-50	8.85	-	-	0.984	0.32	3.38	-	-	0.71	3.78	-	36.69	0.62	100	10.30
50-86	8.54	-	-	0.562	0.24	3.38	-	-	0.58	3.07	-	39.16	0.64	100	7.84
86-146	8.45	-	-	0.526	0.24	3.38	-	-	0.62	2.82	-	38.52	0.63	100	7.31
146-170	8.64	-	-	0.517	0.20	4.29	-	-	0.60	2.99	-	36.87	0.57	100	8.12

Chapter 5

INTERPRETATION FOR LAND RESOURCE MANAGEMENT

The most important soil and site characteristics that affect the land use and conservation needs of an area are land capability, land irrigability, soil depth, soil texture, coarse fragments, available water capacity, soil slope, soil erosion, soil reaction etc. These are interpreted from the data base generated through land resource inventory and several thematic maps are generated. These would help in identifying the areas suitable for growing crops and, soil and water conservation measures and structures needed thus helping to maintain good soil health for sustained crop production. The various interpretative and thematic maps generated are described below.

5.1 Land Capability Classification

Land capability classification is an interpretative grouping of soil map units (soil phases) mainly based on inherent soil characteristics, external land features and environmental factors that limit the use of land for agriculture, pasture, forestry, or other uses on a sustained basis (IARI, 1971). The land and soil characteristics used to group the land resources in an area into various land capability classes, subclasses and units are

Soil Characteristics: Depth, texture, gravelliness, calcareousness.

Land characteristics: Slope, erosion, drainage, rock outcrops.

Climate: Total rainfall and its distribution, and length of crop growing period.

The land capability classification system is divided into land capability classes, subclasses and units based on the level of information available. Eight land capability classes are recognized. They are

Class I: They are very good lands that have no limitations or very few limitations that restrict their use.

Class II: They are good lands that have minor limitations and require moderate conservation practices.

Class III: They are moderately good lands that have moderate limitations that reduce the choice of crops or that require special conservation practices.

Class IV: They are fairly good lands that have very severe limitations that reduce the choice of crops or that require very careful management.

Class V: Soils in these lands are not likely to erode, but have other limitations like wetness that are impractical to remove and as such not suitable for agriculture, but suitable for pasture or forestry with minor limitations.

Class VI: The lands have severe limitations that make them generally unsuitable for cultivation, but suitable for pasture or forestry with moderate limitations.

Class VII: The lands have very severe limitations that make them unsuitable for cultivation, but suitable for pasture or forestry with major limitations.

Class VIII: Soil and other miscellaneous areas (rock lands) that have very severe limitations that nearly preclude their use for any crop production, but suitable for wildlife, recreation and installation of wind mills.

The land capability subclasses are recognised based on the dominant limitations observed within a given land capability class. The subclasses are designated by adding a lower case letter like ‘e’, ‘w’, ‘s’, or ‘c’ to the class numeral. The subclass “e” indicates that the main hazard is risk of erosion, “w” indicates drainage or wetness as a limitation for plant growth, “s” indicates shallow soil depth, coarse or heavy textures, calcareousness, salinity/alkali or gravelliness and “c” indicates limitation due to climate.

The land capability subclasses have been further subdivided into land capability units based on the kinds of limitations present in each subclass. Ten land capability units are used in grouping the soil map units. They are stony or rocky (0), erosion hazard (slope, erosion) (1), coarse texture (sand, loamy sand, sandy loam) (2), fine texture (cracking clay, silty clay) (3), slowly permeable subsoil (4), coarse underlying material (5), salinity/alkali (6), stagnation, overflow, high ground water table (7), soil depth (8) and fertility problems (9). The capability units thus identified have similar soil and land characteristics that respond similarly to a given level of management. The soils of the microwatershed have been classified upto land capability subclass level.

The 15 soil map units identified in the Narayanpet-3microwatershed are grouped under 2land capability classes and3land capability subclasses. Entire areain the microwatershed is suitable for agriculture and about 18 ha (4%) is covered by others (habitation and water bodies)(Fig. 5.1).

Good cultivable lands (Class II) coveranarea of about 92per cent and are distributed in all parts of the microwatershed with minor problems of soilanderosion. Moderately good cultivable lands (Class III) coveranarea of about 4per cent and are distributed in the southernpart of the microwatershed with moderate limitations of erosionandsoil.

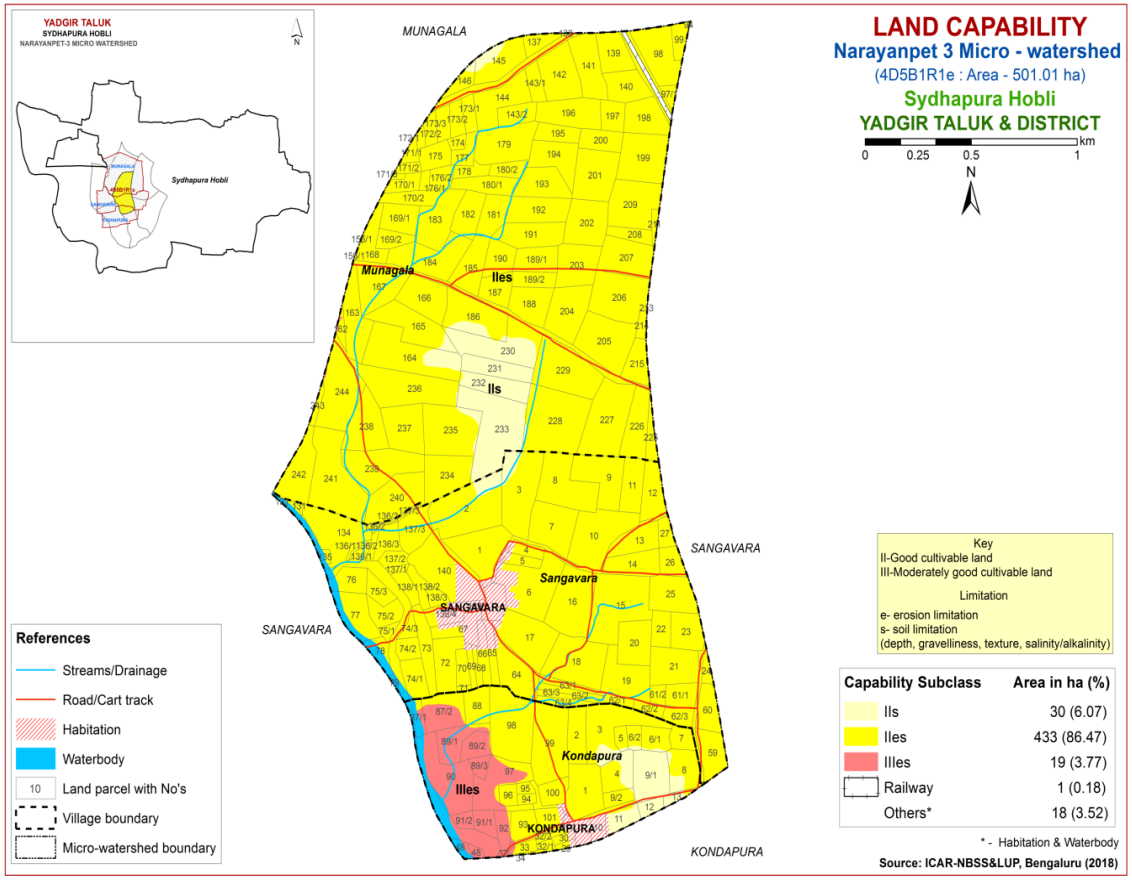


Fig. 5.1 Land Capability map of Narayanpet-3Microwatershed

5.2 Soil Depth

Soil depth refers to the depth of the soil occurring above the parent material or hard rock. The depth of the soil determines the effective rooting depth for plants and in accordance with soil texture, mineralogy and gravel content, the capacity of the soil column to hold water and nutrient availability. Soil depth is one of the most important soil characteristic that is used in differentiating soils into different soil series. The soil depth classes used in identifying soils in the field are very shallow (<25 cm), shallow (25-50 cm), moderately shallow (50-75 cm), moderately deep (75-100 cm), deep (100-150 cm) and very deep (>150 cm). They were used to classify the soils into different depth classes and a soil depth map was generated. The area extent and their geographical distribution in the microwatershedis given in Fig. 5.2.

Shallow (25-50 cm) soils occur in an area of about 108 ha (21%) and are distributed in the northern, western and central part of the microwatershed.Moderately shallow (50-75 cm) soils occupy a maximumarea of about126 ha (25%) and are distributed in all parts of the microwatershed. Moderately deep (75-100 cm) soils occur in an area of about 89 ha (18%) and are distributed in the eastern and southern part of the microwatershed. Deep (100-150 cm) soils occur in an area of about 105 ha (21%) and are distributed in the western and southern part of the microwatershed. Very

deep(>150 cm) soils occur in an area of 54 ha (11%) and are distributed in the southern part of the microwatershed.

The most productive lands 159 ha (32%) with respect to soil rooting depth where all climatically adapted annual and perennial crops can be grown are deep to very deep (100 cm to >150 cm depth) soils occurring in the microwatershed. Problem soils cover an area of 108 ha (21%) that are shallow (25-50 cm depth) where occasionally some short duration crops may be grown. The probability of crop failure is very high.

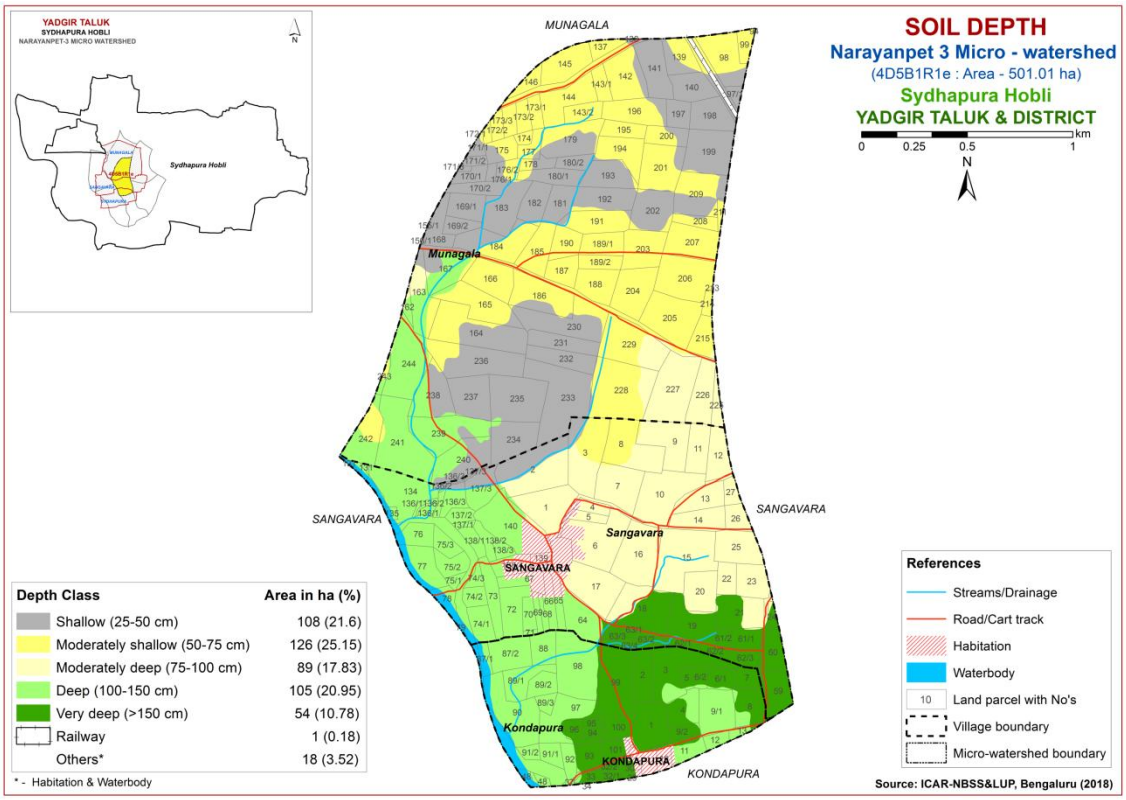


Fig. 5.2Soil Depth map of Narayanpet-3Microwatershed

5.3 Surface Soil Texture

Texture is an expression to indicate the coarseness or fineness of the soil as determined by the relative proportion of primary particles of sand, silt and clay. It has a direct bearing on the structure, porosity, adhesion and consistence. The surface layer of a soil to a depth of about 25 cm is the layer that is most used by crops and plants. The surface soil textural class provides a guide to understanding soil-water retention and availability, nutrient holding capacity, infiltration, workability, drainage, physical and chemical behaviour, microbial activity and crop suitability. The textural classes used for LRI were used to classify and a surface soil texture map was generated. The area extent and their geographical distribution in the microwatershed is shown in Figure 5.3.

An area of about 13ha (3%) has soils that are sandy at the surface and are distributed in the eastern part of the microwatershed. Loamy at the surface occur in an area of about 209 ha (42%) and are distributed in the northern, western, central and

southern part of the microwatershed. Maximum area of about 259 ha (51%) has soils that are clayey at the surface and are distributed in all parts of the microwatershed.

The most productive lands with respect to surface soil texture are clayey and loamy soils (93%)that have high potential for soil-water retention and availability, and nutrient retention and availability, but clayey soils have more problems of drainage, infiltration, workability and other physical problems.

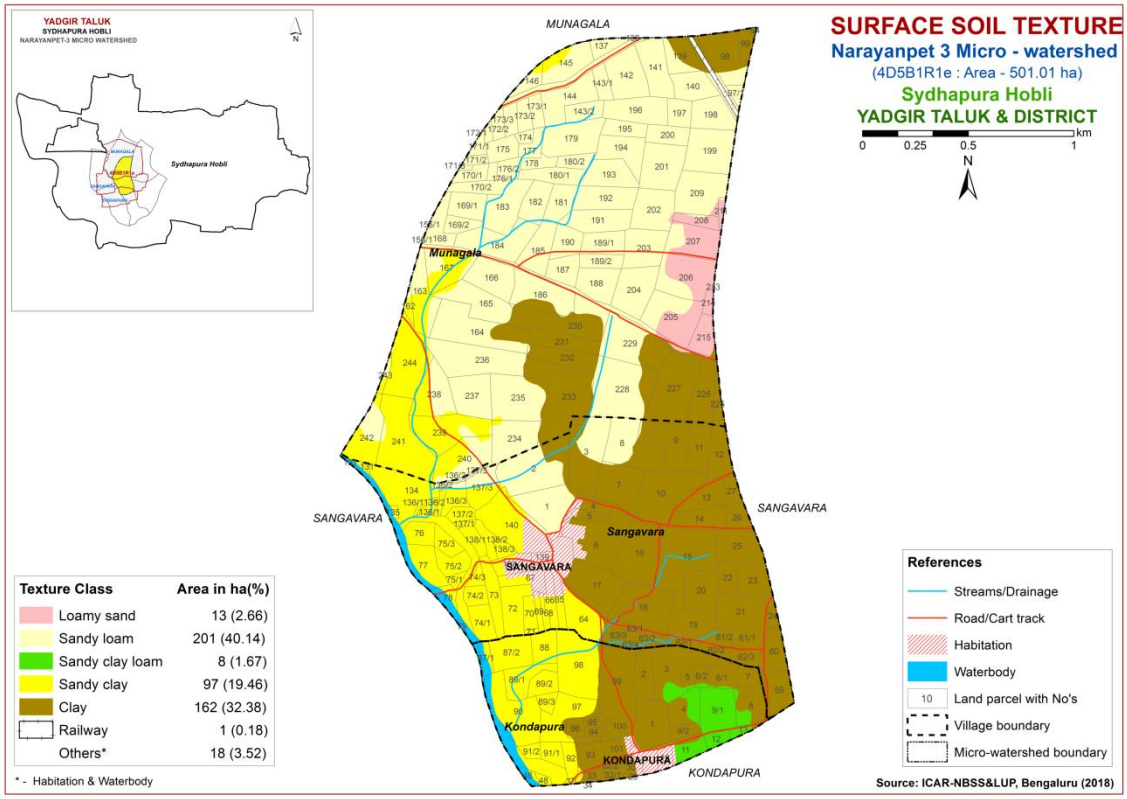


Fig. 5.3 Surface Soil Texture map of Narayanpet-3Microwatershed

5.4 Soil Gravelliness

Gravel is the term used for describing coarse fragments between 2 mm and 7.5 cm diameter and stones for those between 7.5 cm and 25 cm. The presence of gravel and stones in soil reduces the volume of soil responsible for moisture and nutrient storage, drainage, infiltration and runoff, and hinders plant growth by impeding root growth and seedling emergence, intercultural operations and farm mechanization. The gravelliness classes used in LRI were used to classify the soils and using these classes a gravelliness map was generated. The area extent and their geographic distribution in the microwatershed are shown in Figure 5.4.

Non gravelly (<15%) soils cover a maximum area of about 482 ha (96%) in the microwatershed. These are the most productive soils, where all climatically adapted short and long duration crops can be grown. The problem soils are gravelly (15-35%) soils covering avery less area of 1 ha (<1%) and are suitable for growing medium and short duration crops.

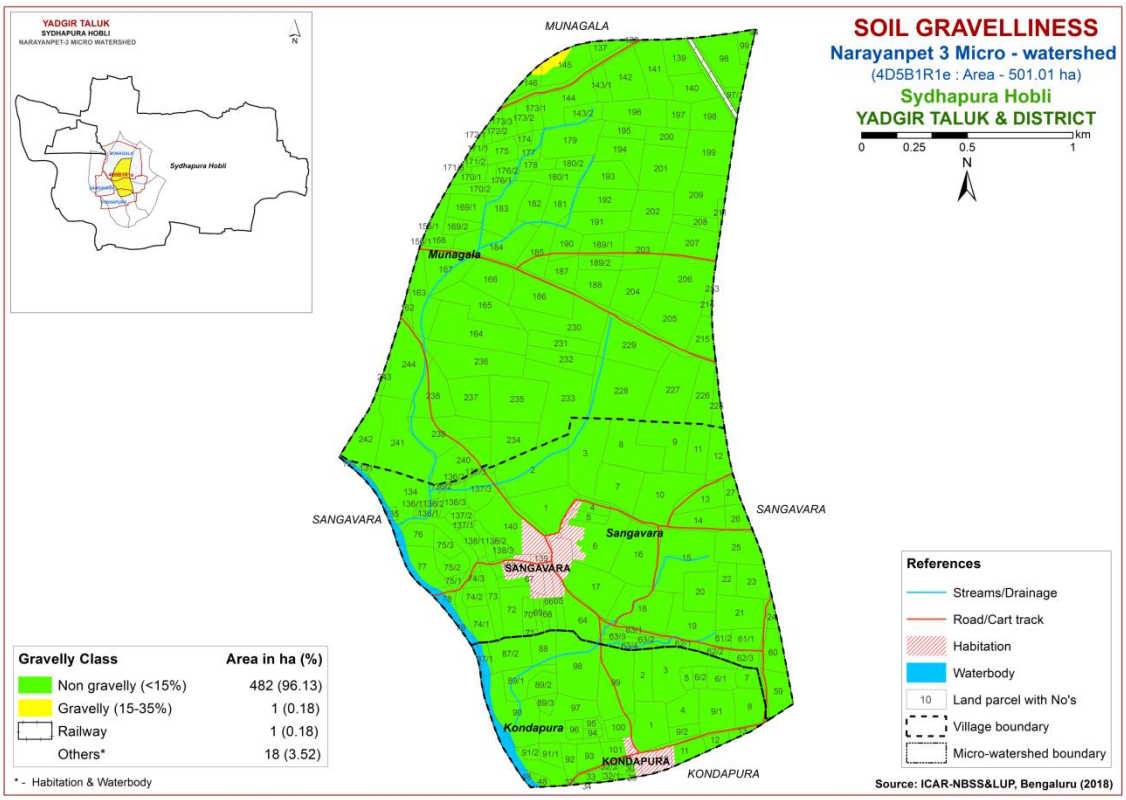


Fig. 5.4 Soil Gravelliness map of Narayanpet-3Microwatershed

5.5 Available Water Capacity

The soil available water capacity (AWC) is estimated based on the ability of the soil column to retain water between the tensions of 0.33 and 15 bar in a depth of 100 cm or the entire solum if the soil is shallower. The AWC of the soils (soil series) as estimated by considering the soil texture, mineralogy, soil depth and gravel content (Sehgal *et al.,* 1990) and accordingly the soil map units were grouped into five AWC classes *viz*, very low (<50 mm/m), low (50-100 mm/m), medium (100-150 mm/m), high (150-200 mm/m) and very high (>200 mm/m) and using these values, an AWC map was generated. The area extent and their geographic distribution of different AWC classes in the microwatershed is given in Figure 5.5.

An area of about 108 ha (21%) in the microwatershed has soils that are very low (<50 mm/m) in available water capacity and are distributed in the northern,western and central part of the microwatershed. An area of about 119ha (24%)are low (51-100mm/m) in available water capacity and are distributed in the northern, central and western part of the microwatershed. An area of about 96 ha (19%) in the microwatershed has soils that are medium (100-150 mm/m) in available water capacity and are distributed in the northern, eastern and southern part of the microwatershed. Maximum area of about 159 ha (32%) in the microwatershed has soils that are very high (>200 mm/m) in available water capacity and are distributed in all parts of the microwatershed.

About 227 ha (45%) area in the microwatershed has soils that are relatively problematic with regard to available water capacity. Here, only short or medium duration crops can be grown and the probability of crop failure is very high. These areas are best put to other alternative uses. The most productive soils cover about 159 ha (32%)where all climatically adapted long duration crops can be grown.

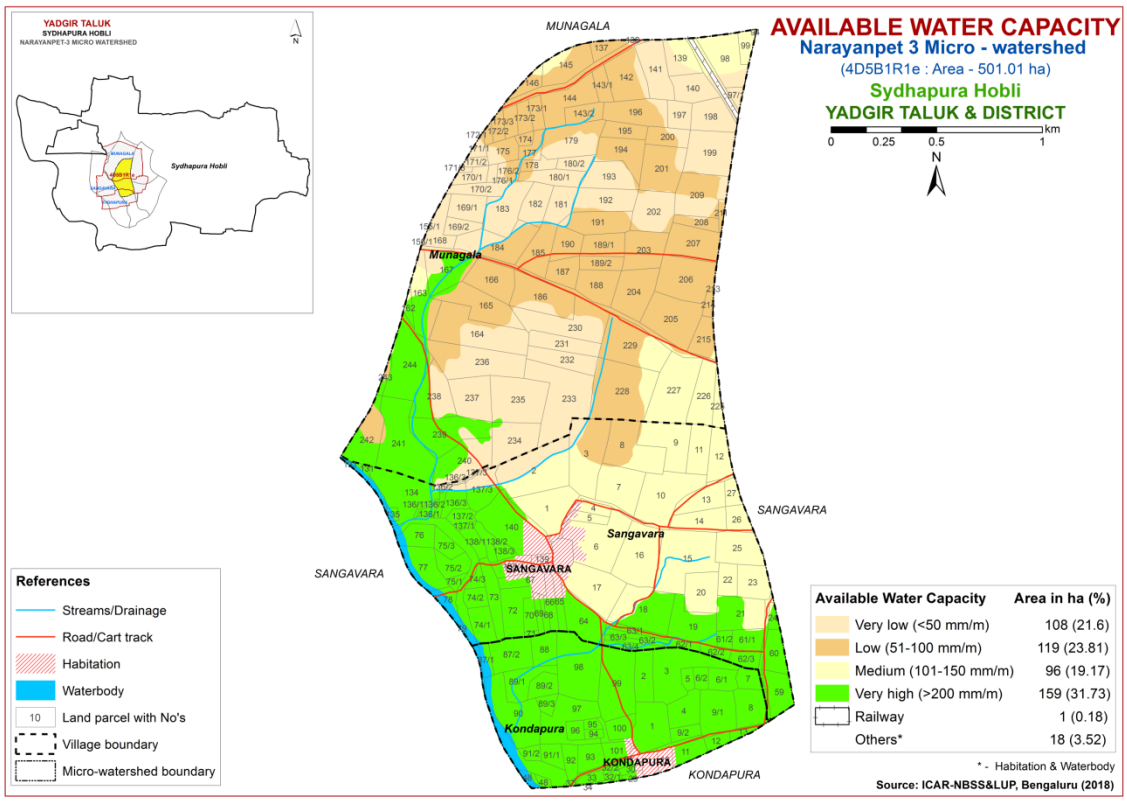


Fig. 5.5 Soil Available Water Capacity map of Narayanpet-3Microwatershed

5.6 Soil Slope

Soil slope refers to the inclination of the surface of the land. It is defined by gradient, shape and length, and is an integral feature of any soil as a natural body. Slope is considered important in soil genesis, land use and land development. The length and gradient of slope influences the rate of runoff, infiltration, erosion and deposition. The soil map units were grouped into a single slope class and a slope map was generated showing the area extent and their geographic distribution in the microwatershed (Fig. 5.6).

An area of 8 ha (2%) in the microwatershed falls under nearly level (0-1%) lands. Major area of about 474 ha (94%)in the microwatershed falls under very gently sloping (1-3% slope) lands and have high potential in respect of soil slopes. In all these areas, all climatically adapted annual and perennial crops can be grown without much soil and water conservation and other land development measures.

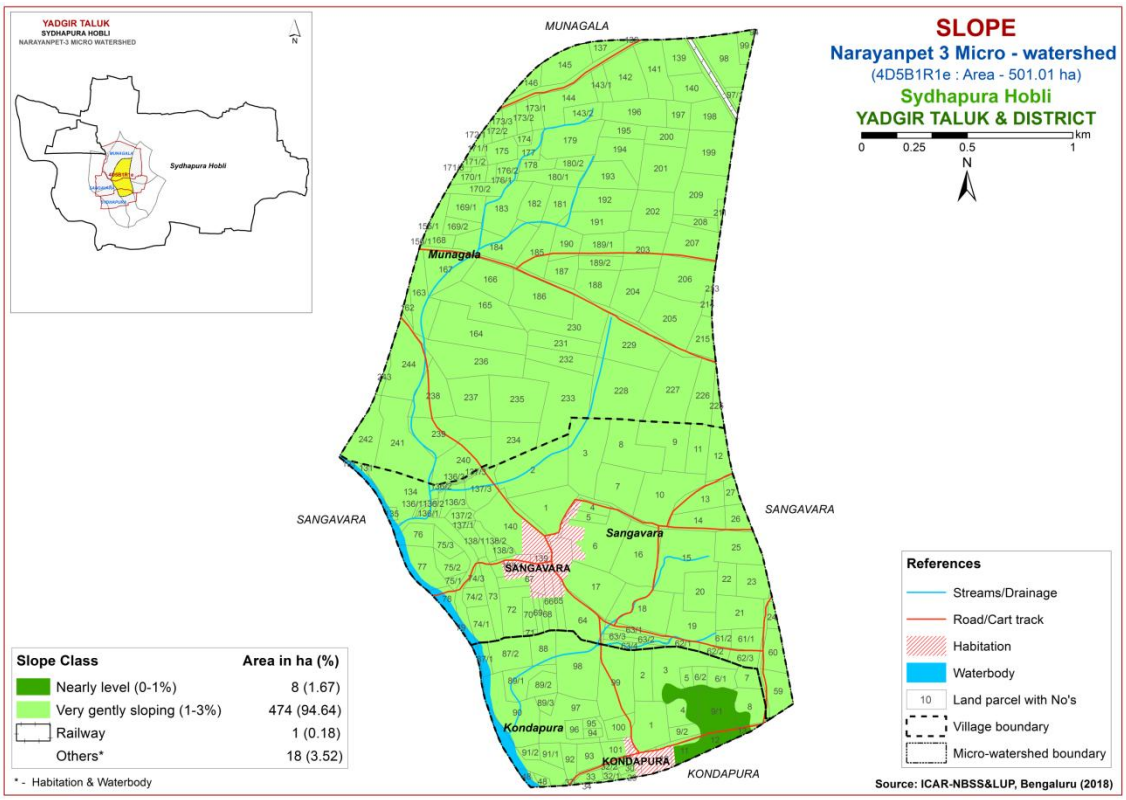


Fig. 5.6 Soil Slope map of Narayanpet-3 Microwatershed

5.7 Soil Erosion

Soil erosion refers to the wearing away of the earth's surface by the forces of water, wind and ice involving detachment and transport of soil by raindrop impact. It is used for accelerated soil erosion resulting from disturbance of the natural landscape by burning, excessive grazing and indiscriminate felling of forest trees and tillage, all usually by man. The erosion classes showing an estimate of the current erosion status as judged from field observations in the form of rills, gullies or a carpet of gravel on the surface are recorded. Four erosion classes, viz, slight erosion (e1), moderate erosion (e2), severe erosion (e3) and very severe erosion (e4) are recognized. The soil map units were grouped into different erosion classes and a soil erosion map generated. The area extent and their spatial distribution in the microwatershed is given in Figure 5.7.

An area of about 30 ha (6%) soils are slightly eroded (e1) and are distributed in the central and southern part of the microwatershed. Moderately eroded (e2) soils cover a maximum area of about 433 ha (86%) and are distributed in all parts of the microwatershed. Severely eroded (e3) soils cover an area of about 19 ha (4%) and are distributed in the southern part of the microwatershed.

Maximum area of 452 ha (90%) in the microwatershed is problematic because of moderate and severe erosion. For these areas, taking up soil and water conservation and other land development measures are needed.

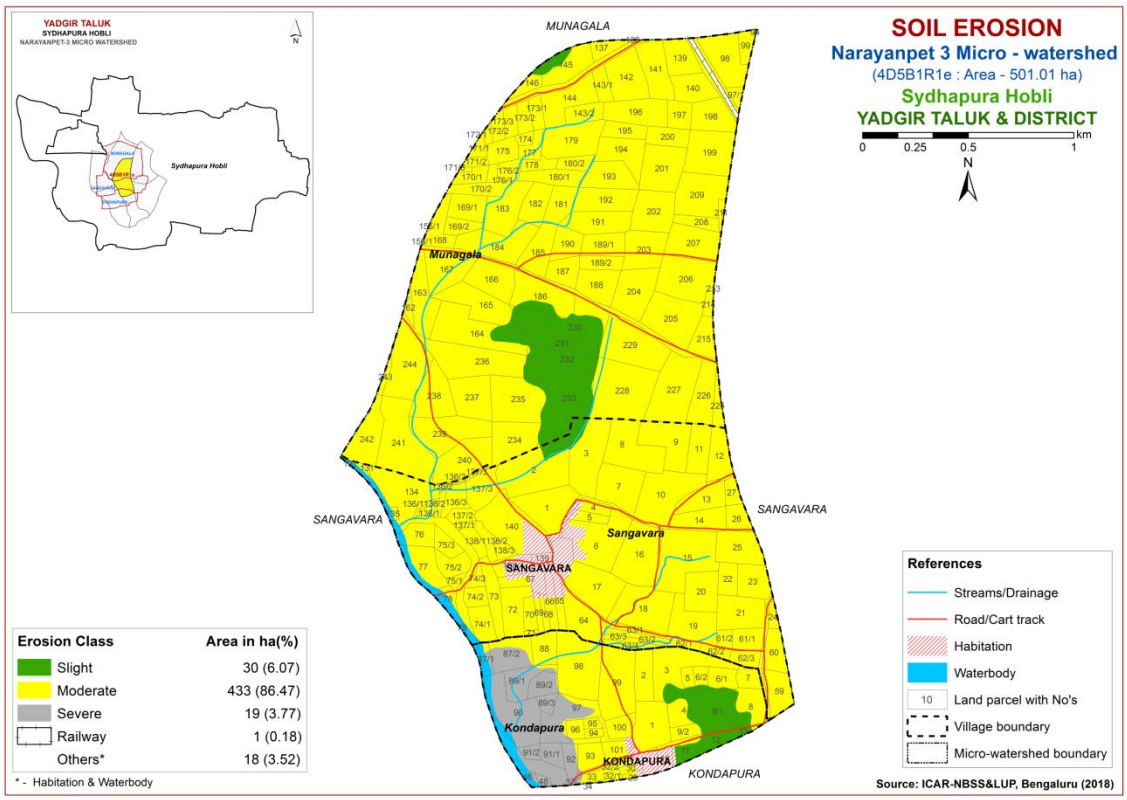


Fig. 5.7 Soil Erosion map of Narayanpet-3 Microwatershed

Chapter 6

FERTILITY STATUS

Soil fertility plays an important role in increasing crop yield. The adoption of high yielding varieties that require high amounts of nutrients has resulted in deficiency symptoms in crops and plants due to imbalanced fertilization and poor inherent fertility status, as these areas are characterised by low rainfall and high temperatures. Hence, it is necessary to know the fertility (macro and micro nutrients) status of the soils of the watersheds for assessing the kind and amount of fertilizers required for each of the crop intended to be grown. For this purpose, the surface soil samples collected from the grid points (one soil sample at every 320 m interval) all over the microwatershed through land resource inventory in the year 2017 were analysed for pH, EC, organic carbon, available phosphorus and potassium, and for micronutrients like zinc, boron, copper, iron and manganese, and secondary nutrient sulphur.

Soil fertility data generated has been assessed and individual maps for all the nutrients for the microwatershed have been generated using Kriging method under GIS. The village/survey number wise fertility data for the microwatershed is given in Appendix-II.

6.1 Soil Reaction (pH)

The soil analysis of the Narayanpet-3microwatershed for soil reaction (pH) showed that an area of about about 33 ha (6%) is neutral (pH 6.5-7.3)and are distributed in the northern and central part of the microwatershed. An area of 146 ha (29%) is slightly alkaline (pH 7.3-7.8) and are distributed in the northern, eastern, western, central and southern part of the microwatershed. Maximum area of about 177 ha (35%) is moderately alkaline (pH 7.8-8.4) and are distributed in all parts of the microwatershed. Strongly alkaline (pH 8.4-9.0) soils occupy an area of about 109 ha (22%) and are distributed in the western, central and southern part of the microwatershed. An area of about 18 ha (4%) is very strongly alkaline (pH >9.0)and are distributed in the western part of the microwatershed(Fig.6.1).Thus, major soils in the microwatershed are alkaline in reaction.

6.2 Electrical Conductivity (EC)

The Electrical Conductivity of the soils of the entire microwatershed area is <2 dSm^{-1} (Fig 6.2) and as such the soils are non-saline.

6.3 Organic Carbon

The soil organic carbon content (an index of available Nitrogen) in the soils of the microwatershed is low (<0.5%) in an area of about 13 ha (3%) and are distributed in the northern and southern part of the microwatershed. Medium (0.5-0.75%) in a maximum area of about268ha (53%) and are distributed in all parts of the

microwatershed. An area of about 201 ha (40%) are high (>0.75%) in organic carbon and are distributed in the northern, western, eastern, central and southern part of the microwatershed(Fig.6.3).

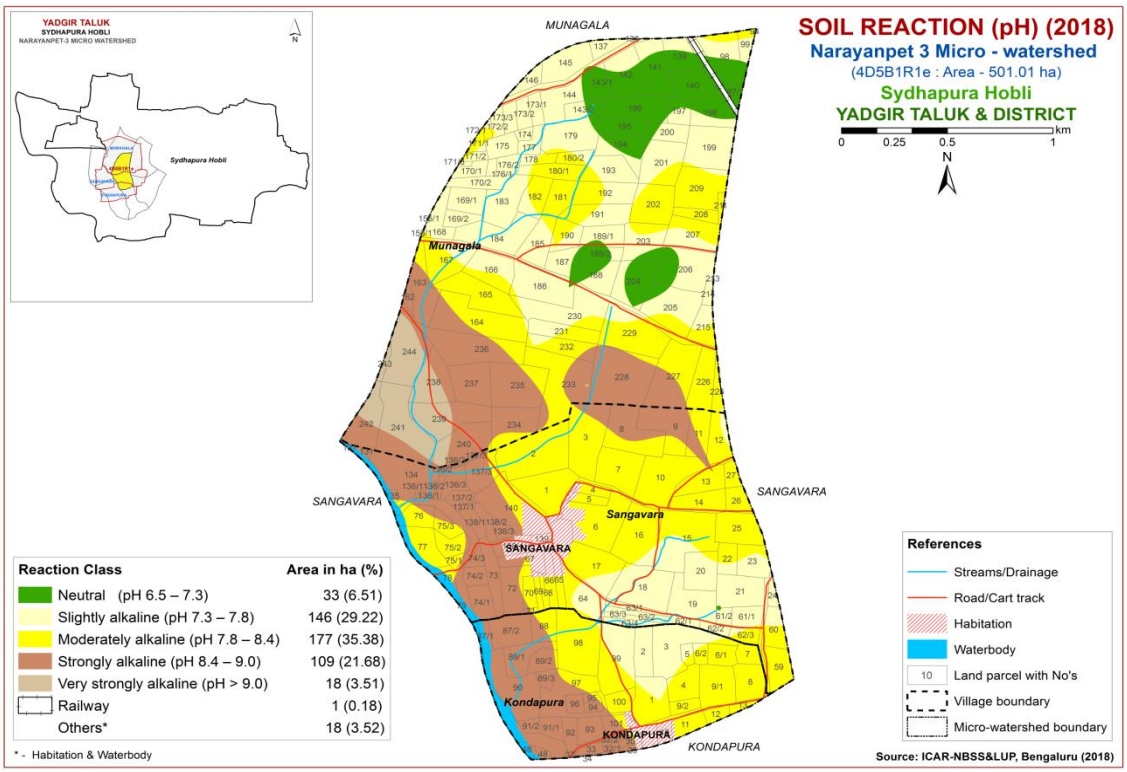


Fig.6.1 Soil Reaction (pH) map ofNarayanpet-3Microwatershed

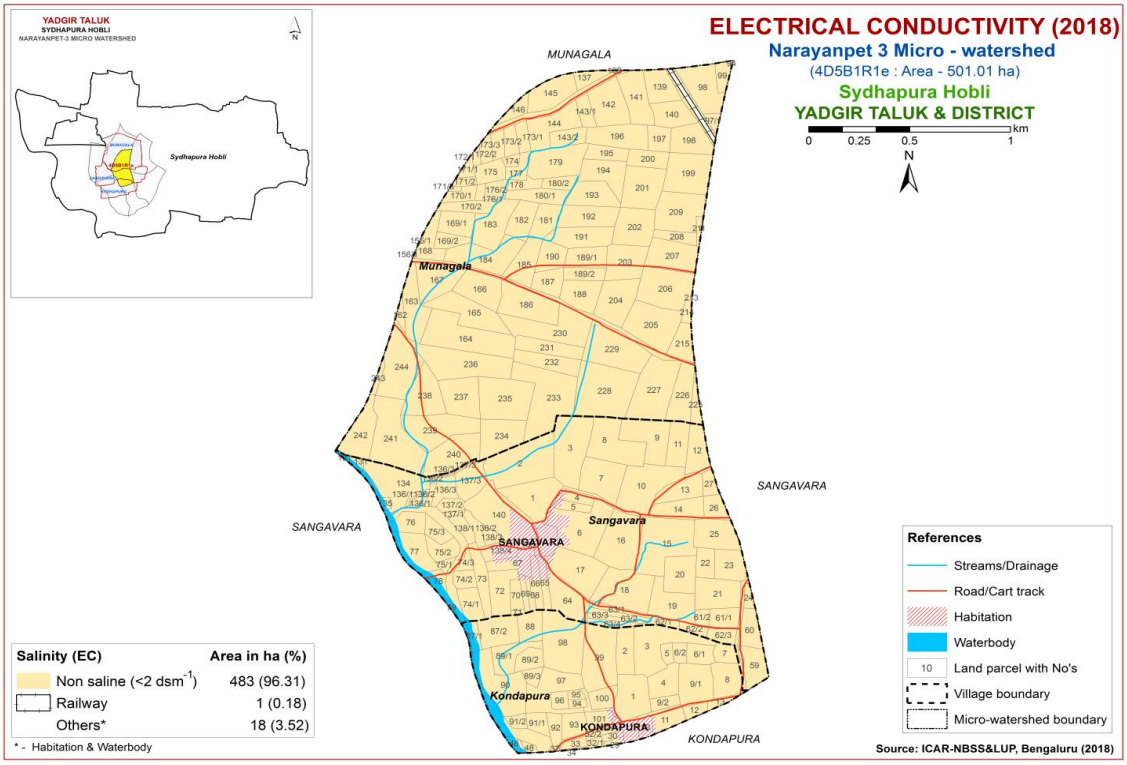


Fig.6.2Electrical Conductivity (EC) map of Narayanpet-3Microwatershed

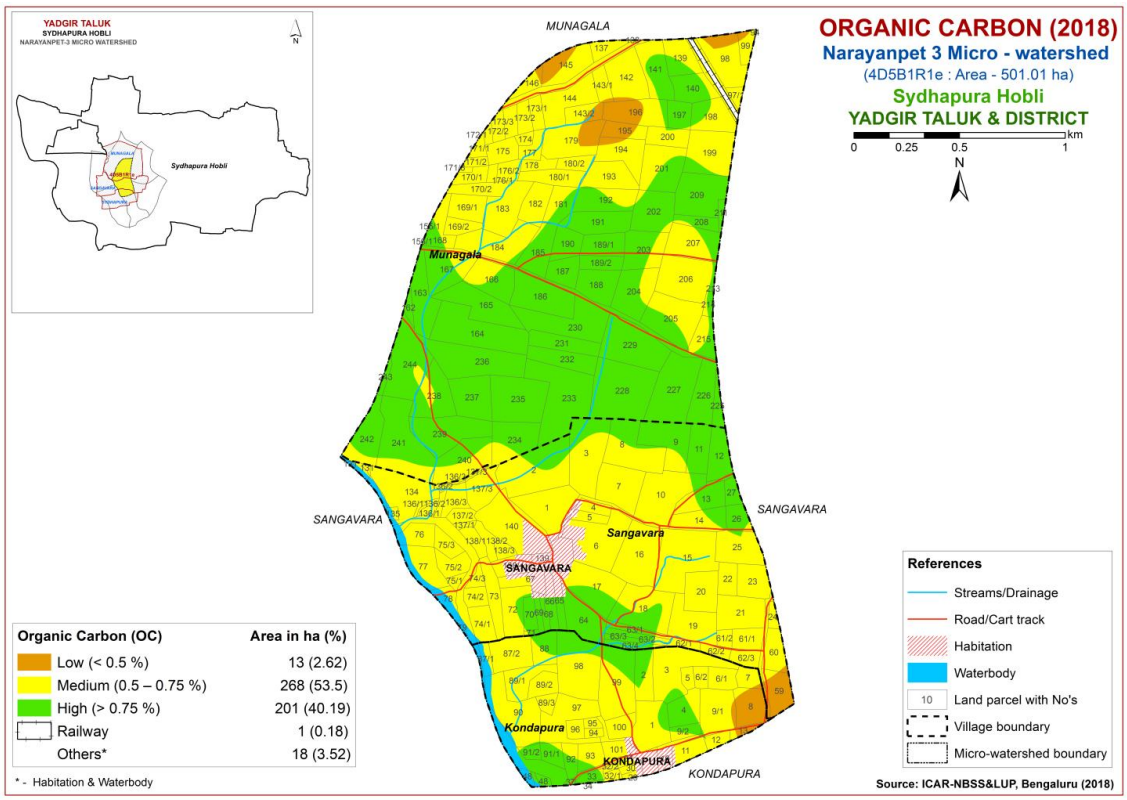


Fig.6.3Soil Organic Carbon map of Narayanpet-3Microwatershed

6.4 Available Phosphorus

Available phosphorus content is low (<23 kg/ha) in an area of71 ha (14%) and are distributed in the northern, western and southern part of the microwatershed. Medium (23-57 kg/ha) in a maximum area of about 412 ha (82%) and are distributed in all parts of the microwatershed (Fig. 6.4).

6.5 Available Potassium

Maximum area of about 316 ha (63%) is medium (145-337 kg/ha) in available potassium and are distributed in all parts of the microwatershed. High(>337 kg/ha) in an area of about 167ha (33%) and are distributed in the western, southeastern and southern part of the microwatershed (Fig.6.5).

6.6 Available Sulphur

An area of about 212ha (42%) is low (<10ppm) in available sulphur content and are distributed in all parts of the microwatershed. Maximum area of about 271 ha (54%) is medium (10-20 ppm) in available sulphur content and are distributed in all parts of the microwatershed(Fig. 6.6).

6.7 Available Boron

An area of about 182 ha (36%) is low (<0.5 ppm) in available boron content and are distributed in the northern, central, eastern and southern part of the microwatershed. Medium (0.5-1.0 ppm) in a maximum area of268 ha (54%) and are distributed in

allparts of the microwatershed. An area of about 32ha (6%) is high (>1.0ppm) in available boron and are distributed in the southeastern and southwestern part of the microwatershed (Fig.6.7).

6.8 Available Iron

Available iron content is deficient (<4.5 ppm) in an area of about 98 ha (19%) and are distributed in the northern, western, central and southern part of the microwatershed. Sufficient (>4.5 ppm) in a maximum area of 385 ha (77%) and are distributed in all parts of the microwatershed (Fig .6.8).

6.9 Available Manganese

Available manganese content is sufficient (>1.0 ppm) in the entire microwatershed area (Fig. 6.9).

6.10 Available Copper

Available copper content is sufficient (>0.2 ppm) in the entire microwatershed area(Fig. 6.10).

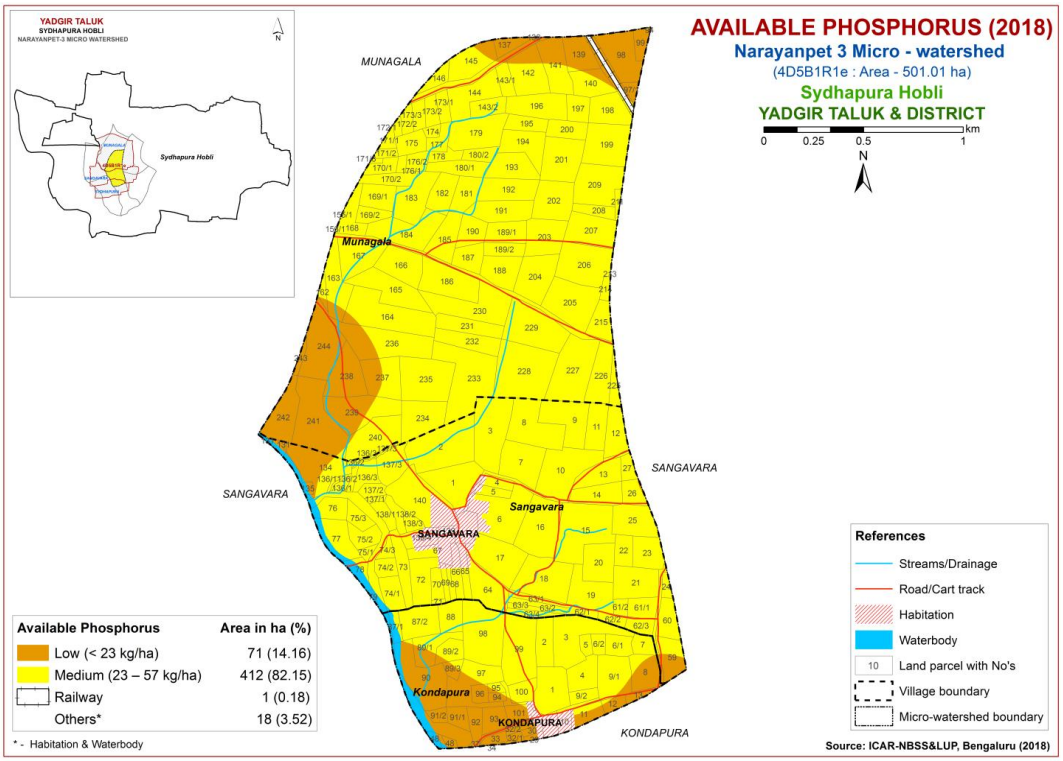


Fig.6.4 Soil Available Phosphorus map of Narayanpet-3Microwatershed

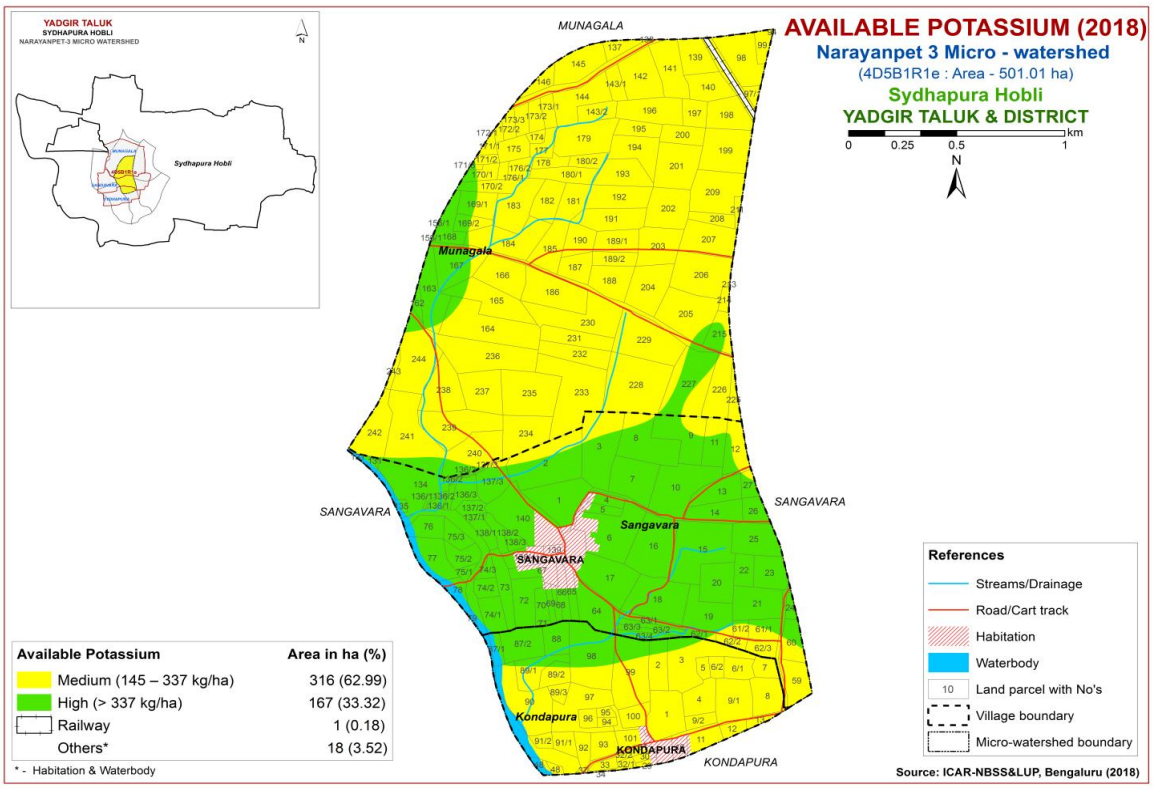


Fig.6.5Soil Available Potassium map of Narayanpet-3Microwatershed

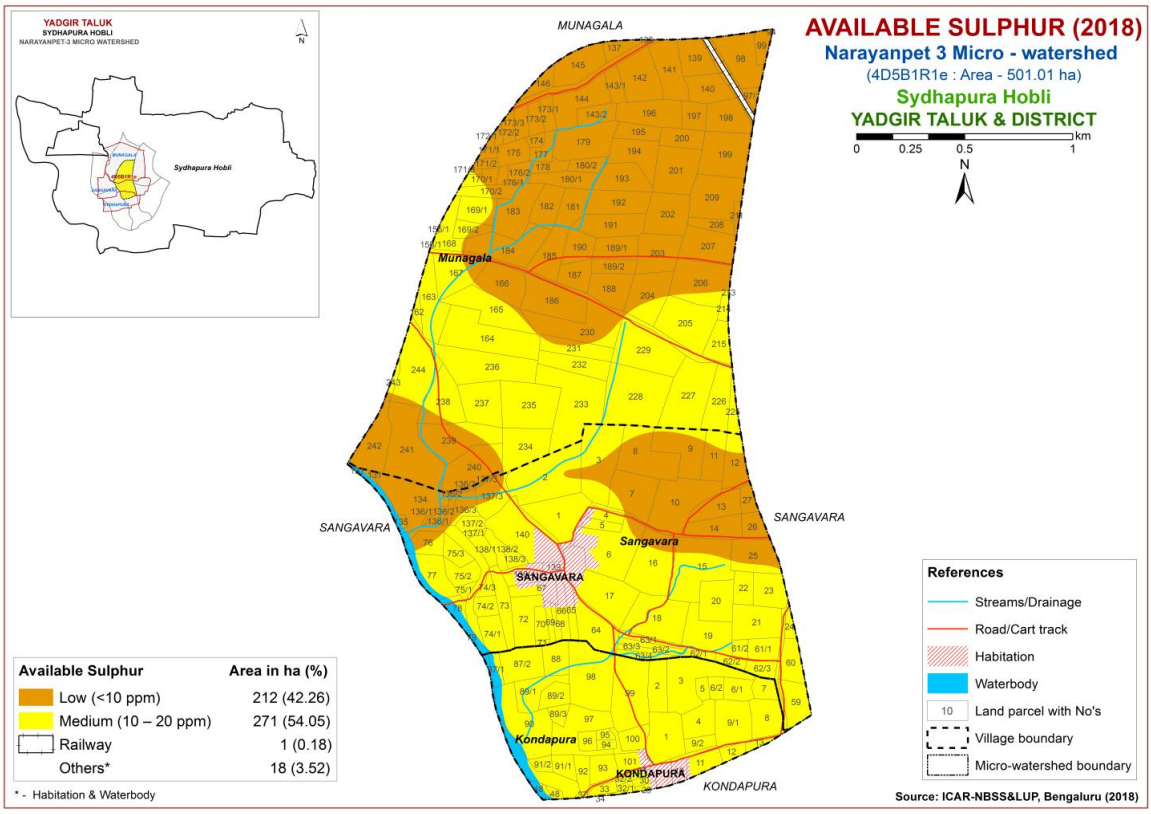


Fig.6.6Soil Available Sulphurmap of Narayanpet-3Microwatershed

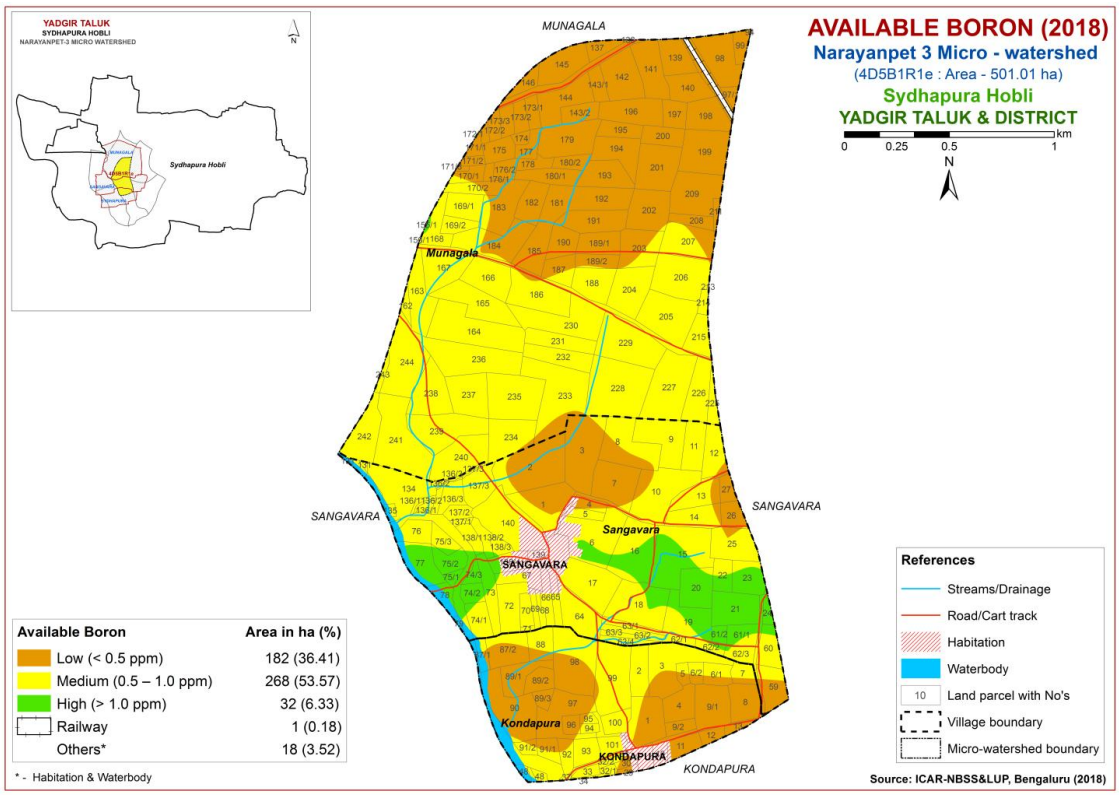


Fig.6.7Soil Available Boron map of Narayanpet-3Microwatershed

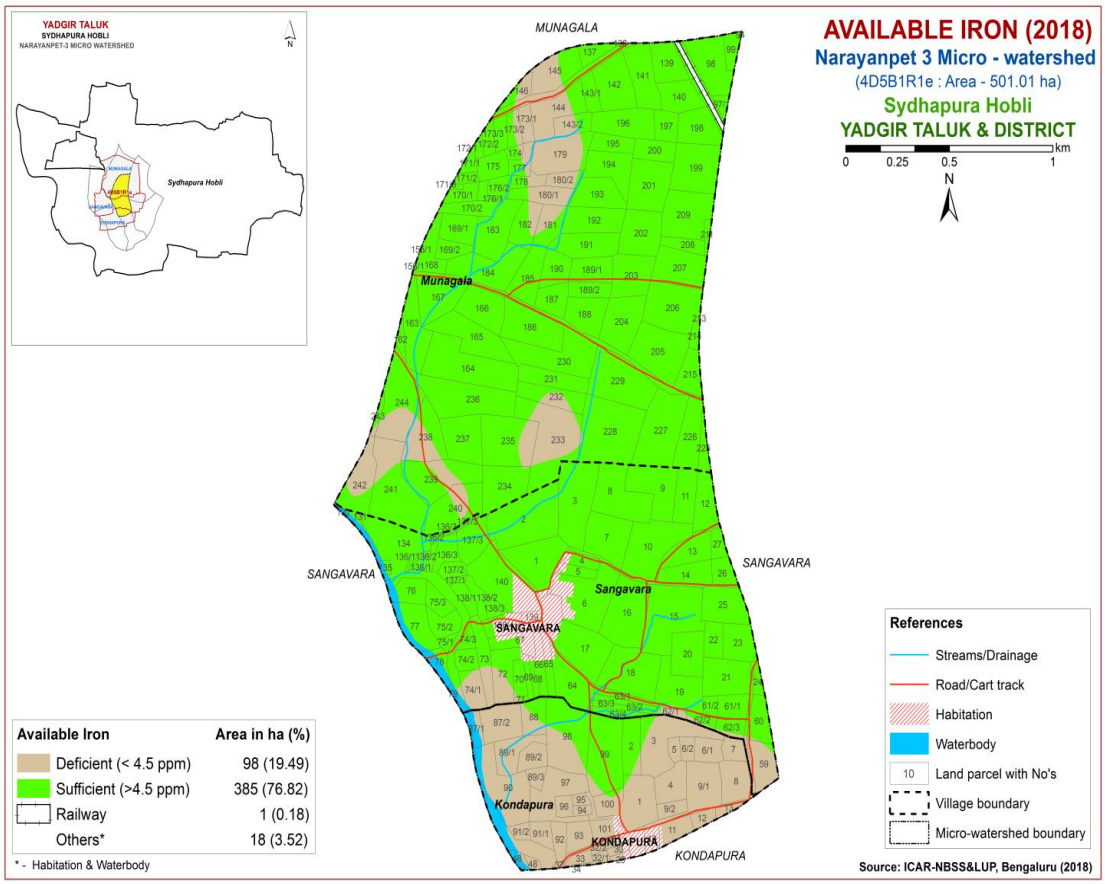


Fig.6.8Soil Available Iron map of Narayanpet-3Microwatershed

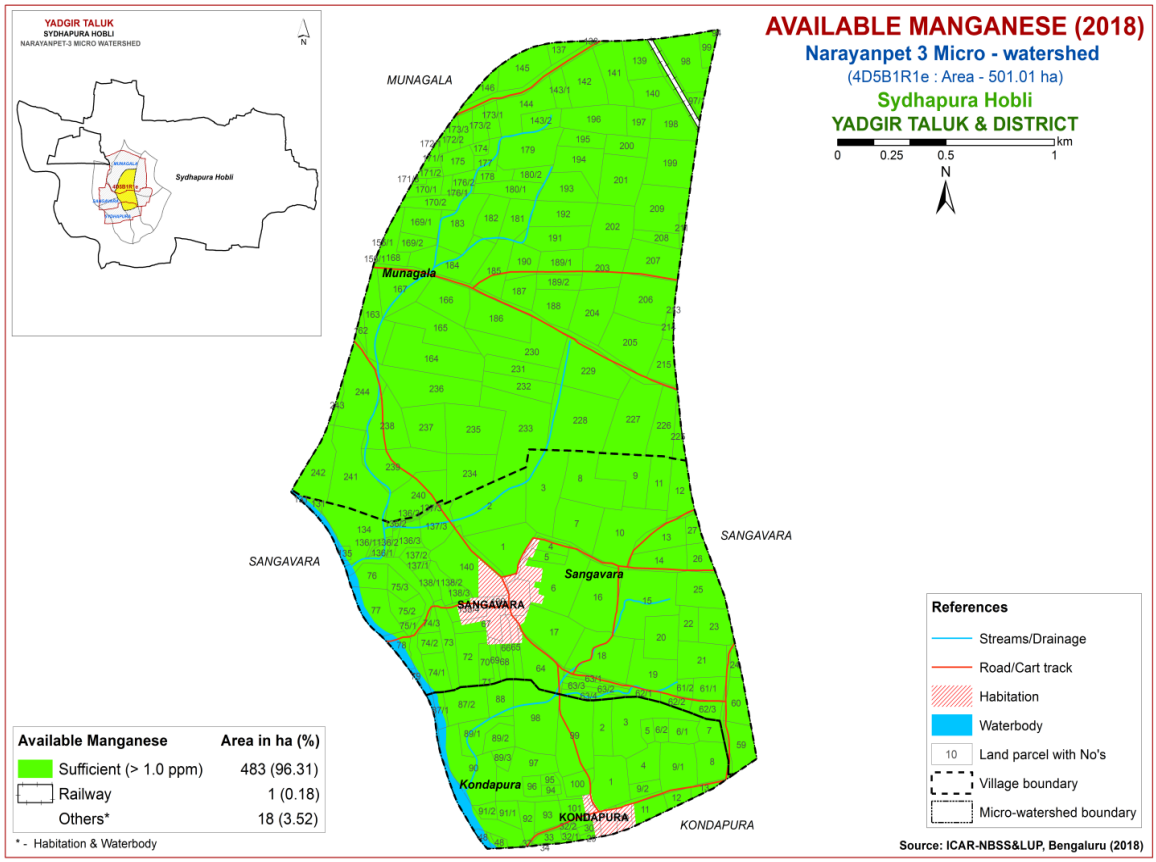


Fig.6.9Soil Available Manganese map of Narayanpet-3Microwatershed

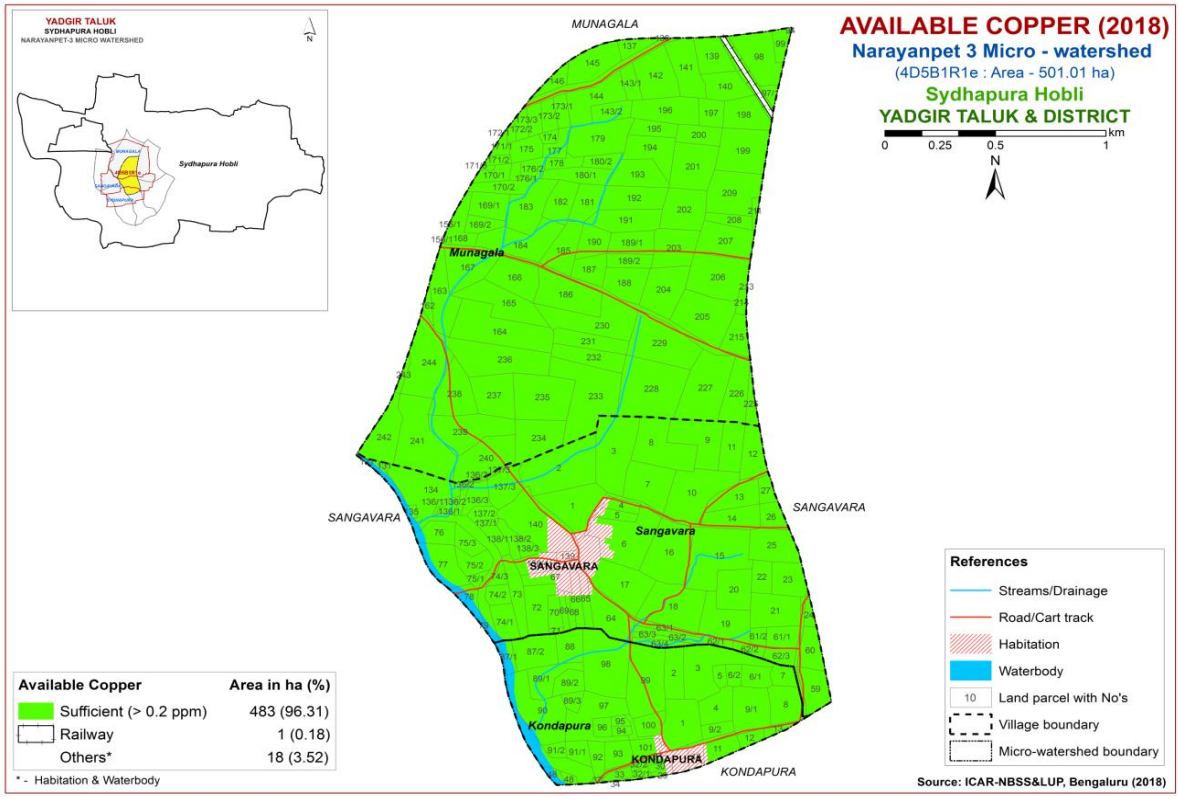


Fig.6.10Soil Available Copper map of Narayanpet-3Microwatershed

6.11 Available Zinc

Available zinc content is deficient (<0.6 ppm) in an entire area of the microwatershed.

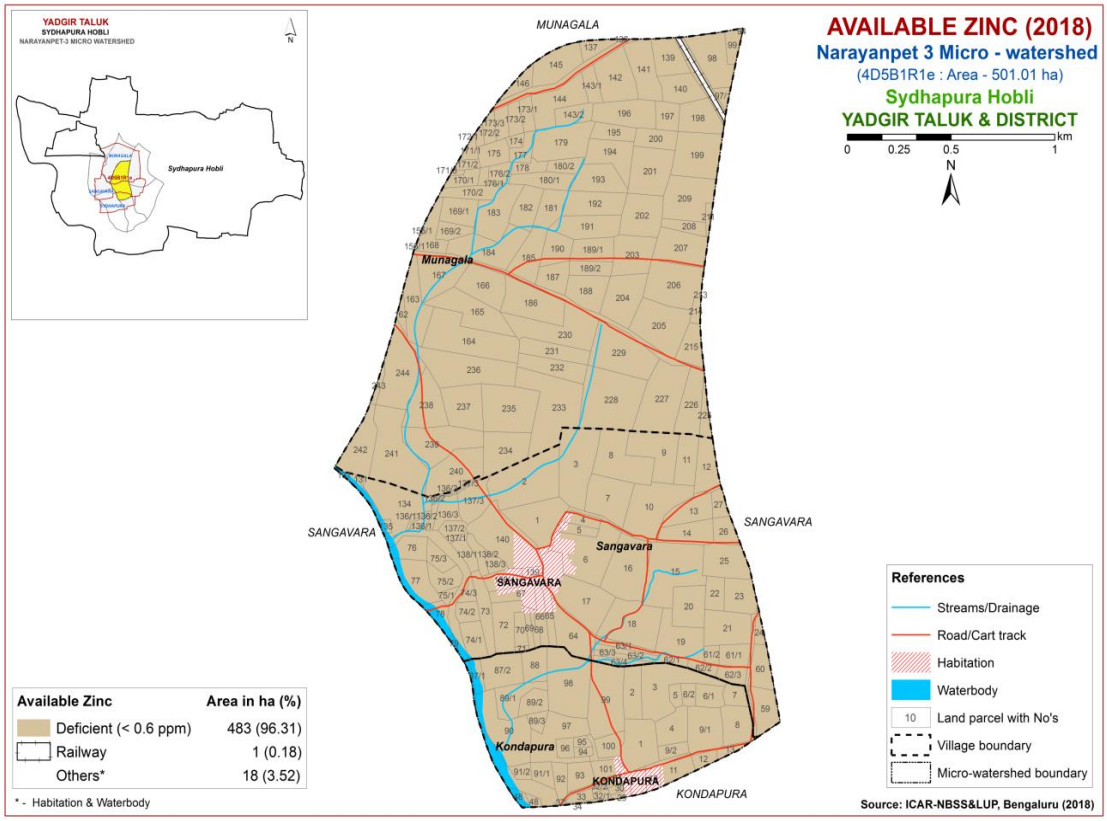


Fig.6.11 Soil Available Zinc map of Narayanpet-3Microwatershed

Chapter 7

LAND SUITABILITY FOR MAJOR CROPS

The soil and land resource units (soil phases) of Narayanpet-3microwatershed were assessed for their suitability for growing food, fodder, fibre and other horticulture crops by following the procedure as outlined in FAO, 1976 and 1983. Crop requirements were developed for each of the crop from the available research data and also by referring to Naidu *et. al.* (2006) and Natarajan *et. al* (2015). The crop requirements were matched with the soil and land characteristics (Table 7.1) to arrive at the crop suitability. In FAO land suitability classification, two orders are recognized. Order S-Suitable and Order N-Not suitable. The orders have classes, subclasses and units. Order-S has three classes, Class S1-Highly Suitable, Class S2-Moderately Suitable and Class S3- Marginally Suitable. Order N has two classes, N1-Currently not Suitable and N2- Permanently not Suitable. There are no subclasses within the Class S1 as they will have very minor or no limitations for crop growth. Classes S2, S3 and N1are divided into subclasses based on the kinds of limitations encountered. The limitations that affect crop production are 'c' for erratic rainfall and its distribution and length of growing period (LGP), 'e' for erosion hazard, 'r' for rooting condition, 't' for lighter or heavy texture, 'g' for gravelliness or stoniness, 'n' for nutrient availability,'l' for topography, 'm' for moisture availability, 'w' for drainage, 's' for sodicity and 'z' for calcareousness. These limitations are indicated as lower case letters to the Class symbol. For example, moderately suitable lands with the limitations of soil depth and erosion are designated as S2re. For the microwatershed, the soil mapping units were evaluated and classified up to subclass level.

Using the above criteria, the soil map units of the microwatershed were evaluated and land suitability maps for26major agricultural and horticultural crops were generated. The detailed information on the kind of suitability of each of the soil phase for the crops assessed are given village/ survey number wise for the microwatershed in Appendix-III.

7.1 Land Suitability for Sorghum (*Sorghum bicolor*)

Sorghum is one of the major crop grown in Karnataka in an area of 10.47 lakh ha in Bijapur, Gulbarga, Raichur, Bidar, Belgaum, Dharwad, Bellary, Chitradurga, Mysore and Tumakuru districts. The crop requirements for growing sorghum (Table 7.2) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing sorghum was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.1.

Highly suitable (Class S1) lands occur in a maximum area of about 248 ha (49%) for growing Sorghum and are distributed in all parts of the microwatershed. An area of about126 ha (25%) is moderately suitable (Class S2) for growing sorghum and are distributed in the northern, central, eastern and western part of the microwatershed. They have minor limitations of calcareousness and rooting depth. An area of about 108

ha (22%) is marginally suitable (class S3) and are distributed in the northern and central part of the microwatershed with major limitation of rooting depth.

Table 7.2 Crop suitability criteria for Sorghum

Crop requirement		Rating			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	2-3	3-8	8-15	>15
LGP	Days	120-150	120-90	<90	
Soil drainage	Class	Well to mod.Well drained	imperfect	Poorly/excessively	V.poorly
Soil reaction	pH	6.0-8.0	5.5-5.9;8.1-8.5	<5.5;8.6-9.0	>9.0
Surface soil texture	Class	c, cl, sicl, sc	l, sil, sic	sl, ls	S,fragmental skeletal
Soil depth	Cm	100-75	50-75	30-50	<30
Gravel content	% vol.	5-15	15-30	30-60	>60
Salinity (EC)	dSm^{-1}	2-4	4-8	8-10	>10
Sodicity (ESP)	%	5-8	8-10	10-15	>15

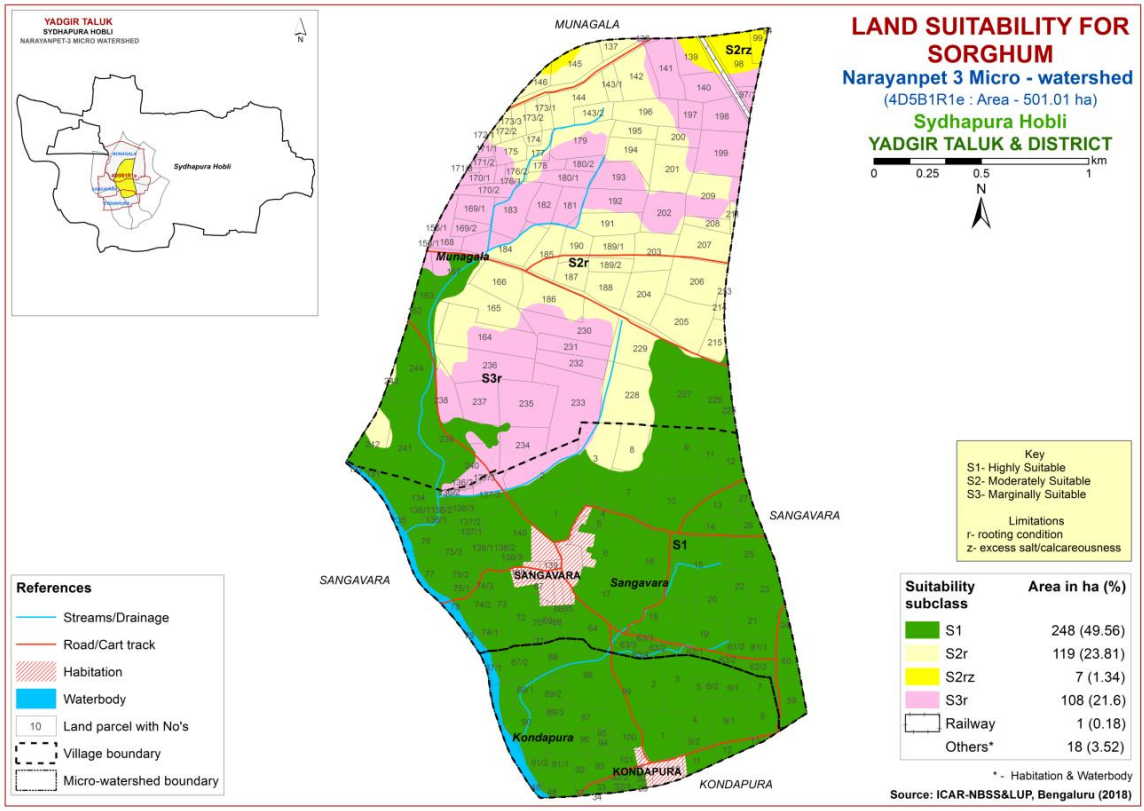


Fig. 7.1 Land Suitability map of Sorghum

Table 7.1 Soil-Site Characteristics of Narayanpet-3 Microwatershed

Soil Map Units	Climate (P) (mm)	Growing period (Days)	Drain-age Class	Soil depth (cm)	Soil texture		Gravelliness		AWC (mm/m)	Slope (%)	Erosion	pH	EC (dSm^{-1})	ESP (%)	CEC [Cmol (p^{+})kg^{-1}]	BS (%)
					Sur-face	Sub-surface	Surface (%)	Sub-surface (%)								
YLRbB2	866	150	WD	50-75	ls	c	-	15-35	51-100	1-3	moderate	6.91	0.07	0.45	6.90	100
JNKcB2	866	150	WD	50-75	sl	scl	-	-	51-100	1-3	moderate	8.42	0.15	0.18	14.50	100
KYTcB2	866	150	WD	25-50	sl	scl	-	-	<50	1-3	moderate	8.39	0.14	1.07	30.60	100
KYTmB1	866	150	WD	25-50	c	scl	-	-	<50	1-3	slight	8.39	0.14	1.07	30.60	100
BLDiB1g1	866	150	MWD	50-75	sc	cl	15-35	-	101-150	1-3	slight	8.19	0.22	0.80	38.20	90
BLDmB2	866	150	MWD	50-75	c	cl	-	-	101-150	1-3	moderate	8.19	0.22	0.80	38.20	90
MGLcB2	866	150	MWD	75-100	sl	c	-	-	101-150	1-3	moderate	8.25	0.23	0.74	49.11	100
MGLcB3	866	150	MWD	75-100	sl	c	-	-	101-150	1-3	severe	8.25	0.23	0.74	49.11	100
KDRhA1	866	150	MWD	100-150	scl	c	-	-	>200	0-1	slight	8.34	0.15	0.22	33.20	100
KDRiB2	866	150	MWD	100-150	sc	c	-	-	>200	1-3	moderate	8.34	0.15	0.22	33.20	100
KDRiB3	866	150	MWD	100-150	sc	c	-	-	>200	1-3	severe	8.34	0.15	0.22	33.20	100
RHNcB2	866	150	WD	75-100	sl	scl	-	-	101-150	1-3	moderate	8.16	0.22	8.81	8.99	99
RHNmB2	866	150	WD	75-100	c	scl	-	-	101-150	1-3	moderate	8.16	0.22	8.81	8.99	99
SWRmB2	866	150	MWD	100-150	c	c	-	-	>200	1-3	moderate	8.44	0.18	0.45	47.70	100
HGNmB2	866	150	MWD	>150	c	c	-	-	>200	1-3	moderate	8.77	1.33	14.38	36.23	100

*Symbols and abbreviations are according to Field Guide for LRI under Sujala-III Project, Karnataka

7.2 Land Suitability for Maize (*Zea mays*)

Maize is one of the most important food crop grown in an area of 13.37 lakh ha in almost all the districts of the State. The crop requirements for growing maize (Table 7.3) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing maize was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.2.

Table 7.3 Crop suitability criteria for Maize

Crop requirement		Rating			
Soil–site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	<3	3.5	5-8	
LGP	Days	>100	100-80	60-80	
Soil drainage	Class	Well drained	Mod. to imperfectly	Poorly/excessively	V.poorly
Soil reaction	pH	5.5-7.5	7.6-8.5	8.6-9.0	
Surface soil texture	Class	l, cl, scl, sil	sl, sicl, sic	c(s-s), ls	s,fragmental
Soil depth	cm	>75	50-75	25-50	<25
Gravel content	% vol.	<15	15-35	35-50	>50
Salinity (EC)	dS m^{-1}	<1.0	1.0-2.0	2.0-4.0	
Sodicity (ESP)	%	<10	10-15	>15	

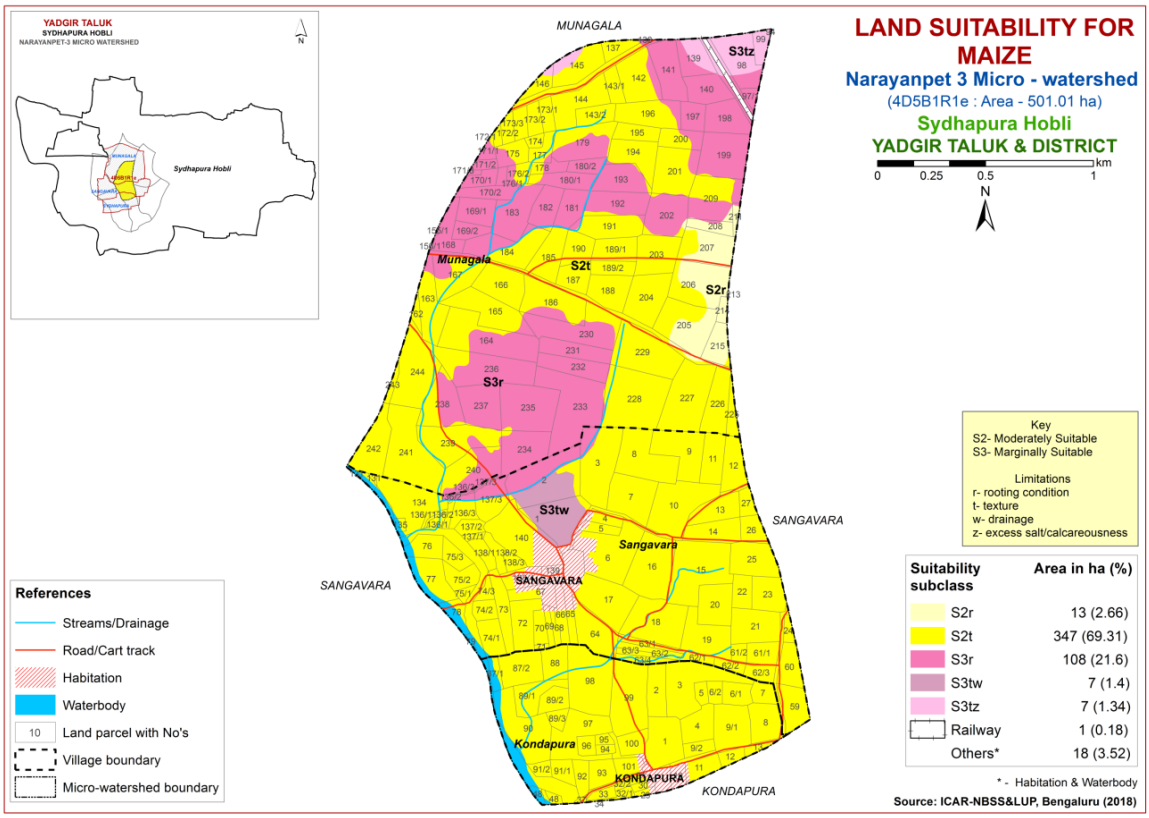


Fig. 7.2 Land Suitability map of Maize

No highly suitable (Class S1) lands are available for growing maize.Maximum area of about 360 ha (72%) is moderately suitable (Class S2) for growing maize and are distributed in all parts of the microwatershed. They have minor limitations of texture and

rooting depth. An area of about 122 ha (24%) is marginally suitable (class S3) and are distributed in the northern, western and central part of the microwatershed with major limitations of rooting depth, calcareousness, drainage and texture.

7.3 Land Suitability for Bajra (*Pennisetum glaucum)*

Bajra is one of the most important millet crop grown in an area of 2.34 lakh ha in the northern districts of Karnataka state. The crop requirements for growing bajra(Table 7.4) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing bajra was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.3.

No highly suitable (Class S1) lands are available for growing Bajra. Maximum area of about 374 ha (74%) is moderately suitable (Class S2) for growing Bajra and are distributed in all parts of the microwatershed. They have minor limitations of texture and rooting depth. An area of about 108 ha (22%) is marginally suitable (class S3) for growing Bajra and are distributed in the northern, western and central part of the microwatershed with major limitation of rooting depth.

Table 7.4 Crop suitability criteria for Bajra

Crop requirement		**Rating**			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	2-3	3-8	8-15	>15
LGP	Days	120-150	120-90	<90	
Soil drainage	Class	Well to mod.Well drained	imperfect	Poorly/excessively	V.poorly
Soil reaction	pH	6.0-8.0	5.5-5.9;8.1-8.5	<5.5;8.6-9.0	>9.0
Surface soil texture	Class	c, cl, sicl, sc	l, sil, sic	sl, ls	S,fragmental skeletal
Soil depth	cm	100-75	50-75	30-50	<30
Gravel content	% vol.	5-15	15-30	30-60	>60
Salinity (EC)	dSm^{-1}	2-4	4-8	8-10	>10
Sodicity (ESP)	%	5-8	8-10	10-15	>15

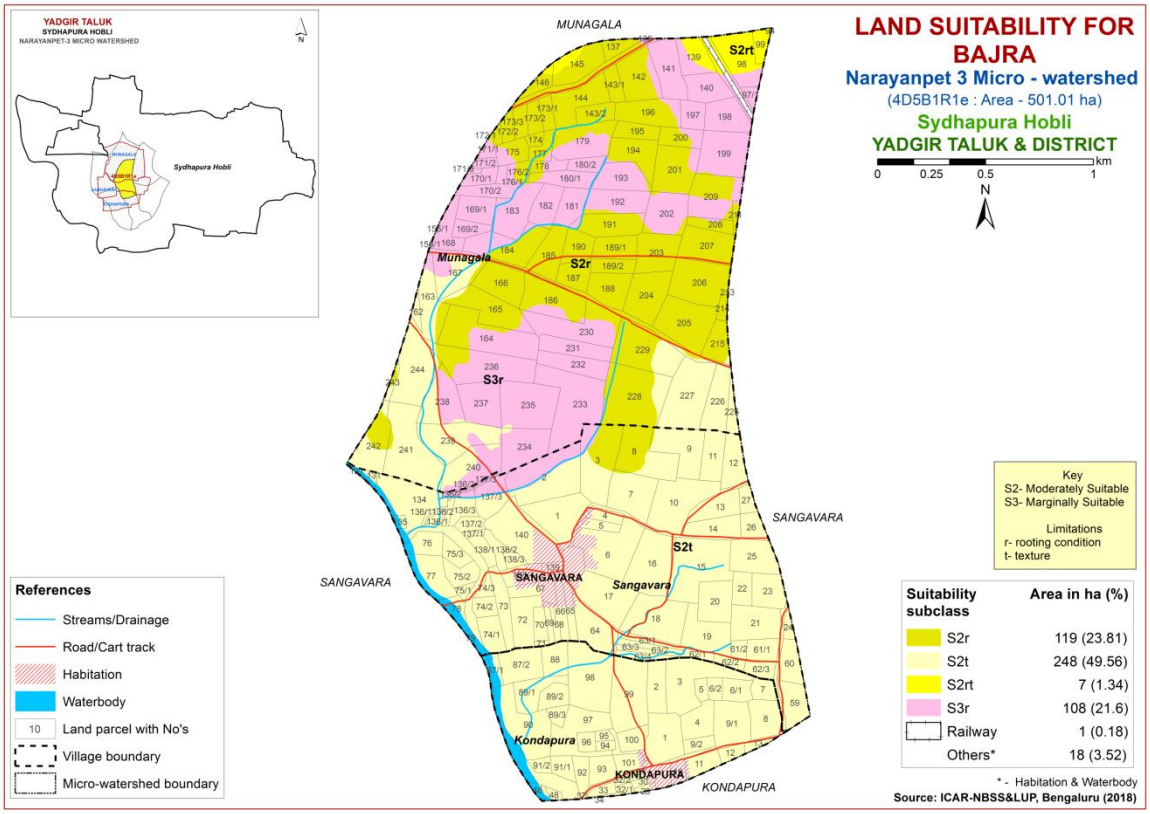


Fig. 7.3 Land Suitability map of Bajra

7.4 Land Suitability for Groundnut (*Arachis hypogaea*)

Groundnut is one of the major oilseed crop grown in an area of 6.54 lakh ha in Karnataka in most of the districts either as rainfed or irrigated crop. The crop requirements for growing groundnut (Table 7.5) were matched with the soil-site characteristics (Table 7.1) of the soils of the microwatershed and a land suitability map for growing groundnut was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed are given in Figure 7.4.

No highly suitable (Class S1) lands for growing Groundnut. An area of about 13ha (3%) is moderately suitable (Class S2) for growing Groundnut and are distributed in the eastern part of the microwatershed. They have minor limitation of rooting depth. Maximum area of about 469 ha (93%) is marginally suitable (Class S3) for growing Groundnut and are distributed in all parts of the microwatershed. They have major limitations of texture, rooting depth and drainage.

Table 7.5 Crop suitability criteria for Groundnut

Crop requirement		Rating			
Soil–site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable(N)**
Slope	%	<3	3-5	5-10	>10
LGP	Days	100-125	90-105	75-90	
Soil drainage	Class	Well drained	Mod. Well drained	Imperfectly drained	Poorly drained
Soil reaction	pH	6.0-8.0	8.1-8.5;5.5-5.9	>8.5;<5.5	
Surface soil texture	Class	l, cl, sil, sc, sicl	sc, sic, c,	s, ls, sl,c(>60%	s,fragmental
Soil depth	cm	>75	50-75	25-50	<25
Gravel content	% vol.	<35	35-50	>50	
$CaCO_3$ in root zone	%	high	Medium	low	
Salinity (EC)	dSm^{-1}	<2.0	2.0-4.0	4.0-8.0	
Sodicity (ESP)	%	<5	5-10	>10	

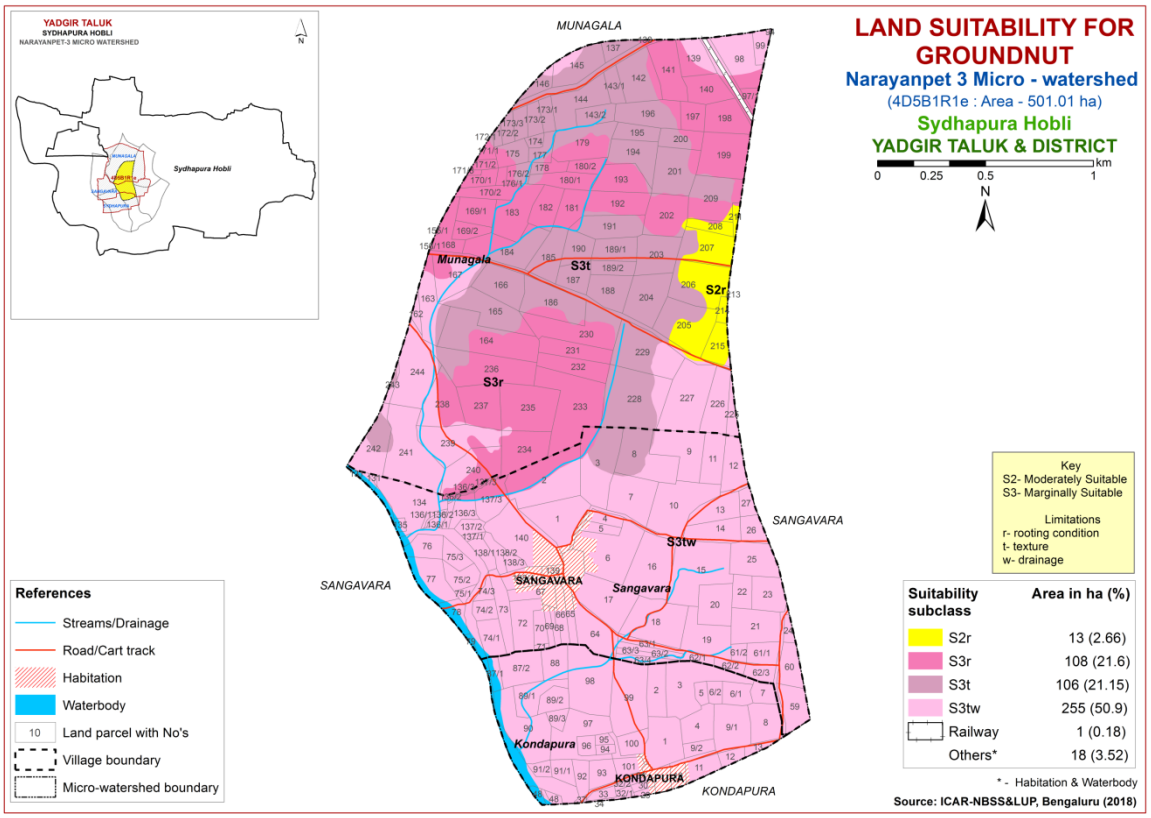


Fig. 7.4 Land Suitability map of Groundnut

7.5 Land Suitability for Sunflower (*Helianthus annus*)

Sunflower is one of the most important oilseed crop grown in an area of 4.1 lakh ha in the State in all the districts. The crop requirements for growing sunflower (Table 7.6) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sunflower was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.5.

Highly suitable (Class S1) lands for growing sunflower occur in a maximum area of about 159 ha (32%) and are distributed in allparts of the microwatershed. An area of

about 89 ha (18%) is moderately suitable (Class S2) for growing sunflower and are distributed in the eastern and southeasternpart of the microwatershed with minor limitations of drainage and rooting depth. Marginally suitable lands (Class S3) for growing sunflower occur in an area of 126 ha (25%) and are distributed in the northern and central part of the microwatershed with major limitations of rooting depth and drainage. An area of about 108ha (21%) iscurrently not suitable (Class N1) for sunflower and are distributed in the northern, western and central part of the microwatershed with severe limitation of rooting depth.

Table 7.6 Crop suitability criteria for Sunflower

Crop requirement		Rating			
Soil–site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable (S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	<3	3-5	5-10	>10
LGP	Days	>90	80-90	70-80	<70
Soil drainage	Class	Well drained	Mod. well rained	Imperfectly drained	Poorly drained
Soil reaction	pH	6.5-8.0	8.1-8.55.5-6.4	8.6-9.0;4.5-5.4	>9.0<4.5
Surface soil texture	Class	l, cl, sil, sc	scl, sic, c,	c (>60%), sl	ls, s
Soil depth	cm	>100	75-100	50-75	<50
Gravel content	% vol.	<15	15-35	35-60	>60
Salinity (EC)	dSm^{-1}	<1.0	1.0-2.0	>2.0	
Sodicity (ESP)	%	<10	10-15	>15	

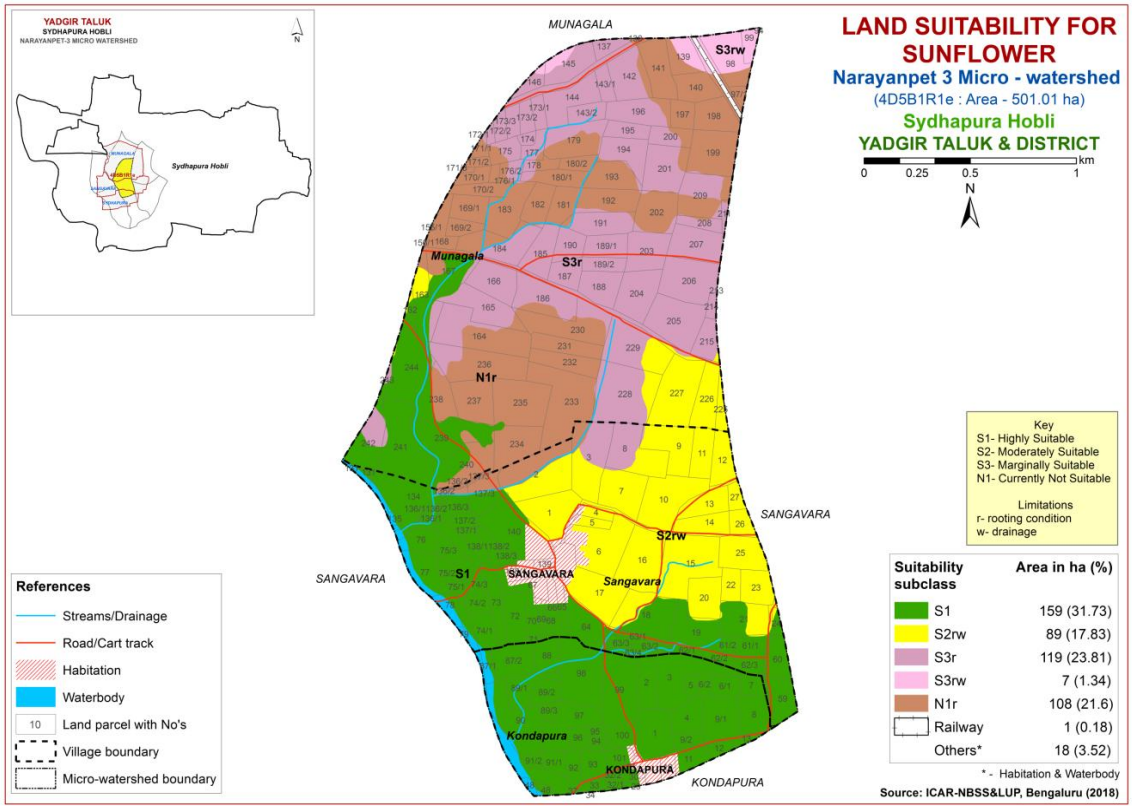


Fig. 7.5 Land Suitability map of Sunflower

7.6 Land suitability criteria for Redgram (*Cajanus Cajan)*

Redgram is one of the most important pulse crop grown in an area of 7.28 lakh ha in almost all the districts of the State. The crop requirements for growing red gram (Table 7.7) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing redgram was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.6.

Table 7.7 Land suitability criteria for Redgram

Crop requirement		Rating			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Slope	%	<3	3-5	5-10	>10
LGP	Days	>210	180-210	150-180	<150
Soil drainage	Class	Well drained	Mod. well drained	Imperfectly drained	Poorly drained
Soil reaction	pH	6.5-7.5	5.0-6.5;7.6-8.0	8.0-9.0	>9.0
Sub Surface soil texture	Class	l, scl, sil, cl, sl	sicl, sic, c(m)	ls	
Soil depth	cm	>100	75-100	50-75	<50
Gravel content	% vol.	<15	15-35	3-60	>60
Salinity (EC)	ds m^{-1}	<1.0	1.0-2.0	>2.0	
Sodicity (ESP)	%	<10	10-15	>15	

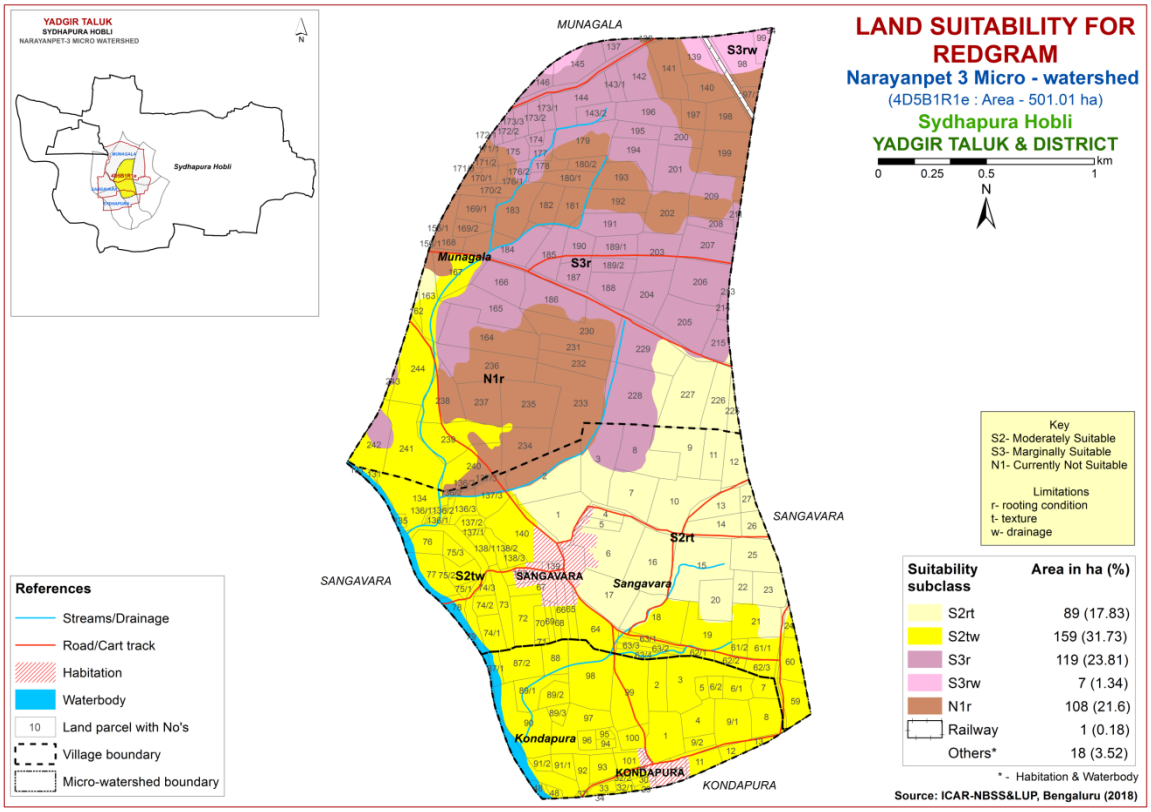


Fig. 7.6 Land Suitability map of Redgram

No highly suitable (Class S1) lands available for growing Redgram in the microwatershed. Maximum area of about 248 ha (50%) is moderately suitable (Class S2)

for Redgramand are distributed in all parts of the microwatershed with minor limitations of drainage, rooting depth and texture. An area of about 126 ha (25%) is marginally suitable (Class S3) for Redgram and are distributed in the northern and central part of the microwatershed. They have major limitations of rooting depth and drainage.An area of about 108 ha (21%) is currentlynot suitable (Class N1) for growing Redgram and is distributed in the northern, western and central part of the microwatershed with severe limitation of rooting depth.

7.7 Land Suitability for Bengalgram (*Cicer aerativum*)

Bengal gram is one of the most important pulse crop grown in about 9.39 lakh ha area in Bijapur, Raichur, Kalaburgi, Dharwad, Belgaum and Bellary districts. The crop requirements for growing Bengal gram (Table 7.8)were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing Bengal gram was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.7.

Highly suitable (Class S1) lands for growing Bengal gram occur in a maximum area of about 248 ha (50%) and are distributed in all parts of the microwatershed. An area of about 126 ha (25%) is moderately suitable (Class S2) for growing Bengal gram and are distributed in the northern and centralpart of the microwatershed with minor limitations of drainage and rooting depth. Marginally suitable lands (Class S3) for growing Bengal gram occur in an area of 108 ha (21%) and are distributed in the northern and central part of the microwatershed with major limitation of rooting depth.

Table 7.8 Crop suitability criteria for Bengalgram

Crop requirement		**Rating**			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable (S2)**	**Marginally suitable (S3)**	**Not suitable(N)**
Slope	%	<3	3-5	5-10	>10
LGP	Days	>100	90-100	70-90	<70
Soil drainage	class	Well drained	Mod. to well drained; imperfectly drained	Poorly drained; excessively drained	Very Poorly drained
Soil reaction	pH	6.0-7.5	5.5-5.7, 7.6-8.0	8.1-9.0;4.5-5.4	>9.0
Surface soil texture	Class	l, scl, sil, cl,	sicl, sic, c	sl, c>60%	
Soil depth	cm	>75	51-75	25-50	<25
Gravel content	% vol.	<15	15-35	>35	
Salinity (ECe)	dsm^{-1}	<1.0	1.0-2.0	>2.0	
Sodicity (ESP)	%	<10	10-15	>15	

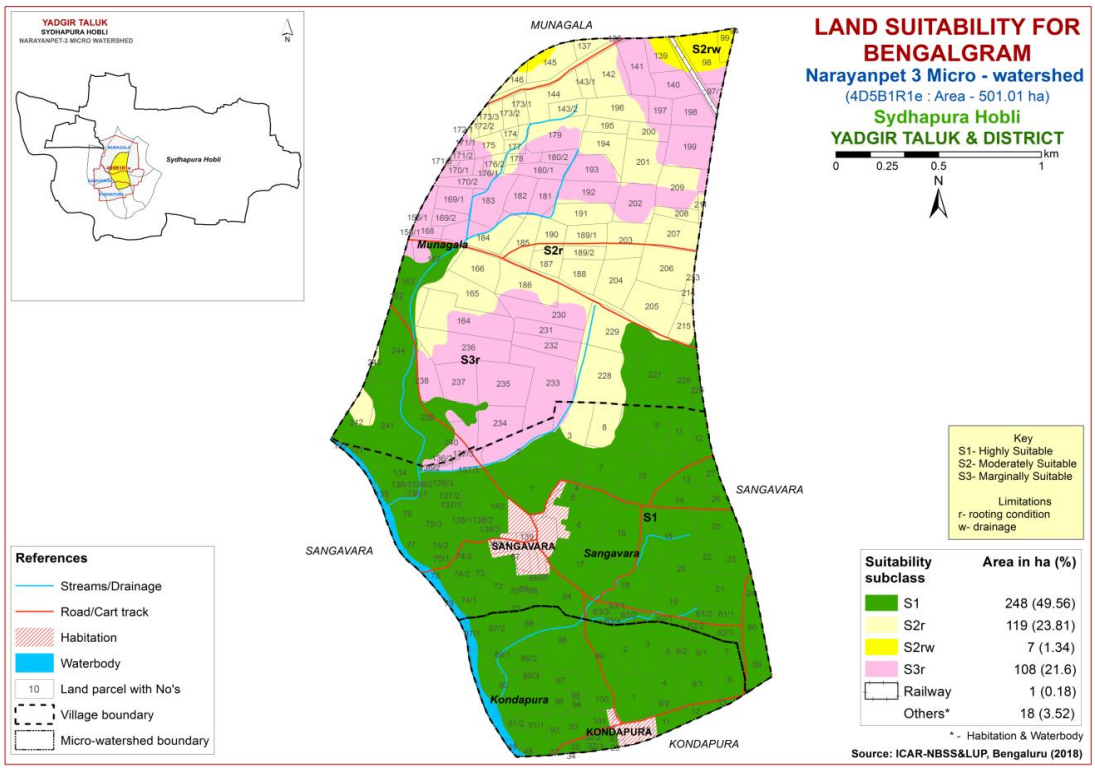


Fig. 7.7 Land Suitability map of Bengalgram

7.8 Land Suitability for Cotton (*Gossypium hirsutum*)

Cotton is the most important fibre crop grown in the State in about 8.75 lakh ha area in Raichur, Dharwad, Belgaum, Kalaburgi, Bijapur, Bidar, Bellary, Chitradurga and Chamarajnagar districts. The crop requirements for growing cotton (Table 7.9) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cotton was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.8.

Table 7.9 Crop suitability criteria for Cotton

Crop requirement		Rating			
Soil–site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable (N)**
Slope	%	1-2	2-3	3-5	>5
LGP	Days	180-240	120-180	<120	
Soil drainage	class	Well to mod.well	imperfectly drained	Poor somewhat excessive	Stagnant/excessive
Soil reaction	pH	6.5-7.5	7.6-8.0	8.1-9.0	>9.0>6.5
Surface soil texture	Class	sic, c	sicl, cl	si, sil, sc, scl, l	sl, s,ls
Soil depth	Cm	100-150	60-100	30-60	<30
Gravel content	% vol.	<5	5-10	10-15	15-35
$CaCO_3$ in root zone	%	<3	3-5	5-10	10-20
Salinity (EC)	dSm^{-1}	2-4	4.0-8.0	8.0-12	>12
Sodicity (ESP)	%	5-10	10-20	20-30	>30

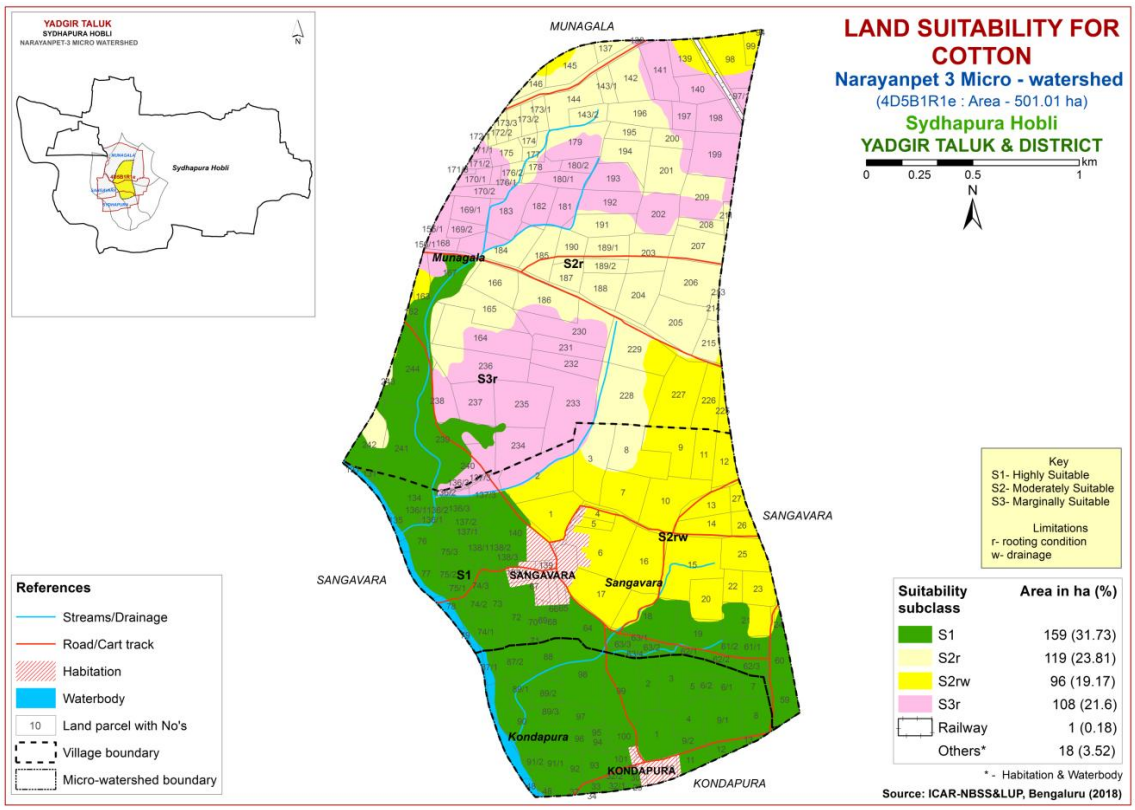


Fig. 7.8 Land Suitability map of Cotton

Highly suitable (Class S1) lands for growing cotton occur in an area of about 159 ha (32%) and are distributed in the western and southern part of the microwatershed. Maximum area of about 215 ha (43%) is moderately suitable (Class S2) for growing cotton and are distributed in all partsof the microwatershed with minor limitations of drainage and rooting depth. Marginally suitable lands (Class S3) for growing cotton occur in an area of 108 ha (21%) and are distributed in the northern and central part of the microwatershed with major limitation of rooting depth.

7.9 Land Suitability for Chilli (*Capsicum annuum)*

Chilli is one of the most important vegetable and spice crop grown in about 0.42 lakh ha inKarnataka state. The crop requirements for growing chilli (Table 7.10)were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing chilli was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.9.

No highly suitable (Class S1) lands for growing Chilli.Maximum area of about 374 ha (75%) is moderately suitable (Class S2) for growing Chilli and are distributed in all parts of the microwatershed. They have minor limitations of drainage, texture and rooting depth. An area of about 108 ha (21%) is marginally suitable (Class S3) for growing Chilli and are distributed in the northern and central part of the microwatershed. They have major limitation of rooting depth.

Table 7.10 Crop suitability criteria for Chilli

Crop requirement		Rating			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately Suitable(S2)**	**Marginally suitable (S3)**	**Not suitable(N)**
Mean temperature in growing season	^{0}c	20-30	30-35, 13-15	35-40, 10-12	>40,<10
Slope	%	<3	3-5	5-10	>10
LGP	Days	>150	120-150	90-120	<90
Soil drainage	class	Well drained	Moderately drained	Imp./ poor drained/excessively	Very poorly drained
Soil reaction	pH	6.5-7.8, 6.0-7.0	7.8-8.4	8.4-9.0, 5.0-5.9	>9.0
Surface soil texture	Class	scl, cl, sil	sl, sc, sic,c(m/k)	c(ss), ls, s	
Soil depth	cm	>75	50-75	25-50	<25
Gravel content	% vol.	<15	15-35	35-60	>60
Salinity (ECe)	dsm^{-1}	<1.0	1.0-2.0	2.0-4.0	<4
Sodicity (ESP)	%	<5	5-10	10-15	

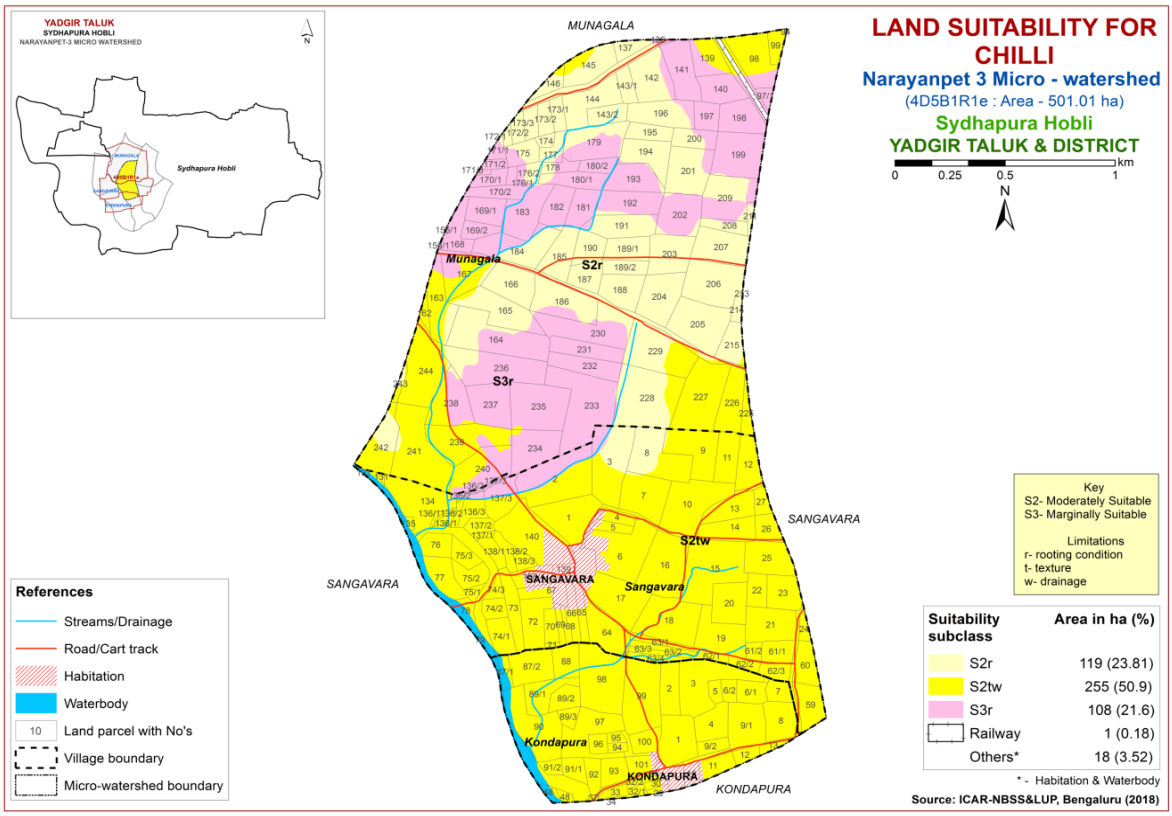


Fig 7.9 Land Suitability map of Chilli

7.10 Land Suitability for Tomato (*Lycopersicon esculentum*)

Tomato is one of the most important vegetablecrop grown in about 0.61 lakh ha covering almost all the district of the state. The crop requirements for growing tomato (Table 7.11)were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing tomato was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.10.

Table 7.11 Crop suitability criteria for Tomato

Crop requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
climate	Temperature in growing season	^{0}c	25-28	29-32 , 20-24	15-1933-36	<15, >36
Soil moisture	Growing period	Days	>150	120-150	90-120	
Soil aeration	Soil drainage	class	Well drained	Moderately well drained	Poorly drained	V. poorly drained
Nutrient availability	Texture	Class	l, sl, cl, scl	sic,sicl,sc, c(m/k)	c (ss), ls	s
	pH	1:2.5	6.0-7.3	5.5-6.07.3-8.4	8.4-9.0	>9.0
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Stronglycalcareous	
Roting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	%vol.	<15	15-35	>35	
Soil toxicity	Salinity	dS/m	Non saline	slight	strongly	
	Sodicity (ESP)	%	<10	10-15	>15	-
Erosion	Slope	%	1-3	3-5	5-10	>10

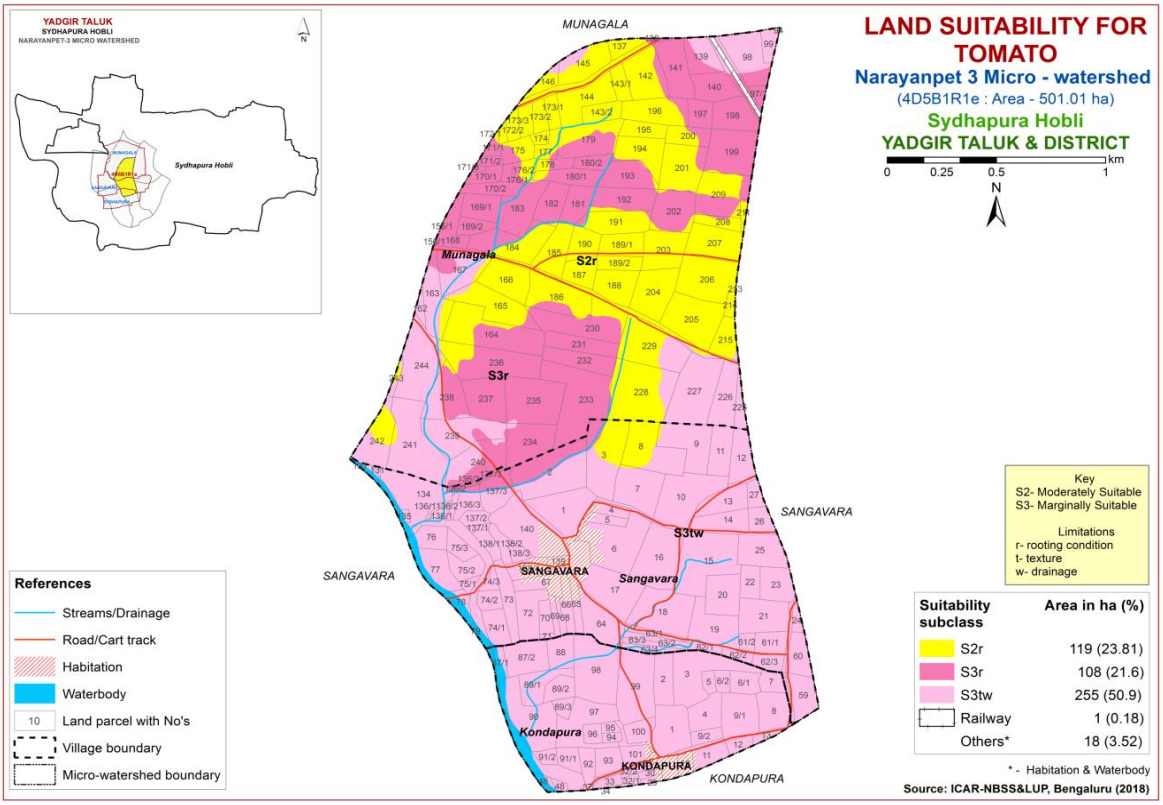


Fig 7.10 Land Suitability map of Tomato

No highly suitable (Class S1) lands for growing tomato in the microwatershed. An area of about 119 ha (24%) is moderately suitable (Class S2) for growing tomato and are

distributed in the northern and central part of the microwatershed with minor limitation of rooting depth. Marginally suitable lands (Class S3) for growing tomato occur in a maximum area of 363 ha (72%) and are distributed in all parts of the microwatershed with major limitations of rooting depth, texture and drainage.

7.11 Land Suitability for Drumstick (*Moringa oleifera*)

Drumstick is one of the most important vegetablecrop grown in about 2403 ha in the state. The crop requirements for growing drumstick (Table 7.12)were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing drumstick was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.11.

Table 7.12 Crop suitability criteria for Drumstick

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable (S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V. Poorly drained
Nutrient availability	Texture	Class	sc, scl, cl,c (red)	sl, c (black)	ls	s
	pH	1:2.5	5.5-6.5	5-5.5, 6.5-7.3	7.8-8.4	>8.4
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	0-35	35-60	60-80	>80
Erosion	Slope	%	0-3	3-10	-	>10

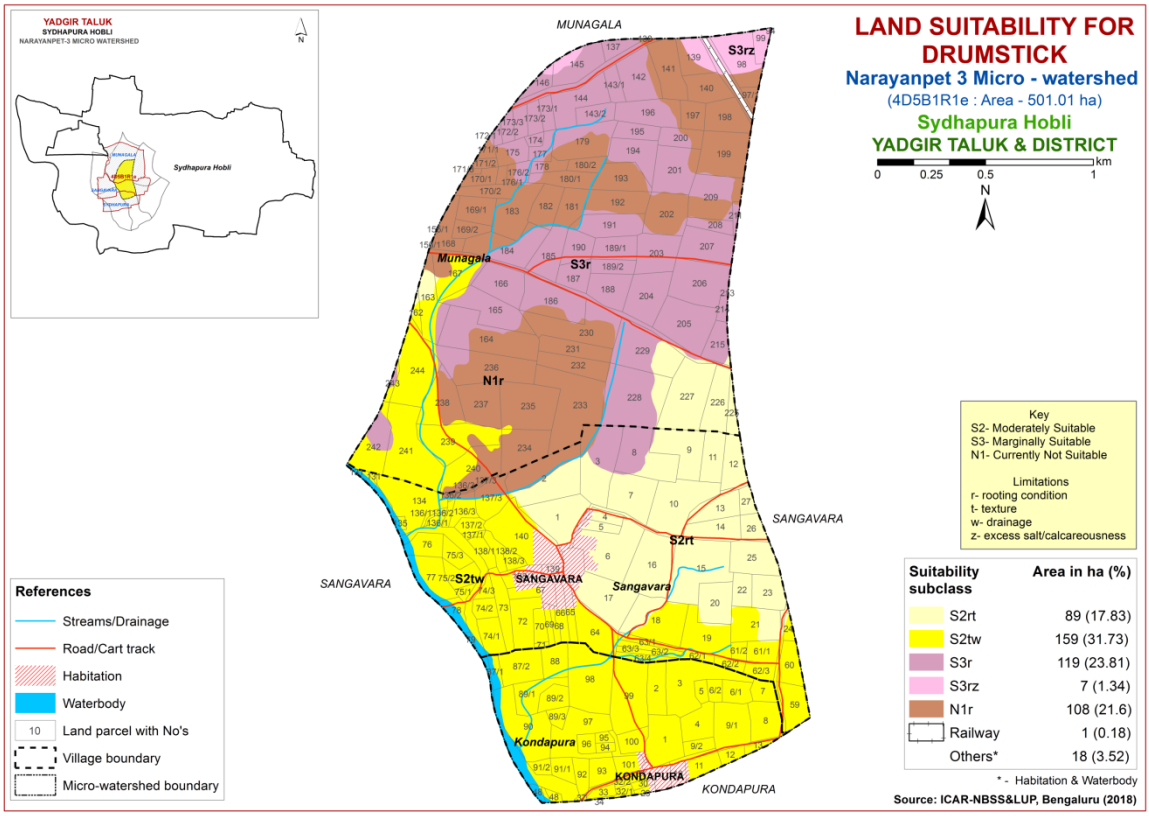


Fig 7.11 Land Suitability map of Drumstick

No highly (Class S1) suitable lands for growing drumstick in the microwatershed. Maximum area of about 248 ha (50%) is moderately suitable (Class S2) for growing drumstick and are distributed in all parts of the microwatershed. They have minor limitations of texture, rooting depth and drainage. An area of about 126 ha (25%) is marginally suitable (Class S3) for growing drumstick and are distributed in the northern, central and western part of the microwatershed. They have moderate limitations of rooting depth and calcareousness. An area of about 108 ha (21%) is currently not suitable (Class N1) for growing drumstick withsevere limitation of rooting depth. They are distributed in the northern and central part of the microwatershed.

7.12 Land suitability for Brinjal (*Solanum melongena*)

Brinjal is one of the most important vegetable crop grown in all the districts. The crop requirements for growing brinjal (Table 7.13) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing brinjal was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.12.

Highly suitable (Class S1) lands for growing Brinjal occur in an area of about 88 ha (18%) and are distributed in the eastern and southern part of the microwatershed. Maximum area of about 286 ha (57%) is moderately suitable (Class S2) for growing Brinjal and are distributed in all partsof the microwatershed with minor limitations of texture and rooting depth. Marginally suitable lands (Class S3) for growing Brinjal occur in an area of 108 ha (21%) and are distributed in the northern and central part of the microwatershed with major limitation of rooting depth.

Table 7.13 Land suitability criteria for Brinjal

Crop requirement			**Rating**			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V. Poorly drained
Nutrient availability	Texture	Class	sl, scl, cl, sc	c (red)	ls, c (black)	-
	pH	1:2.5	6.0-7.3	7.3-8.4;5.5-6.0	8.4-9.0	>9.0
Rooting conditions	Soil depth	Cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	35-60	>60
Erosion	Slope	%	0-3	3-5	5-10	>10

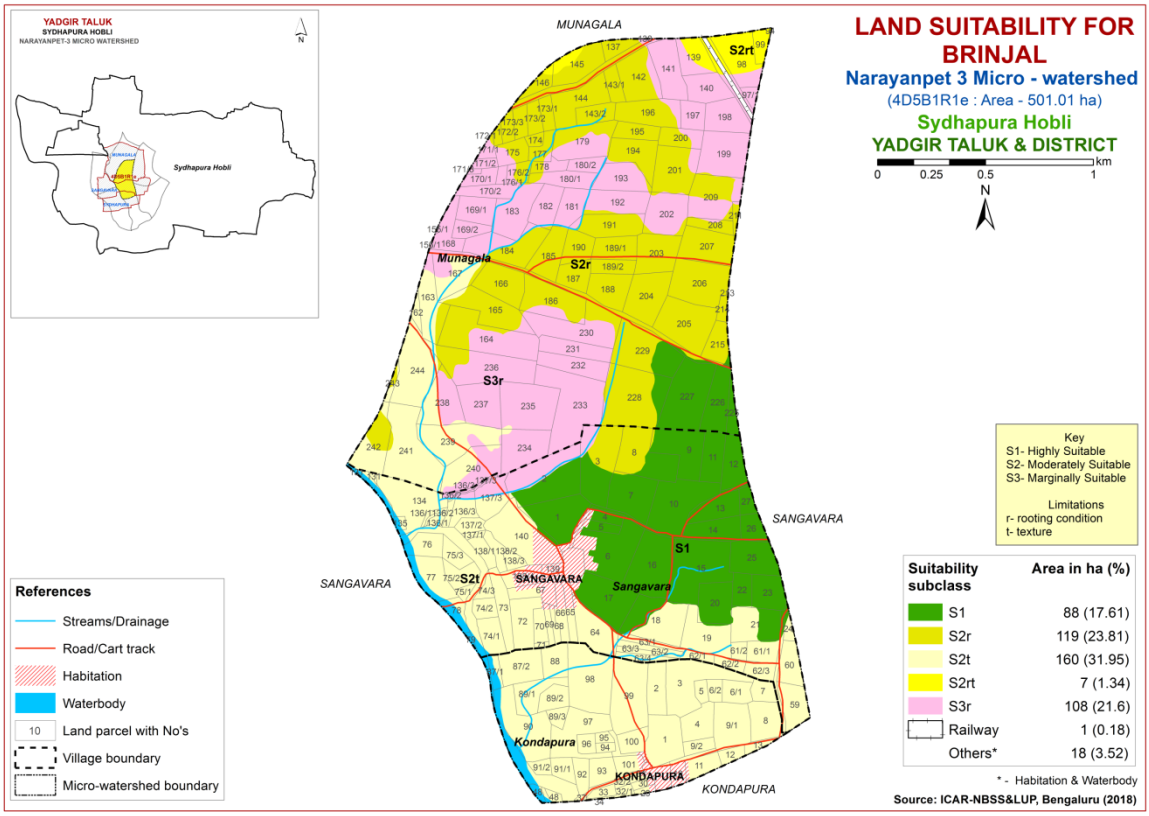


Fig 7.12 Land Suitability map of Brinjal

7.13 Land suitability for Bhendi (*Abelmoschus esculentus*)

Bhendi is one of the most important vegetable crop grown in all the districts. The crop requirements for growing bhendi (Table 7.14) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing bhendi was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.13.

Table 7.14 Land suitability criteria for Bhendi

Crop requirement			Rating			
Soil –site characteristics		unit	Highly suitable(S1)	Moderately Suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Climate	Temperature in growing season	^{0}C	25-28	29-32 20-24	15-19 33-36	<15 >36
Soil moisture	Growing period	Days	>150	120-150	90-120	<90
Soil aeration	Soil drainage	class	Well drained	Mod. well drained	Imper. drained	Poorly drained
Nutrient availability	Texture	Class	l, sl, cl, scl	Sic, sicl, sc, c(m/k)	C (ss)	ls, s
	pH	1:2.5	6.1-7.3	5.6-6.0;7.4-7.8	<5.6;7.9-8.4	>8.4
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strongly calcareous	
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	>35	>60
Soil toxicity	Salinity	ds/m	Non saline	Slight	Strongly	
	Sodicity (ESP)	%	<10	10-15	>15	-
Erosion	Slope	%	1-3	3-5	5-10	>10

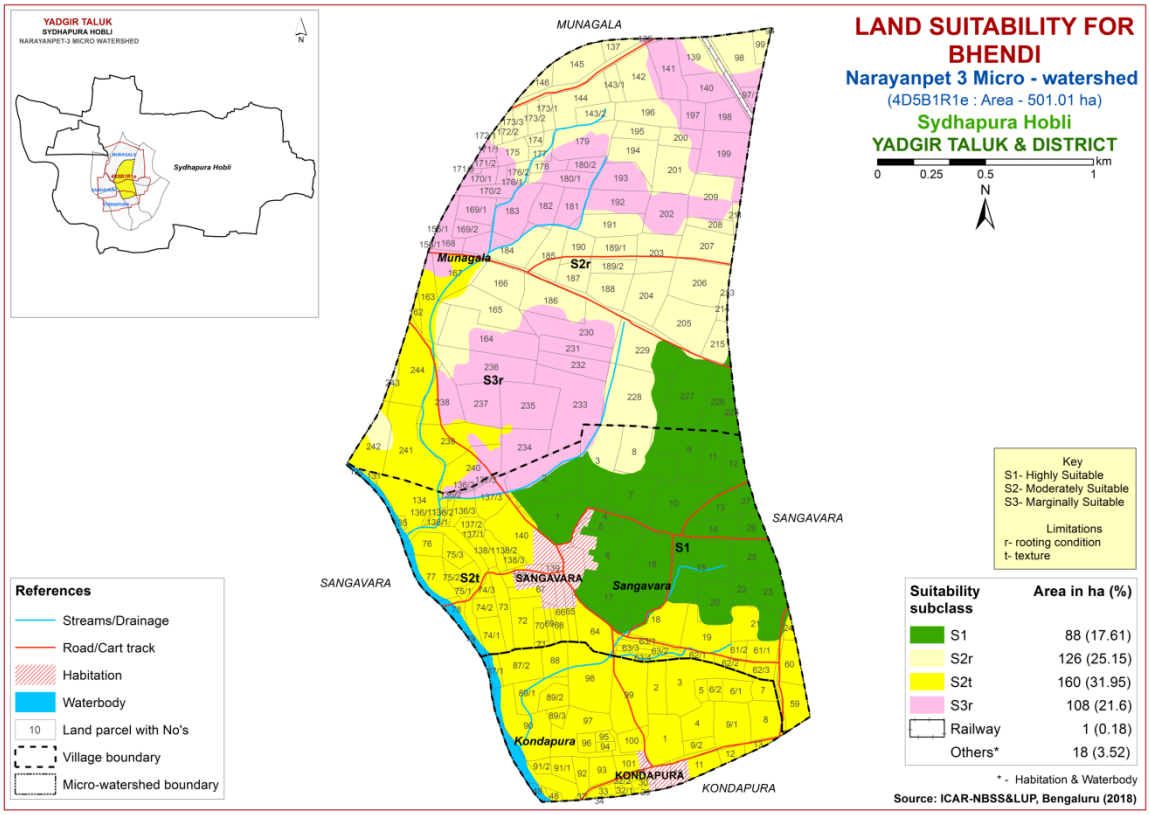


Fig 7.13 Land Suitability map of Bhendi

Highly suitable (Class S1) lands for growing Bhendi occur in an area of about 88 ha (18%) and are distributed in the eastern and southern part of the microwatershed. Maximum area of about 286 ha (57%) is moderately suitable (Class S2) for growing Bhendi and are distributed in all partsof the microwatershed with minor limitations of texture and rooting depth. Marginally suitable lands (Class S3) for growing Bhendi occur in an area of 108 ha (21%) and are distributed in the northern and central part of the microwatershed with major limitation of rooting depth.

7.14 Land Suitability for Onion (*Allium cepa*)

Onion is one of the most important vegetable crop grown in Raichur, Dharwad, Belgaum, Gulbarga, Bijapur, Bidar, Bellary, Chitradurga and Tumakuru districts. The crop requirements for growing onion (Table 7.15) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing Onion was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.14.

Highly suitable (Class S1) lands for growing Onion occur in an area of about 88 ha (18%) and are distributed in the eastern and southern part of the microwatershed. Maximum area of about 231 ha (46%) is moderately suitable (Class S2) for growing Onion and are distributed in all partsof the microwatershed with minor limitations of texture and rooting depth. Marginally suitable lands (Class S3) for growing Onion occur

in an area of 163 ha (32%) and are distributed in the northern, western,central and southern part of the microwatershed with major limitations of texture and rooting depth.

Table 7.15 Land suitability criteria for Onion

Crop requirement		Rating			
Soil –site characteristics	**Unit**	**Highly suitable(S1)**	**Moderately Suitable(S2)**	**Marginally suitable(S3)**	**Not suitable (N)**
Mean temperature in growing season	^{0}C	20-30	30-35	35-40	>40
Slope	%	<3	3-5	5-10	>10
Soil drainage	Class	Well drained	Moderately /imperfectly	Poor drained	Very poorly drained
Soil reaction	pH	6.5-7.3	7.3-7.8;5.0-5.4	7.8-8.4;<5.0	>8.4
Surface soil texture	Class	scl, sil, sl	sc, sicl,c (red soil)	c, c (black soil)	ls
Soil depth	Cm	>75	50-75	25-50	<25
Gravel content	% vol.	<15	15-35	35-60	60-80
Salinity (ECe)	dsm^{-1}	<1.0	1.0-2.0	2.0-4.0	<4
Sodicity (ESP)	%	<5	5-10	10-15	>15

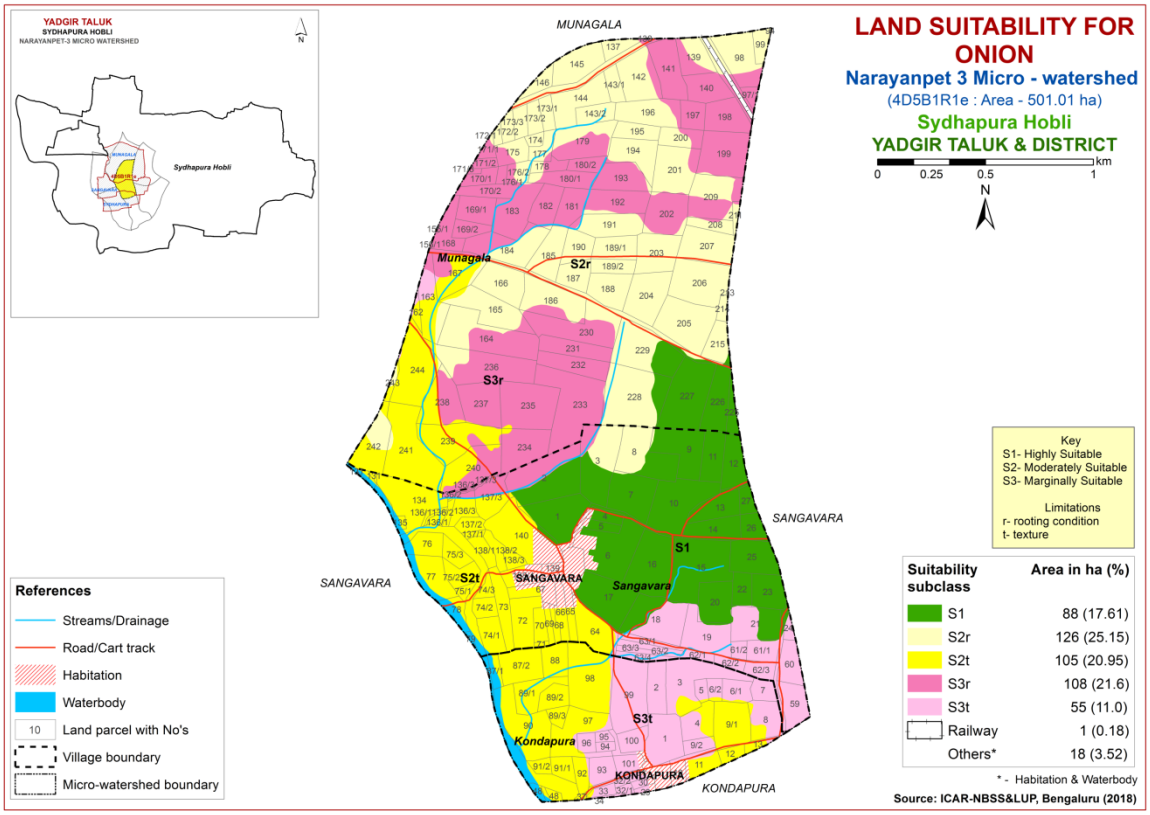


Fig 7.14 Land Suitability map of Onion

7.15 Land suitability for Mango (*Mangifera indica*)

Mango is one of the most important fruit crop grown in an area of 1.73 lakh ha in almost all the districts of the State. The crop requirements (Table 7.16) for growing mango were matched with the soil-site characteristics (Table 7.1) and a land suitability

map for growing mango was generated. The area extent and their geographic distribution of different suitability subclasses in the microwatershed is given in Figure 7.15.

Table 7.16 Crop suitability criteria for Mango

Crop requirement			**Rating**			
Soil-site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temp. in growing season	^{0}C	28-32	24-27 33-35	36-40	20-24
	Min. temp. before flowering	^{0}C	10-15	15-22	>22	-
Soil moisture	Growing period	Days	>180	150-180	120-150	<120
Soil aeration	Soil drainage	Class	Well drained	Mod. To imper. drained	Poor drained	Very poorly drained
	Water table	M	>3	2.50-3.0	2.5-1.5	<1.5
Nutrient availability	Texture	Class	sc, l, sil, cl	sl, sc, sic, l, c	c(<60%)	c(>60%),
	pH	1:2.5	5.5-7.5	7.6-8.5;5.0-5.4	8.6-9.0;4.0-4.9	>9.0<4.0
	OC	%	High	medium	low	
	$CaCO_3$ in root zone	%	Non calcareous	<5	5-10	>10
Rooting conditions	Soil depth	cm	>200	125-200	75-125	<75
	Gravel content	%vol	Non-gravelly	<15	15-35	>35
Soil toxicity	Salinity	dS/m	Non saline	<2.0	2.0-3.0	>3.0
	Sodicity	%	Non sodic	<10	10-15	>15
Erosion	Slope	%	<3	3-5	5-10	

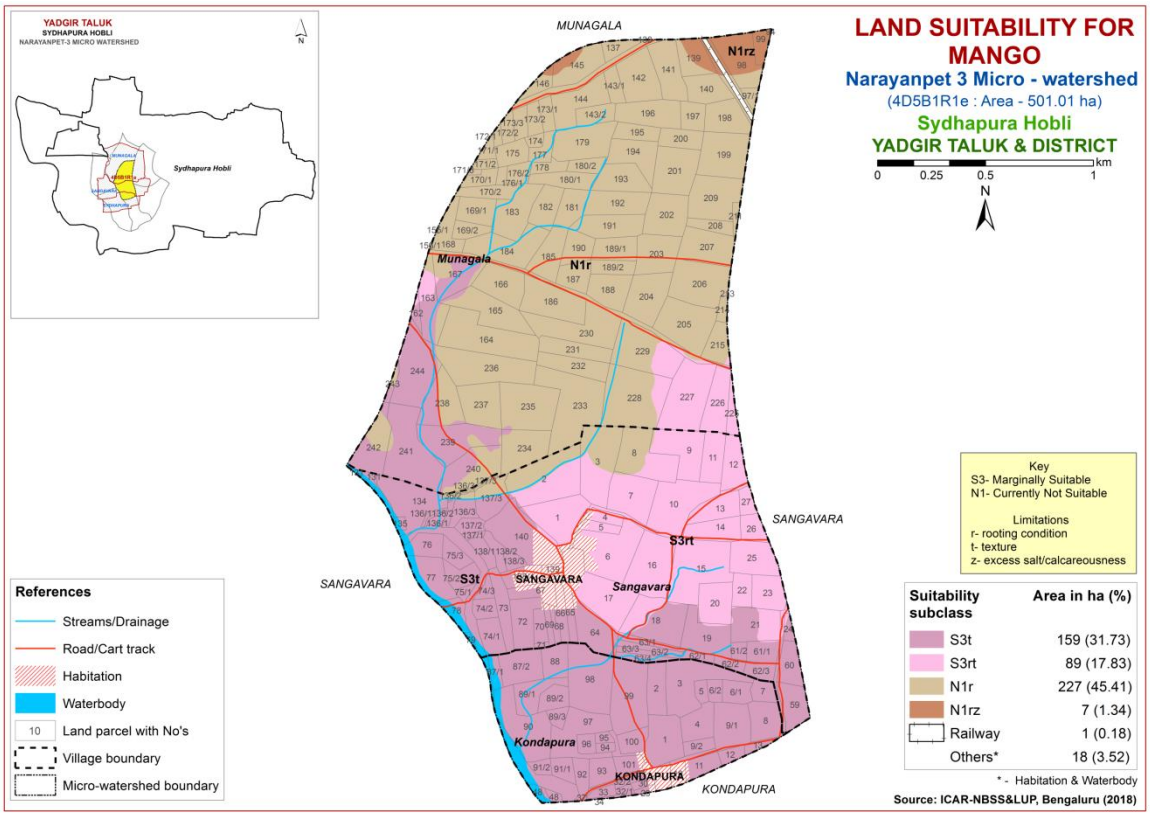


Fig. 7.15 Land Suitability map of Mango

No highly suitable (Class S1) and moderately suitable (Class S2) landsare availablefor growing mango in the microwatershed.Maximum area of 248 ha (50%) is marginally suitable (Class S3) for growing mango with moderate limitations of rooting depth and texture and are distributed in all parts of the microwatershed. An area of about 234 ha (46%) is currently not suitable (Class N1) for growing mango andoccur in the northern, central and western part of the microwatershed with severe limitations of rooting depth and calcareousness.

7.16 Land suitability for Guava (*Psidium guajava*)

Guava is one of the most important fruit crop grown in an area of 0.06 lakh ha in almost all the districts of the State. The crop requirements (Table 7.17) for growing guava were matched with the soil-site characteristics (7.1) and a land suitability map for growing guava was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.16.

No highly suitable (Class S1)and moderately suitable (Class S2) lands for growing Guava in the microwatershed. Major area of about 374 ha (74%) is marginally suitable (Class S3) for growing Guava and are distributed in all partsof the microwatershed. They have major limitations of texture and rooting depth. An area of about 108 ha (22%) is currently not suitable (Class N1) for growing Guava withsevere limitation of rooting depth. They are distributed in the northern, western and central part of the microwatershed.

Table 7.17 Crop suitability criteria for Guava

Crop requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable (S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}C	28-32	33-36 24-27	37-42 20-23	-
Soil moisture	Growing period	Days	>150	120-150	90-120	<90
Soil aeration	Soil drainage	Class	Well drained	Mod. to imperfectly	poor	Very poor
Nutrient availability	Texture	Class	scl, l, cl, sil	sl,sicl,sic.,sc,c	c(<60%)	c(>60%)
	pH	1:2.5	6.0-7.5	7.6-8.0:5.0-5.9	8.1-8.5:4.5-4.9	>8.5:<4.5
	$CaCO_3$ in root zone	%	Non calcareous	<10	10-15	>15
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	<15	15-35	>35	
Soil toxicity	Salinity	dS/m	<2.0	2.0-4.0	4.0-6.0	
	Sodicity	%	Non sodic	10-15	15-25	>25
Erosion	Slope	%	<3	3-5	5-10	>10

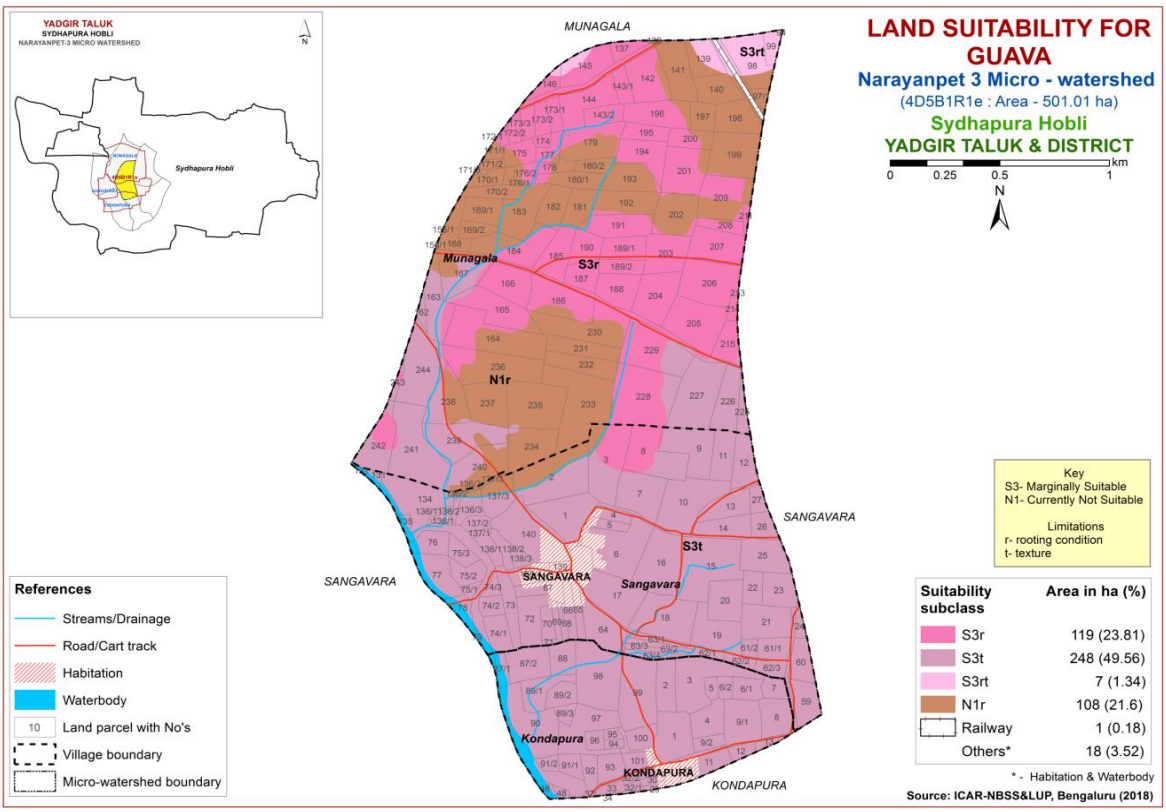


Fig. 7.16 Land Suitability map of Guava

7.17 Land suitability for Sapota (*Manilkara zapota*)

Sapota is one of the most important fruit crop grown in an area of 29373 ha in almost all the districts of the State. The crop requirements (Table 7.18) for growing sapota were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing sapota was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.17.

Table 7.18 Crop suitability criteria for Sapota

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Climate	Temperature in growing season	^{0}C	28-32	33-36 24-27	37-42 20-23	>42 <18
Soil moisture	Growing period	Days	>150	120-150	90-120	<120
Soil aeration	Soil drainage	Class	Well drained	Mod.well drained	Imper.drained	Poorly drained
Nutrient availability	Texture	Class	scl, l, cl, sil	sl, sicl, sc	c(<60%)	ls, s,c (>60%)
	pH	1:2.5	6.0-7.5	7.6-8.0;5.0-5.9	8.1-9.0;4.5-4.9	>9.0;<4.5
	$CaCO_3$ in root zone	%	Non calcareou	<10	10-15	>15
Rooting conditions	Soil depth	cm	>150	75-150	50-75	<50
	Gravel content	% vol.	Non gravelly	<15	15-35	<35
Soil toxicity	Salinity	dS/m	Non saline	Up to 1.0	1.0-2.0	2.0-4.0
	Sodicity	%	Non sodic	10-15	15-25	>25
Erosion	Slope	%	<3	3-5	5-10	>10

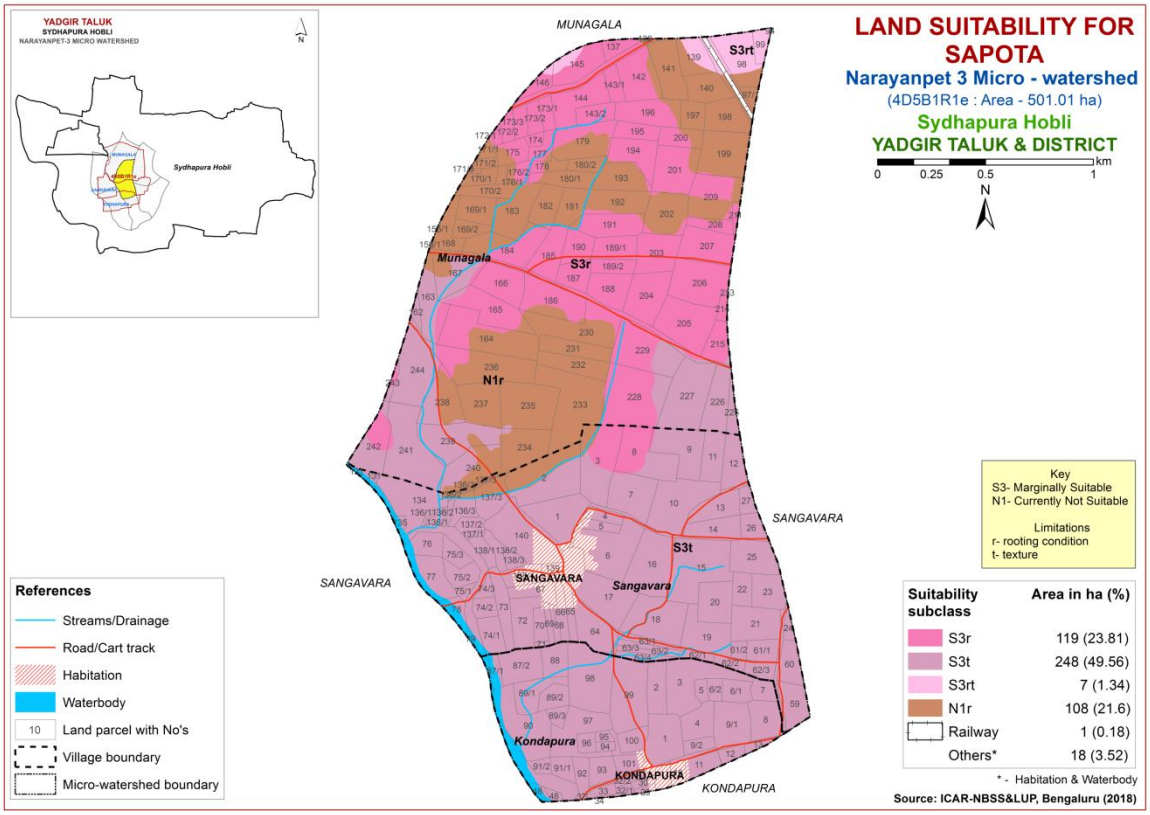


Fig. 7.17 Land Suitability map of Sapota

No highly suitable (Class S1)and moderately suitable (Class S2) lands for growing Sapota in the microwatershed. Major area of about 374 ha (74%) is marginally suitable (Class S3) for growing Sapota and are distributed in all partsof the microwatershed. They have major limitations of texture and rooting depth. An area of about 108 ha (22%) is currently not suitable (Class N1) for growing Sapota withsevere limitation of rooting depth.They are distributed in the northern, western and central part of the microwatershed.

7.18 Land Suitability for Pomegranate (*Punica granatum*)

Pomegranate is one of the most important fruit crop commercially grown in about 18488 ha in Karnataka,mainly in Bijapur, Bagalkot, Koppal, Gadag and Chitradurga districts. The crop requirements for growing pomegranate (Table 7.19) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing pomegranate was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.18.

No highly suitable (Class S1) lands are available for growing pomegranatein the microwatershed. Maximum area of about 248 ha (50%) is moderately suitable (Class S2) for growing pomegranate and are distributed in all parts of the microwatershed. They have minor limitations of texture and rooting depth. Anarea of about 126 ha (25%) is marginally suitable (class S3) for growing pomegranate and are distributed in the northern and central part of the microwatershed with major limitations of rooting depth and

calcareousness. An area of about 108 ha (21%) is currently not suitable (Class N1) for growing pomegranate and are distributed in the northern, western and central part of the microwatershed with severe limitation of rooting depth.

Table 7.19 Crop suitability criteria for Pomegranate

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
climate	Temperature in growing season	^{0}C	30-34	35-38,25-29	39-40 15-24	-
Soil moisture	Growing period	Days	>150	120-150	90-120	<90
Soil aeration	Soil drainage	class	Well drained	imperfectly drained		
Nutrient availability	Texture	Class	sl, scl, l, cl	c, sic, sicl	cl, s, ls	
	pH	1:2.5	5.5-7.5	7.6-8.5	8.6-9.0	
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	nil	15-35	>35	
Soil toxicity	Salinity	ds/m	Nil	<9	>9	<50
	Sodicity	%	nil			
Erosion	Slope	%	<3	3-5	5-10	

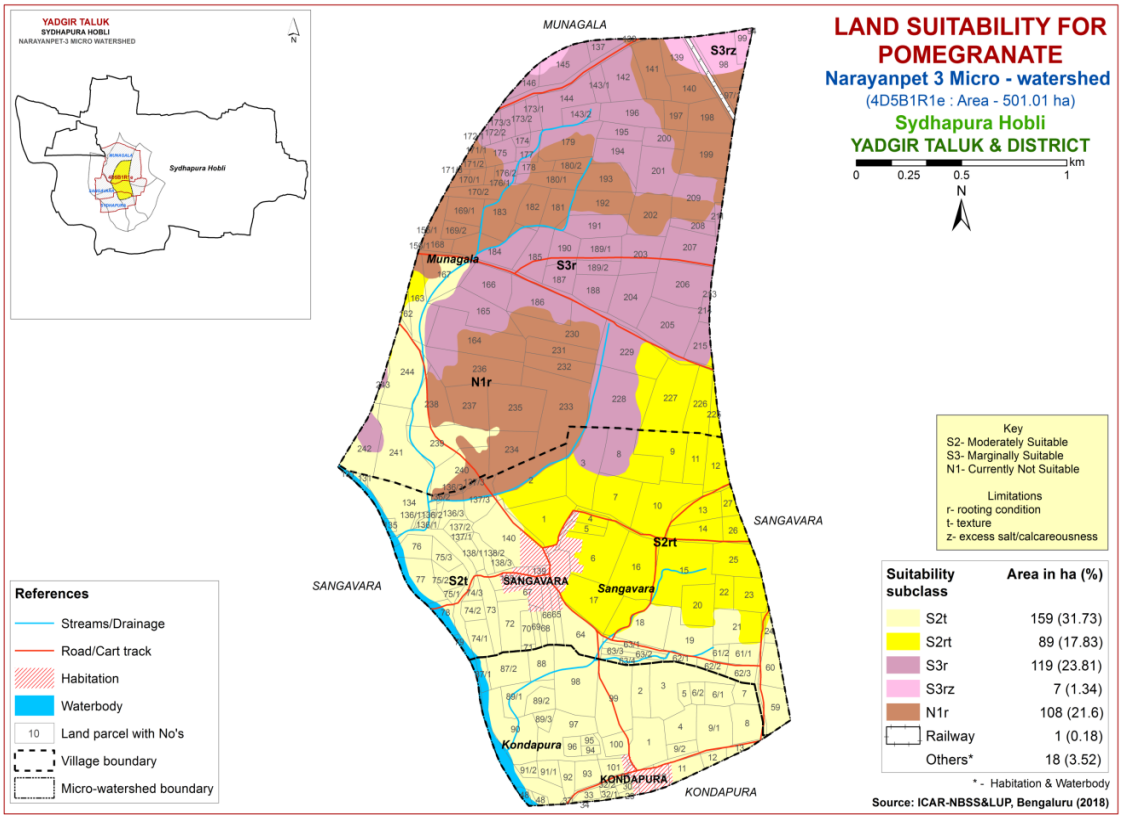


Fig 7.18 Land Suitability map of Pomegranate

7.19 Land Suitability for Musambi (*Citrus limetta*)

Musambi is one of the important fruit crop grown in an area of 3446 ha in almost all the districts of the State. The crop requirements for growing musambi (Table 7.20) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for

growing musambi was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.19.

Table 7.20 Crop suitability criteria for Musambi

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable (S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Mod. to imper. drained	poorly	Very poorly
Nutrient availability	Texture	Class	scl,l,sicl,cl,s	sc, sc, c	c(>70%)	s, ls
	pH	1:2.5	6.0-7.5	5.5-6.4;7.6-8.0	4.0-5.4;8.1-8.5	<4.0;>8.5
Rooting conditions	Soil depth	cm	>150	100-150	50-100	<50
	Gravel content	% vol.	Non gravelly	15-35	35-55	>55
Erosion	Slope	%	<3	3-5	5-10	

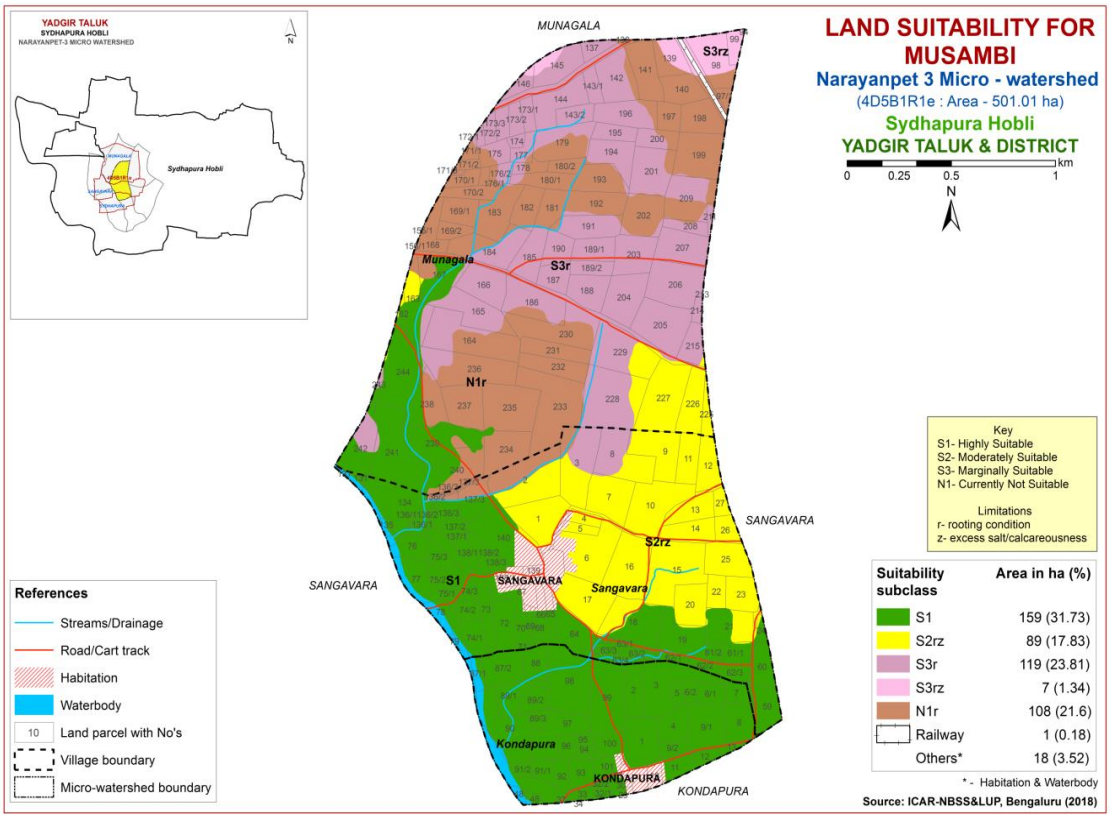


Fig. 7.19 Land Suitability map of Musambi

Highly suitable (Class S1) lands for growing musambi occur in a maximum area of about 159 ha (32%) and are distributed in all parts of the microwatershed. An area of about 89 ha (18%) is moderately suitable (Class S2) for growing musambi and are distributed in the eastern and southeastern part of the microwatershed with minor limitations of calcareousness and rooting depth. Marginally suitable lands (Class S3) for growing musambi occur in an area of 126 ha (25%) and are distributed in the northern and central part of the microwatershed with major limitations of rooting depth and calcareousness. An area of about 108 ha (21%) iscurrently not suitable (Class N1) for

musambi and are distributed in the northern, western and central part of the microwatershed with severe limitation of rooting depth.

7.20 Land Suitability for Lime (*Citrus sp*)

Lime is one of the most important fruit crop grown in an area of 0.11 lakh ha in almost all the districts of the State. The crop requirements for growing lime (Table 7.21) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing lime was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7. 20.

Highly suitable (Class S1) lands for growing Lime occur in a maximum area of about 159 ha (32%) and are distributed in all parts of the microwatershed. An area of about 89 ha (18%) is moderately suitable (Class S2) for growing Lime and are distributed in the eastern and southeastern part of the microwatershed with minor limitations of calcareousness and rooting depth. Marginally suitable lands (Class S3) for growing Lime occur in an area of 126 ha (25%) and are distributed in the northern and central part of the microwatershed with major limitations of rooting depth and calcareousness. An area of about 108 ha (21%) iscurrently not suitable (Class N1) for Lime and are distributed in the northern, western and central part of the microwatershed with severe limitation of rooting depth.

Table 7.21 Crop suitability criteria for Lime

Crop requirement			**Rating**			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}C	28-30	31-35 24-27	36-40 20-23	>40 <20
Soil moisture	Growing period	Days	240-265	180-240	150-180	<150
Soil aeration	Soil drainage	Class	Well drained	Mod. to imper.drained	poorly	Very poorly
Nutrient availability	Texture	Class	scl, l, sicl, cl, s	sc, sc, c	c(>70%)	s, ls
	pH	1:2.5	6.0-7.5	5.5-6.47.6-8.0	4.0-5.4;8.1-8.5	<4.0;>8.5
	$CaCO_3$ in root zone	%	Non 34calcareous	Upto 5	5-10	>10
Rooting conditions	Soil depth	cm	>150	100-150	50-100	<50
	Gravel content	% vol.	Non gravelly	15-35	35-55	>55
Soil toxicity	Salinity	dS/m	Non saline	Upto 1.0	1.0-2.5	>2.5
	Sodicity	%	Non sodic	5-10	10-15	>15
Erosion	Slope	%	<3	3-5	5-10	

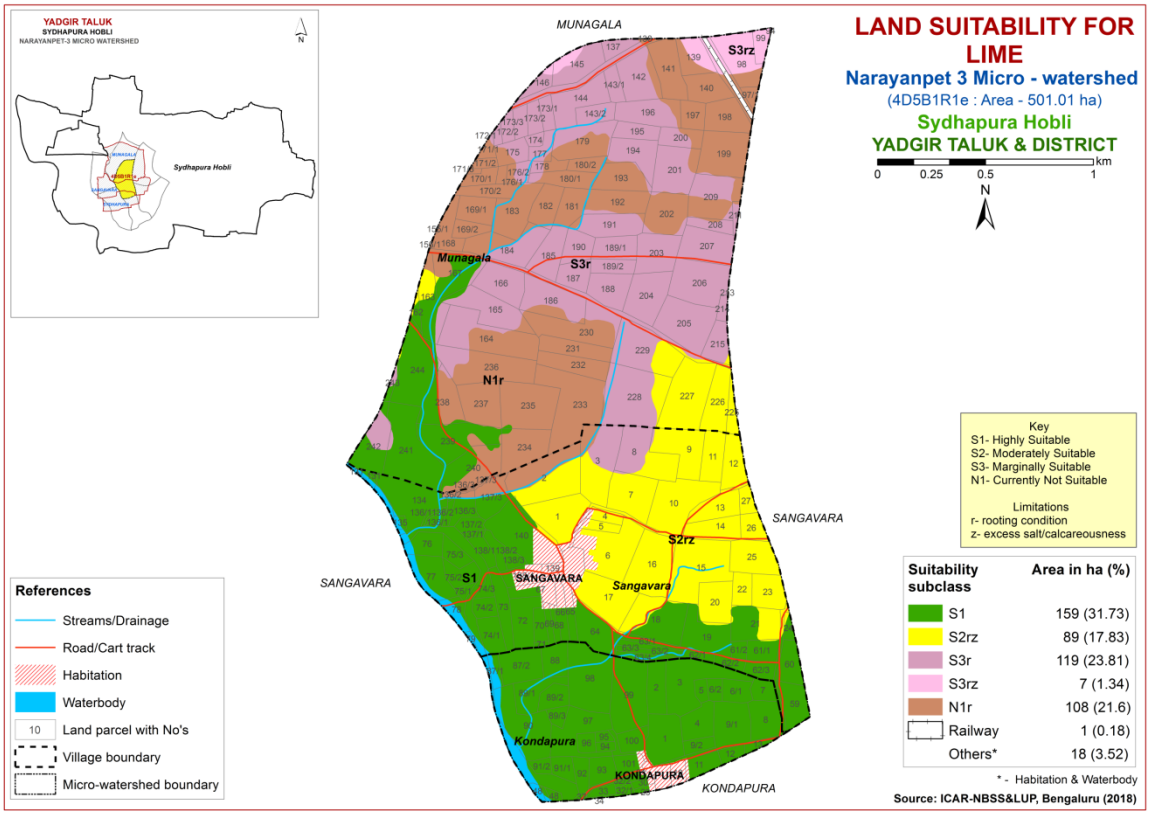


Fig. 7.20 Land Suitability map of Lime

7.21Land Suitability for Amla (*Phyllanthus emblica*)

Amla is one of the medicinal fruit crop grown in almost all the districts of the State. The crop requirements for growing amla (Table 7.22) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing amla was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.21.

Table 7.22 Land suitability criteria for Amla

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Mod.well drained	Poorly drained	V. Poorly drained
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	c (black)	ls, sl	-
	pH	1:2.5	5.5-7.3	5.0-5.5	7.8-8.4	>8.4
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15-35	35-60	60-80	
Erosion	Slope	%	0-3	3-5	5-10	>10

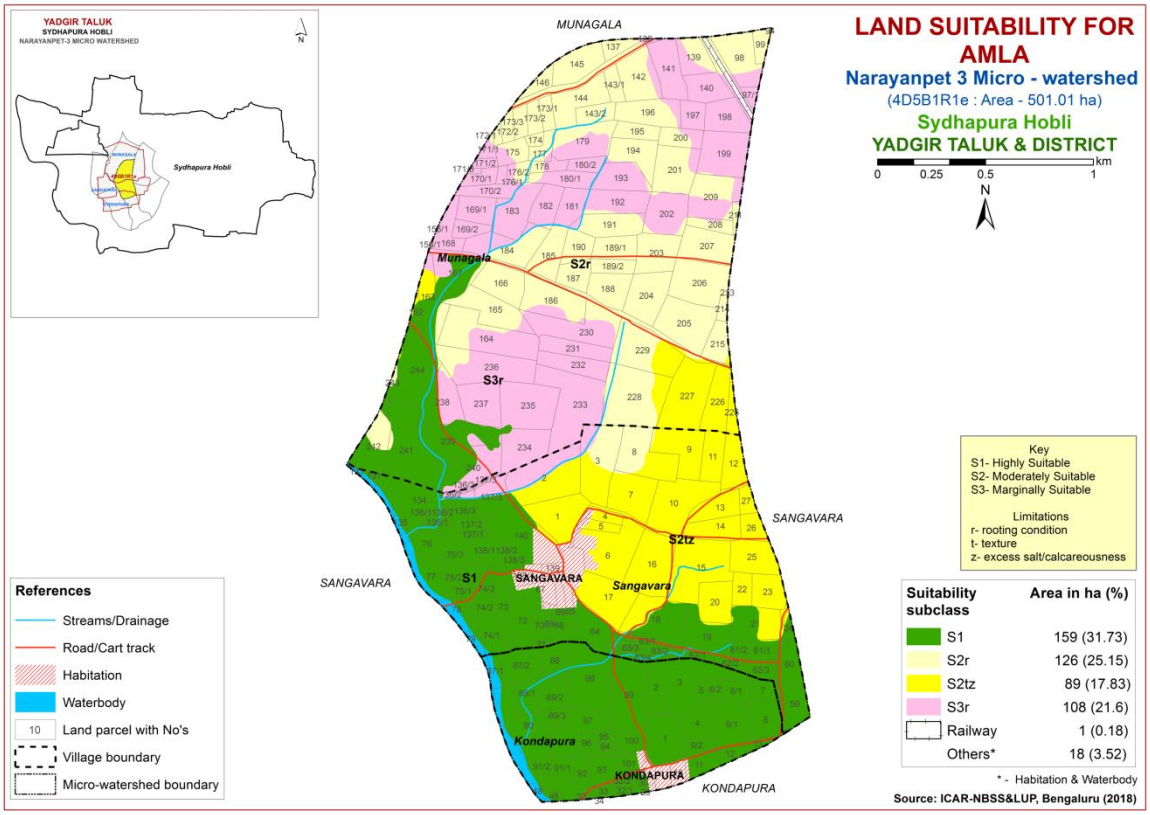


Fig. 7.21 Land Suitability map of Amla

Highly suitable (Class S1) lands for growing amla occur in an area of about 159 ha (32%) and are distributed in the western and southern part of the microwatershed. Maximum area of about 215 ha (43%) is moderately suitable (Class S2) for growing amla and are distributed in all partsof the microwatershed with minor limitations of calcareousness, texture and rooting depth. Marginally suitable lands (Class S3) for growing amla occur in an area of 108 ha (21%) and are distributed in the northern, western and central part of the microwatershed with major limitation of rooting depth.

7.22 Land Suitability for Cashew (*Anacardium occidentale)*

Cashew is one of the most important plantation nut crop grown in an area of 0.7 lakh ha in almost all the districts of the State. The crop requirements for growing cashew (Table 7.23) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing cashew was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.22.

No highly suitable (Class S1) and moderately suitable (Class S2) landsare availablefor growing Cashew in the microwatershed. An area of about 13 ha (3%) is marginally suitable lands (Class S3)for growing Cashew in the microwatershed and are distributed in the eastern part of the microwatershed.They have major limitation of rooting depth. Maximumarea of about 469ha (93%) is currently not suitable (Class N1) for growing cashew with severe limitations of texture, rooting depthand calcareousness.

Table 7.23 Land suitability criteria for Cashew

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Mod. well drained	Poorly drained	V.Poorly drainage
Nutrient availability	Texture	Class	sc, c (red), scl, cl,	-	ls, sl	c (black)
	pH	1:2.5	5.5-6.5	5.0-5.5;6.5-7.3	7.3-7.8	>7.8
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	<15	15-35	35-60	>60
Erosion	Slope	%	0-3	3-10	>10	

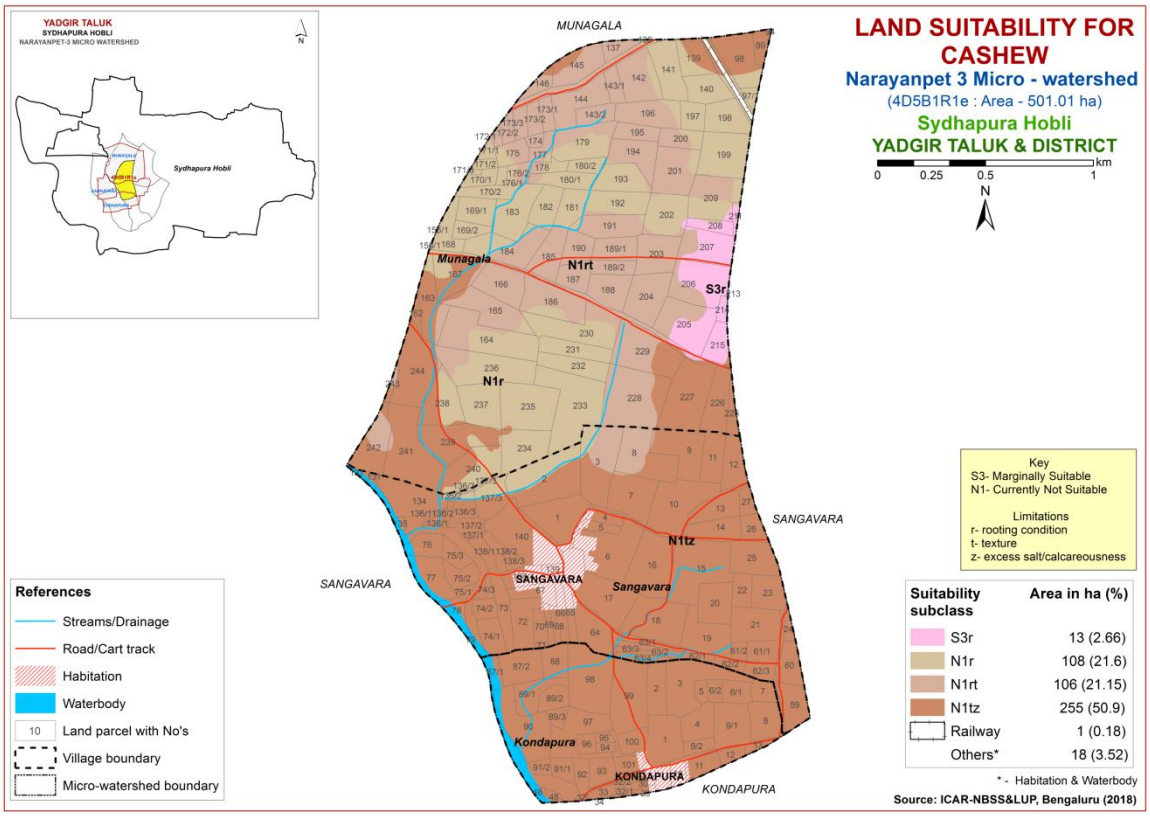


Fig. 7.22 Land Suitability map of Cashew

7. 23Land Suitability for Jackfruit (*Artocarpus heterophyllus*)

Jackfruit is one of the most important fruit crop grown in an area of 5368 ha in almost all the districts of the State. The crop requirements for growing jackfruit (Table 7.24) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing jackfruit was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.23.

No highly suitable (Class S1)and moderately suitable (Class S2) lands for growing Jackfruit in the microwatershed. Major area of about 374 ha (74%) is marginally suitable (Class S3) for growing Jackfruit and are distributed in all partsof the microwatershed. They have major limitations of texture and rooting depth. An area of about 108 ha (22%) is currently not suitable (Class N1) for growing Jackfruit and are distributed in the

northern, western and central part of the microwatershed withsevere limitation of rooting depth.

Table 7.24 Land suitability criteria for Jackfruit

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	class	well	Mod. well	Poorly	V. Poorly
Nutrient availability	Texture	Class	scl, cl, sc, c (red)	-	sl, ls, c (black)	-
	pH	1:2.5	5.5-7.3	5.0-5.5;7.3-7.8	7.8-8.4	>8.4
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	<15	15-35	35-60	>60
Erosion	Slope	%	0-3	3-5	>5	-

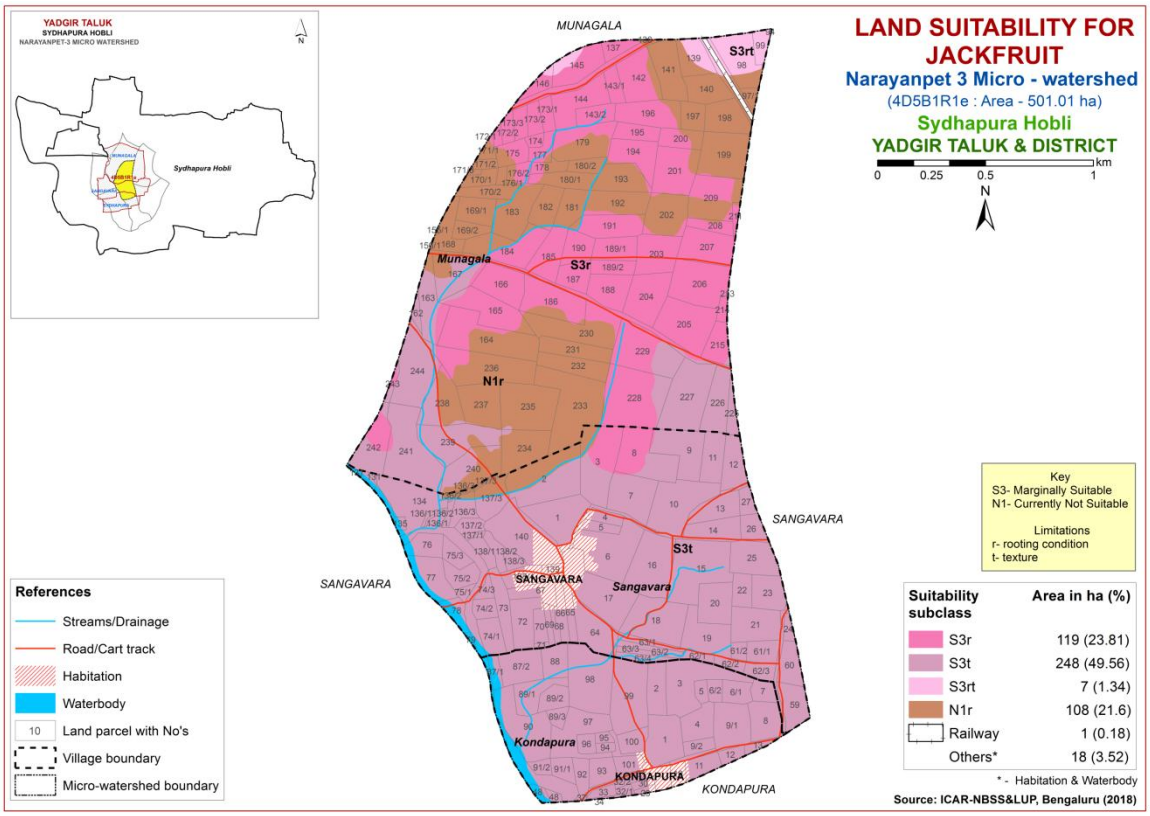


Fig. 7.23 Land Suitability map of Jackfruit

7.24 Land Suitability for Jamun (*Syzygium cumini*)

Jamun is an important fruit crop grown in almost all the districts of the State. The crop requirements for growing Jamun (Table 25) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing Jamun was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.24.

No highly suitable (Class S1) lands are available for growing Jamun in the microwatershed. An area of about 159 ha (32%) is moderately suitable (Class S2) for

growing Jamun and are distributed in the western and southernpart of the microwatershed. They have minor limitation of texture. Maximum area of about 215ha (43%) is marginally suitable (class S3) for growing Jamun and are distributed in all parts of the microwatershed with major limitations of rooting depth, calcareousness and texture. An area of about 108 ha (21%) is currently not suitable (Class N1) for growingJamun and are distributed in the northern, western and centralpart of the microwatershed with severe limitation of rooting depth.

Table 7.25 Land suitability criteria for Jamun

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable (N)
Soil aeration	Soil drainage	Class	Well	Mod. well	Poorly	V.Poorly
Nutrient availability	Texture	Class	scl,cl,sc,c(red)	sl, c (black)	ls	-
	pH	1:2.5	6.0-7.8	5.0-6.0	7.8-8.4	>8.4
Rooting conditions	Soil depth	cm	>150	100-150	50-100	<50
	Gravel content	% vol.	<15	15-35	35-60	>60
Erosion	Slope	%	0-3	3-5	5-10	>10

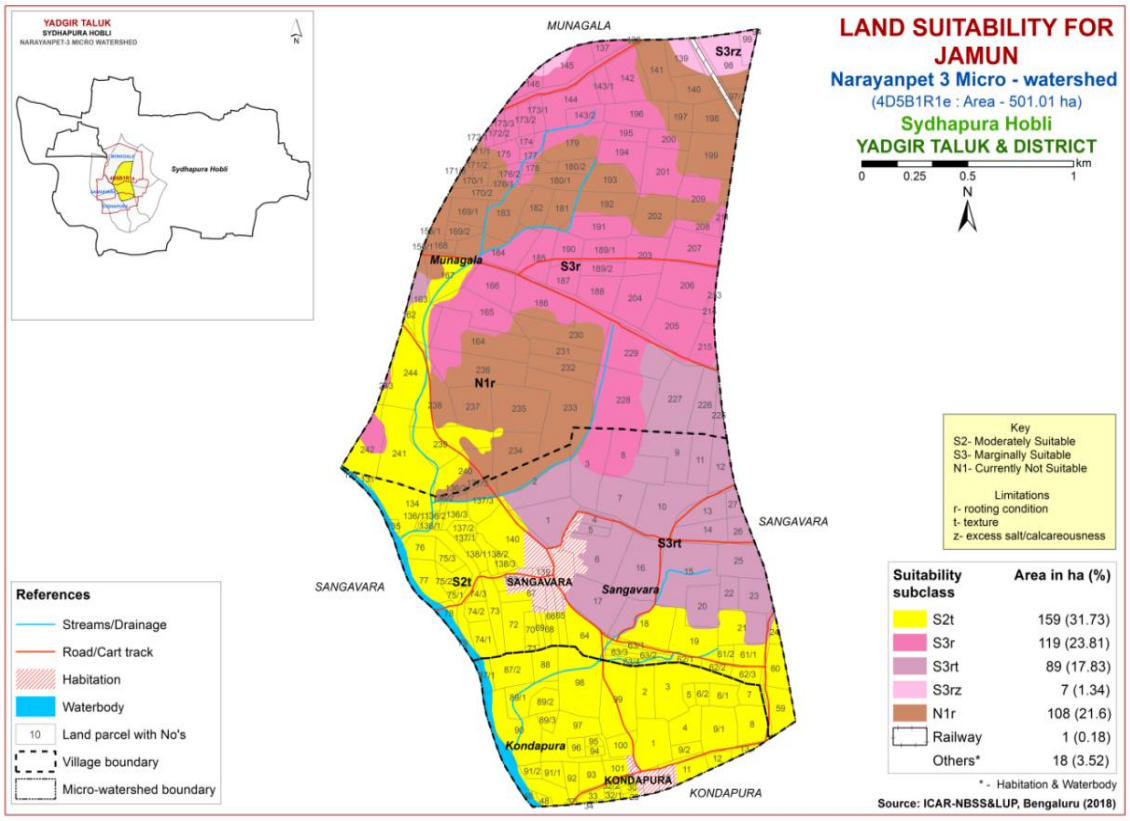


Fig. 7.24 Land Suitability map of Jamun

7.25 Land Suitability for Custard Apple (*Annona reticulata*)

Custard apple is one of the most important fruit crop grown in almost all the districts of the State. The crop requirements for growing custard apple (Table7.26) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for

growing custard apple was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.25.

Highly suitable (Class S1) lands for growing custard apple occur in a maximum area of about 248 ha (49%) and are distributed in all parts of the microwatershed. An area of about 126 ha (25%) is moderately suitable (Class S2) for growing custard apple and are distributed in the northern, western and centralpart of the microwatershed with minor limitation of rooting depth. Marginally suitable lands (Class S3) for growing custard apple occur in an area of 108 ha (22%) and are distributed in the northern, western and central part of the microwatershed with major limitation of rooting depth.

Table 7.26 Land suitability criteria for Custard apple

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable (S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Mod. well drained	Poorly drained	V. Poorly drained
Nutrient availability	Texture	Class	scl,cl,sc,c(red),c (black)	-	sl, ls	-
	pH	1:2.5	6.0-7.3	7.3-8.4	5.0-5.5;8.4-9.0	>9.0
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15-35	35-60	60-80	-
Erosion	Slope	%	0-3	3-5	>5	

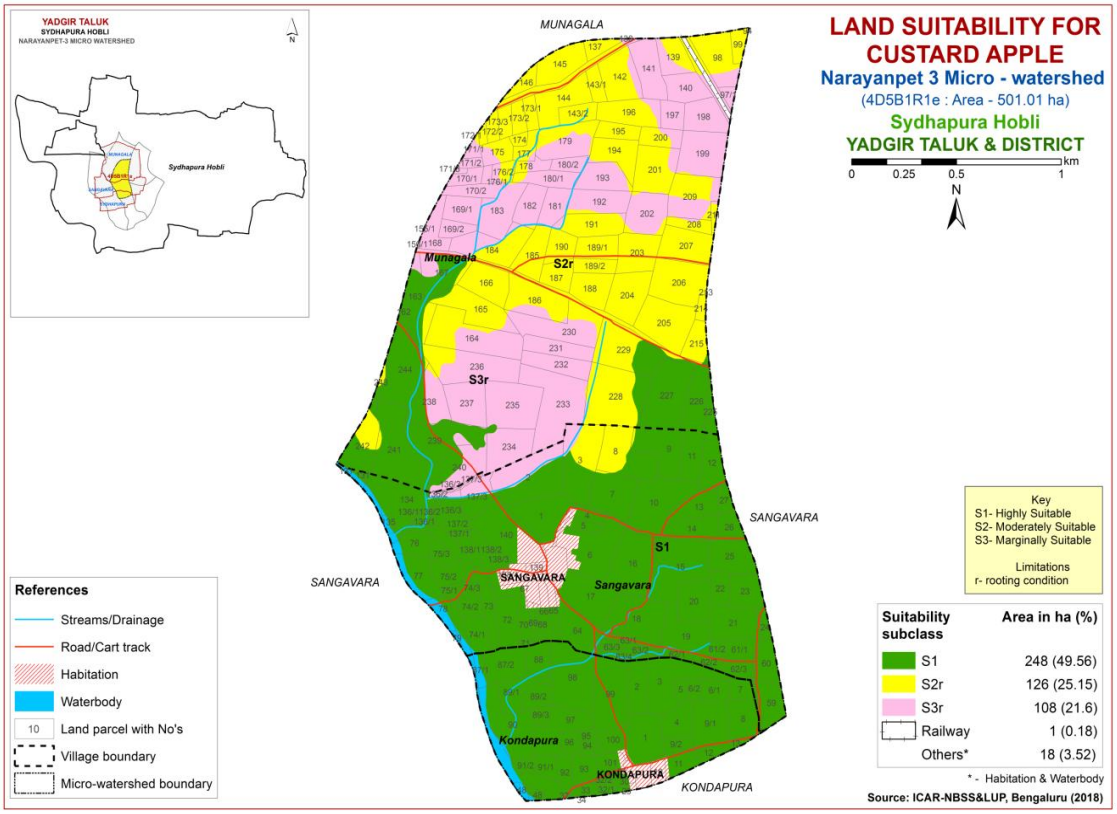


Fig. 7.25 Land Suitability map of Custard Apple

7.26 Land Suitability for Tamarind (*Tamarindus indica*)

Tamarind is the most important spice crop grown in almost all the districts of the state. The crop requirements for growing tamarind (Table 7.27) were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing tamarind was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Fig. 7.26.

Table 7.27 Land suitability criteria for Tamarind

Crop requirement			Rating			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Soil aeration	Soil drainage	Class	Well drained	Mod.well drained	Poorly drained	V.Poorly drained
Nutrient availability	Texture	Class	scl,cl,sc,c(red)	sl, c (black)	ls	-
	pH	1:2.5	6.0-7.3	5.0-6.0;7.3-7.8	7.8-8.4	>8.4
Rooting conditions	Soil depth	cm	>150	100-150	75-100	<50
	Gravel content	% vol.	<15	15-35	35-60	60-80
Erosion	Slope	%	0-3	3-5	5-10	>10

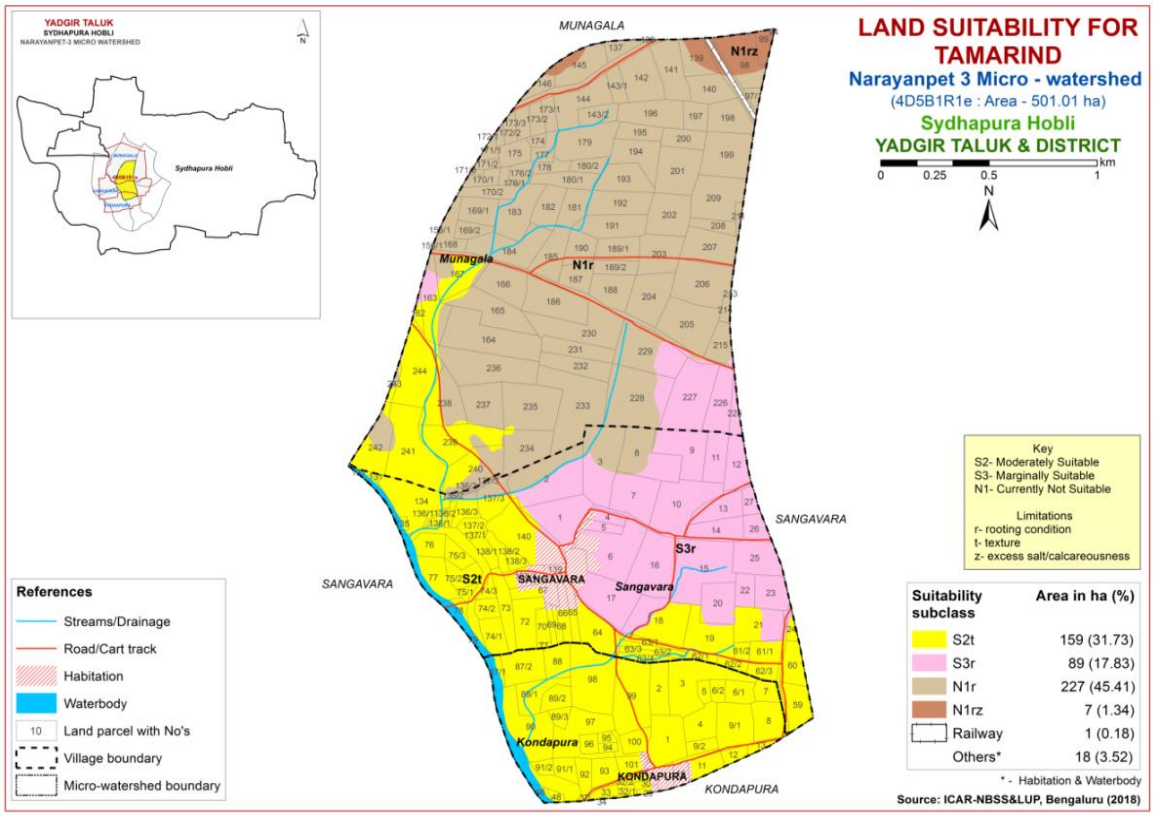


Fig. 7.26 Land Suitability map of Tamarind

No highly suitable (Class S1) lands are available for growing Tamarind in the microwatershed. An area of about 159 ha (32%) is moderately suitable (Class S2) for growing Tamarind and are distributed in the western and southern part of the microwatershed with minor limitation of texture. Marginally suitable (Class S3) lands occur in an area of about 89 ha (18%) and are distributed in the eastern and southern part

of the microwatershed with major limitation of rooting depth.Maximum area of about 234 ha (46%) is currently not suitable (Class N1) for growing Tamarind and are distributed in all parts of the microwatershed with severe limitations of rooting depth and calcareousness.

7.27 Land Suitability for Mulberry (*Morus nigra*)

Mulberry is an important leaf crop grown forrearing silkworms in about 1.6 lakh ha area in all the districts of the state. The crop requirements for growing mulberry (Table 7.28)were matched with the soil-site characteristics (Table 7.1)and a land suitability map for growing mulberry was generated.The area extent and their geographical distribution of different suitability subclasses in the microwatershed is given in Figure 7.27.

Table 7.28 Crop suitability criteria for Mulberry

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Poorly drained	V. Poorly drained
Nutrient availability	Texture	Class	sc, cl, scl	c (red)	c (black), sl, ls	-
	pH	1:2.5				
Rooting conditions	Soil depth	cm	>100	75-100	50-75	<50
	Gravel content	% vol.	0-35	35-60	60-80	>80
Erosion	Slope	%	0-3	3-5	5-10	>10

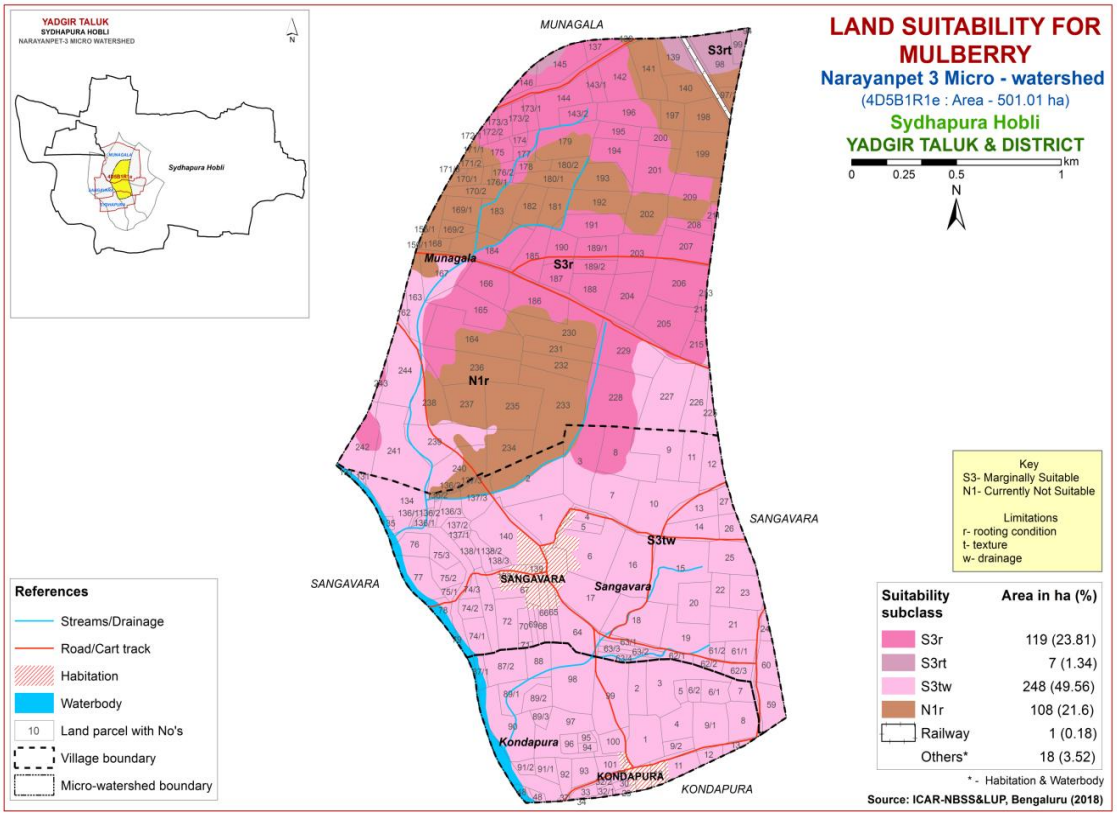


Fig 7.27 Land Suitability map of Mulberry

No highly suitable (Class S1)and moderately suitable (Class S2) lands for growing mulberry in the microwatershed. Major area of about 374 ha (74%) is marginally suitable (Class S3) for growing mulberry and are distributed in all partsof the microwatershed. They have major limitations of texture, drainage and rooting depth. An area of about 108 ha (22%) is currently not suitable (Class N1) for growing mulberry withsevere limitation of rooting depth.

7.28 Land suitability for Marigold (*Tagetes sps*.)

Marigold is one of the most important flower crop grown in an area of 9108 ha in almost all the districts of the State. The crop requirements (Table 7.29) for growing marigold were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing marigold was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.28.

No highly suitable (Class S1) lands are available for growing Marigold. Maximum area of about 374 ha (74%) is moderately suitable (Class S2) for growing Marigold and are distributed in all parts of the microwatershed. They have minor limitations of drainage, textureand rooting depth. Marginally suitable lands (Class S3)occur in an area of about 108 ha (22%) and are distributed in the northern, western and centralpart of the microwatershed with major limitation of rooting depth.

Table 7.29 Land suitability criteria for Marigold

Crop requirement			**Rating**			
Soil –site characteristics		**Unit**	**Highly suitable(S1)**	**Moderately suitable(S2)**	**Marginally suitable(S3)**	**Not suitable(N)**
Climate	Temperature in growing season	^{0}C	18-23	17-15 24-35	35-40 10-14	>40 <10
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Imperfectly drained	Poorly drained
Nutrient availability	Texture	Class	l ,sl, scl, cl, sil	sicl, sc, sic,c	c	ls, s
	pH	1:2.5	7.0-7.5	5.5-5.9;7.6-8.5	<5;>8.5	-
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strongly calcareous	-
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	>35	-
Soil toxicity	Salinity	ds/m	Non saline	Slightly	Strongly	-
	Sodicity (ESP)	%	<10	10-15	>15	-
Erosion	Slope	%	1-3	3-5	5-10	-

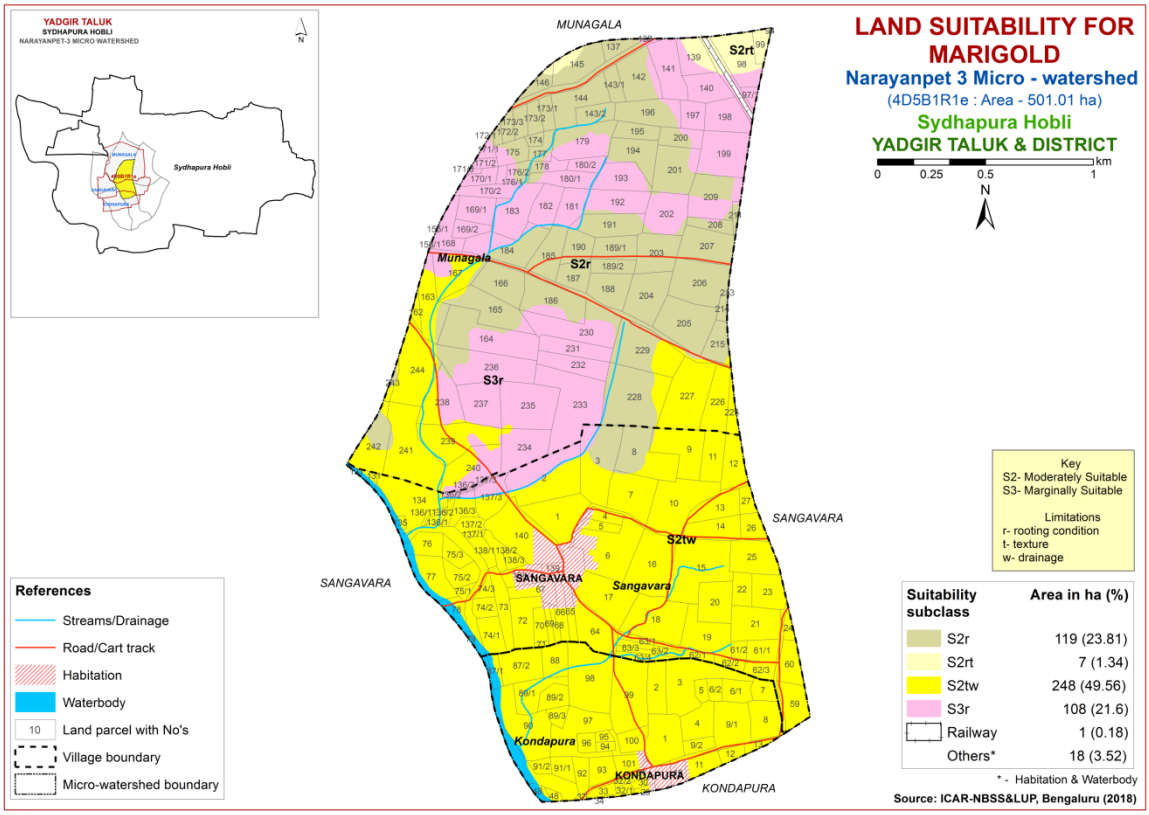


Fig. 7.28 Land Suitability map of Marigold

7.29 Land Suitability for Chrysanthemum (*Dendranthema grandiflora*)

Chrysanthemum is one of the most important flower crop grown in an area of 4978 ha in almost all the districts of the State. The crop requirements (Table 7.30) for growing chrysanthemum were matched with the soil-site characteristics (Table 7.1) and a land suitability map for growing chrysanthemum was generated. The area extent and their geographical distribution of different suitability subclasses in the microwatershed are given in Figure 7.29.

Table 7.30 Land suitability criteria for Chrysanthemum

Crop requirement			Rating			
Soil –site characteristics		Unit	Highly suitable(S1)	Moderately suitable(S2)	Marginally suitable(S3)	Not suitable(N)
Climate	Temperature in growing season		18-23	17-15 24-35	35-40 10-14	>40 <10
Soil aeration	Soil drainage	Class	Well drained	Moderately well drained	Imperfectly drained	Poorly drained
Nutrient availability	Texture	Class	l,sl,scl,cl,sil	sicl,sc,sic,c	c	ls, s
	pH	1:2.5	7.0-7.5	5.5-5.9;7.6-8.5	<5;>8.5	
	$CaCO_3$ in root zone	%	Non calcareous	Slightly calcareous	Strongly calcareous	
Rooting conditions	Soil depth	cm	>75	50-75	25-50	<25
	Gravel content	% vol.	<15	15-35	>35	
Soil toxicity	Salinity	ds/m	Non saline	slightly	strongly	
	Sodicity(ESP)	%	<10	10-15	>15	-
Erosion	Slope	%	1-3	3-5	5-10	

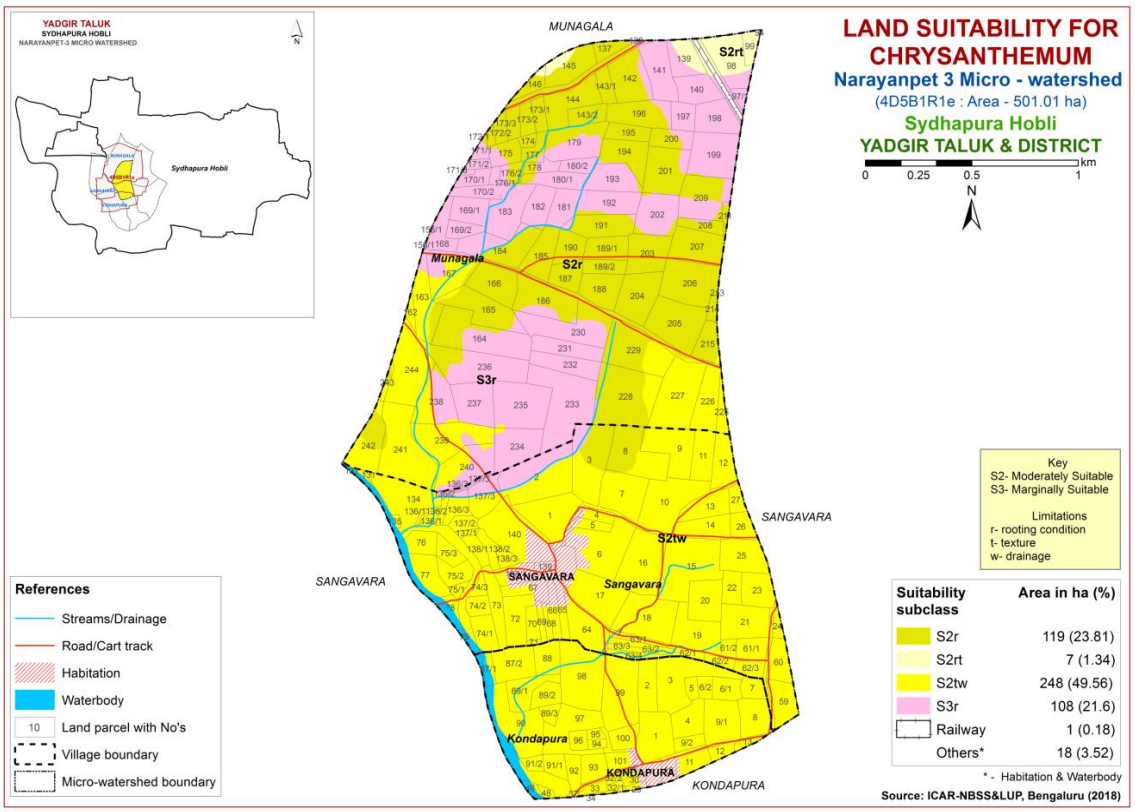


Fig. 7.29 Land Suitability map of Chrysanthemum

No highly suitable (Class S1) lands are available for growing chrysanthemum. Maximum area of about 374 ha (74%) is moderately suitable (Class S2) for growing chrysanthemum and are distributed in all parts of the microwatershed. They have minor limitations of drainage, texture and rooting depth. Marginally suitable lands (Class S3)occur in an area of about 108 ha (22%) and are distributed in the northern, western and central part of the microwatershed with major limitation of rooting depth.

7.30 Land Management units (LMUs)

The 15 soil map units identified in Narayanpet-3 microwatershed have been grouped into 4 Land Management units (LMU's) for the purpose of preparing a Proposed Crop Plan. Land Management units are grouped based on the similarities in respect of the type of soil, the depth of the soil, the surface soil texture, gravel content, AWC, slope, erosion etc. and a Land Management units map (Fig. 7.30) has been generated. These Land Management units are expected to behave similarly for a given level of management.

The map units that have been grouped into 4 Land Management units along with brief description of soil and site characteristics are given below.

LMU NO.	Soil map units	Soil and site characteristics
1	95.HGNmB2 86.KDRhA1 87.KDRiB2 88.KDRiB3 80.MGLcB2 81.MGLcB3 77.RHNcB2 79.RHNmB2 91.SWRmB2	Moderately deep to very deep (75 to >150 cm), black clayeysoils, 0-3% slopes, slight to moderate and severe erosion
2	20.JNKcB2 75.BLDiB1g1 76.BLDmB2	Moderately shallow (50-75 cm), black gravelly clayey soils, 1-3% slope, slight to moderate erosion
3	27.YLRbB2	Moderately shallow (50-75 cm), red loamy sand soils, 1-3% slope, moderate erosion
4	68.KYTcB2 69.KYTmB1	Shallow (25-50 cm), clayey soils, 1-3% slope, slight to moderate erosion

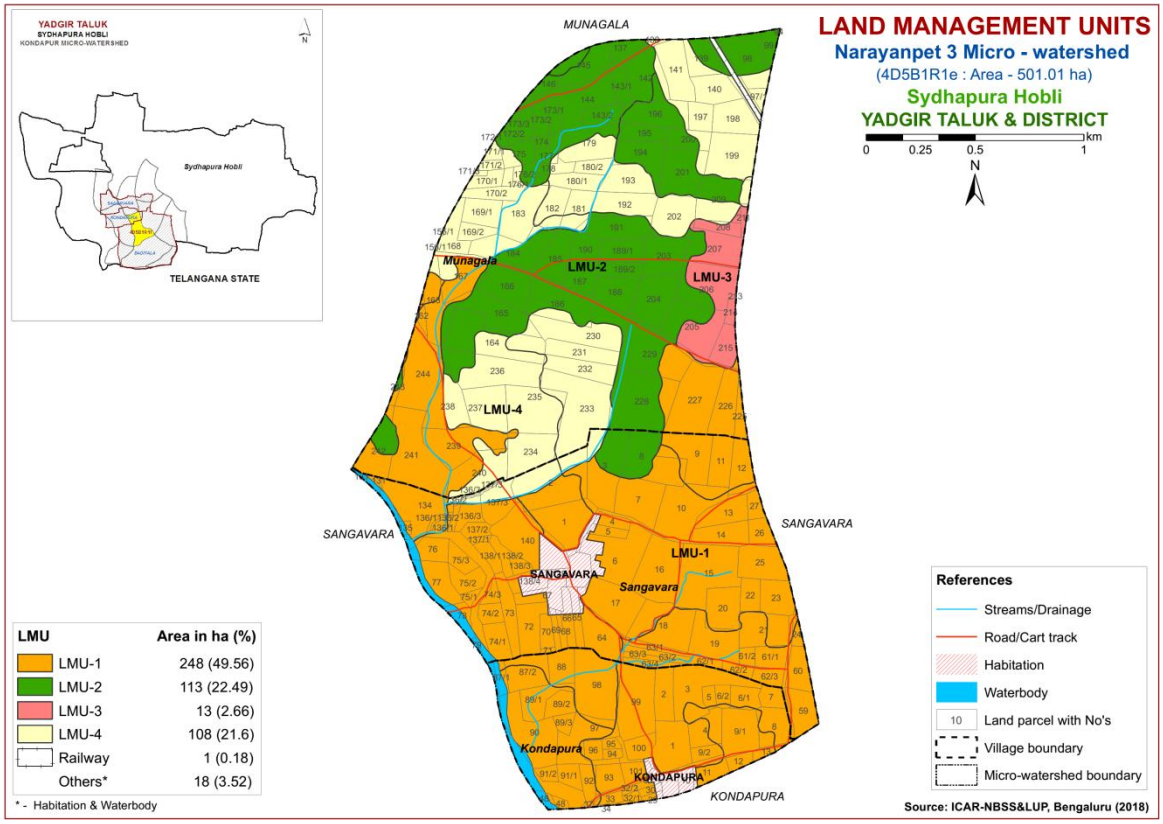


Fig. 7.30 Land Management units Map Narayanpet-3 Microwatershed

7.31 Proposed Crop Plan for Narayanpet-3 Microwatershed

After assessing the land suitability for the 29crops, the proposed crop plan has been prepared for the 4 identified LMUs by considering only the highly (Class S1) and moderately (Class S2) suitable lands for each of the 29 crops. The resultant proposed crop plan is presented below in Table 7.31.

Table 7.31 Proposed Crop Plan for Narayanpet-3Microwatershed

Proposed LMU	Soil Map Units	Survey Number	Soil and site characteristics	Field Crops	Horticulture Crops	Suitable Interventions
1	95.HGNmB2 86.KDRhA1 87.KDRiB2 88.KDRiB3 80.MGLcB2 81.MGLcB3 77.RHNcB2 79.RHNmB2 91.SWRmB2	**Kondapura:**1,2,3,4,5,6/1,6/2,7,8,9/1,9/2,11, 12,13,29,30,31,32/1,32/2,33,34,37,48,87/2,8 8,89/1,89/2,89/3,90,91/1,91/2,92,93,94,95,96 ,97,98,99,100,101, **Munagala:**162,163,167,225,226,227,239,24 1,242,243,244 **Sangavara:**1,2,3,4,5,6,9,10,11,12,13,14,15,1 6,17,18,19,20,21,22,23,24,25,26,27,59,60,61 /1,61/2,62/1,62/2,62/3,63/1,63/2,63/3,63/4,6 4,65,66,68,69,7,70,71,72,73,74/1,74/2,74/3,7 5/1,75/2,75/3,76,77,134,135,136/1,136/2,136 /3,137/1,137/2,137/3,138/1,138/2,138/3, 140	Moderately deep to very deep (75 to >150 cm), black clayeysoils, 0-3% slopes, slight to moderate and severe erosion	Sunflower, Sorghum, Soybean, Cotton, Bengal gram, Safflower, Linseed, Bajra	**Fruit crops:** Lime, Pomegranate, Jamun, Musambi, Amla, Custard apple, Tamarind **Vegetables:** Chilli, Drumstick, Coriander, Bhendi **Flowers:** Marigold, Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, Mulching, suitable soil and water conservation practices
2	20.JNKcB2 75.BLDiB1g1 76.BLDmB2	**Munagala:**94,98,99,137,139,142,143/1,143/ 2,144,145,146,164,165,166,172/1,172/2,173/ 1,173/2,173/3,174,175,176/2,177,184,185,18 6,187,188,189/1,189/2,190,191,194,195,196, 200,201,203,204,228,229 **Sangavara:** 8	Moderately shallow (50-75 cm), black gravelly clay soils, 1-3% slope, slight to moderate erosion	Bengal gram, Sorghum, Bajra, Safflower, Linseed, Coriander	**Fruit crops:** Amla, Custard apple, Lime, Cashew, Musambi **Vegetables:**Coriand er, Bhendi **Flowers:** Marigold, Jasmine Chrysanthemum	Application of FYM, Biofertilizers and micronutrients, drip irrigation, mulching, suitable soil and water conservation practices
3	27.YLRbB2	**Munagala:**205,206,207,208,211,213,214,21 5	Moderately shallow (50-75 cm), red loamy sand soils , 1-3% slope, moderate erosion	Maize, Bajra, Red gram, Green gram, Black gram, Cowpea, Horse gram, Castor	**Fruit crops:** Amla, Custard apple **Vegetables:** Tomato, Chilli **Flowers:** Marigold,Chrysanthe mum	Drip irrigation, mulching, suitable soil and water conservation practices (Crescent Bunding with Catch Pit etc)

4	68.KYTcB2 69.KYTmB1	**Munagala:**97/1,138,140,141,155/1,156/1,168,169/1,169/2,170/1,170/2,171/1,171/2,171/3,176/1,178,179,180/1,180/2,181,182,183,192,193,197,198,199,202,209,230,231,232,233,234,235,236,237,238,240	Shallow (25-50 cm), clayey soils , 1-3% slope, slight to moderate erosion	Green gram, Black gram, Horse gram	**Agri-Silvi-Pasture:** Custard apple, Amla, Hybrid Napier, Styloxanthes hamata, Glyricidia, Styloxanthes scabra	Use of short duration varieties, sowing across the slope, drip irrigation and mulching is recommended

Chapter 8

SOIL HEALTH MANAGEMENT

8.1 Soil Health

Soil health is basic to plant health and plant health is basic to human and bovine health. Soil is fundamental to crop production. Without soil, no food could be produced nor would livestock be fed on a large scale. Because it is finite and fragile, soil is a precious resource that requires special care from its users.

Soil health or the capacity of the soil to function is critical to human survival. Soil health has been defined as: "The capacity of the soil to function as a living system without adverse effect on the ecosystem". Healthy soils maintain a diverse community of soil organisms that help to form beneficial symbiotic associations with plant roots, recycle essential plant nutrients, improve soil structure with positive repercussions for soil, water and nutrient holding capacity and ultimately improve crop production and also contribute to mitigating climate change by maintaining or increasing its carbon content.

Functional interactions of soil biota with organic and inorganic components, air and water determine a soil's potential to store and release nutrients and water to plants and to promote and sustain plant growth. Thus, maintaining soil health is vital to crop production and conserve soil resource base for sustaining agriculture.

The most important characteristics of a healthy soil are

- Good soil tilth
- Sufficient soil depth
- Good water storage and good drainage
- Adequate supply, but not excess of nutrients
- Large population of beneficial organisms
- Small proportion of plant pathogens and insect pests
- Low weed pressure
- Free of chemicals and toxins that may harm the crop
- Resistance to degradation
- Resilience when unfavorable conditions occur

Characteristics of Narayanpet-3Microwatershed

- The soil phases identified in the microwatershed belonged to the soil series of KYT 108 ha (22%), JNK 106 ha (21%), KDR 105 ha (21%), RHN 88 ha (17%), HGN 54 ha (11%), YLR 13 ha (3%), BLD 7 ha (1%), MGL 1 ha (0.22%) and SWR 0.003 ha (0.0007%).
- As per land capability classification,entire area of the microwatershed falls under arable land category (Class II& III). The major limitations identified in the arable lands were soil anderosion.
- On the basis of soil reaction, about 33 ha (7%) is neutral (pH 6.5-7.3), 146 ha (29%) is slightly alkaline (pH 7.3-7.8),177 ha (35%) is moderately alkaline (pH 7.8-8.4),109 ha

(22%) is strongly alkaline (pH 8.4-9.0) and 18 ha (4%) is very strongly alkaline (pH>9.0).
.

Soil Health Management

The following actions are required to improve the current land husbandry practices that provide a sound basis for the successful adoption of sustainable crop production system.

Neutral soils

1. Regular addition of organic manure, green manuring, green leaf manuring, crop residue incorporation and mulching needs to be taken up to improve the soil organic matter status.
2. Application of biofertilizers, (Azospirullum, Azotobacter, Rhizobium).
3. Application of 100 per cent RDF.
4. Need based micronutrient applications.

Alkaline soils

(Slightly alkaline to moderately alkaline soils)

1. Regular addition of organic manure, green manuring, green leaf manuring, crop residue incorporation and mulching needs to be taken up to improve the soil organic matter status.
2. Application of biofertilizers (Azospirullum, Azatobacter, Rhizobium).
3. Application of 25% extra N and P (125 % RDN&P).
4. Application of $ZnSO_4$ – 12.5 kg/ha (once in three years).
5. Application of Boron – 5kg/ha (once in three years).

Besides the above recommendations, the best transfer of technology options are also to be adopted.

Soil Degradation

Soil erosion is one of the major factor affecting the soil health in the microwatershed. An area of about 433 ha (86%) is suffering from moderateerosion and 19 ha (4%) from severe erosion. These areas need immediate soil and water conservation and, other land development and land husbandry practices for restoring soil health.

Dissemination of Information and Communication ofBenefits

Any large scale implementation of soil health management requires that supporting information is made available widely, particularly through channels familiar to farmers and extension workers. Given the very high priority attached to soil-health especially by the Central Government on issuing Soil-Health Cards to all the farmers, media outlets like Regional, State and National Newspapers, Radio and Dooradarshan programs in local languages but also modern information and communication technologies such as Cellular phones and the Internet, which can be much more effective in reaching the younger farmers.

Inputs for Net Planning (Saturation Plan) and Interventions needed

Net planning (Saturation Plan) in IWMP is focusing on preparation of

1. Soil and Water Conservation Plan for each plot or farm.
2. Productivity enhancement measures/ interventions for existing crops/livestock/other farm enterprises.
3. Diversification of farming mainly with perennial horticultural crops and livestock.
4. Improving livelihood opportunities and income generating activities.

In this connection, how various outputs of Sujala-III are of use in addressing these objectives of Net Planning (Saturation Plan) are briefly presented below.

- **Soil Depth:** The depth of a soil decides the amount of moisture and nutrients it can hold, what crops can be taken up or not, depending on the rooting depth and the length of growing period available for raising any crop. Deeper the soil, better for a wide variety of crops. If sufficient depth is not available for growing deep rooted crops, either choose medium or short duration crops or deeper planting pits need to be opened and additional good quality soil brought from outside has to be filled into the planting pits.
- **Surface Soil Texture:** Lighter soil texture in the top soil means, better rain water infiltration, less run-off and soil moisture conservation, less capillary rise and less evaporation losses. Lighter surface textured soils are amenable to good soil tilth and are highly suitable for crops like groundnut, root vegetables (carrot, raddish, potato etc) but not ideal for crops that need stagnant water like lowland paddy. Heavy textured soils are poor in water infiltration and percolation. They are prone for sheet erosion; such soils can be improved by sand mulching. The technology that is developed by the AICRP-Dryland Agriculture, Vijayapura, Karnataka can be adopted.
- **Gravelliness:** More gravel content is favorable for run-off harvesting but poor in soil moisture storage and nutrient availability. It is a significant parameter that decides the kind of crop to be raised.
- **Land Capability Classification:** The land capability map shows the areas suitable and not suitable for agriculture and the major constraints in each of the plot/survey number. Hence, one can decide what kind of enterprise is possible in each of these units. In general soil, erosion and drainageare the major constraints in Narayanpet-3microwatershed.
- **Organic Carbon:** The OC content (an index of available Nitrogen) is low (<0.5%) in 13 ha (3%), medium (0.5-0.75%) in about 268 ha (54%)andhigh (>0.75%) in 201 ha (40%). The areas that are low and medium in OC needs to be further improved by applying farm yard manure and rotating crops with cereals and legumes or mixed cropping.
- **Promoting green manuring:** Growing of green manuring crops costs Rs. 1250/ha (green manuring seeds) and about Rs. 2000/ha towards cultivation that totals to Rs. 3250/- per ha. On the other hand, application of organic manure @ 10 tons/ha costs Rs. 5000/ha. The practice needs to be continued for 2-3 years or more. Nitrogen fertilizer needs to be supplemented by 25% in addition to the recommended level in 281 ha area where OC is

low (<0.5%) and medium (0.5-0.75%). For example, for rainfed maize, recommended level is 50 kg N per ha and an additional 12 kg /ha needs to be applied for all the crops grown in these plots.

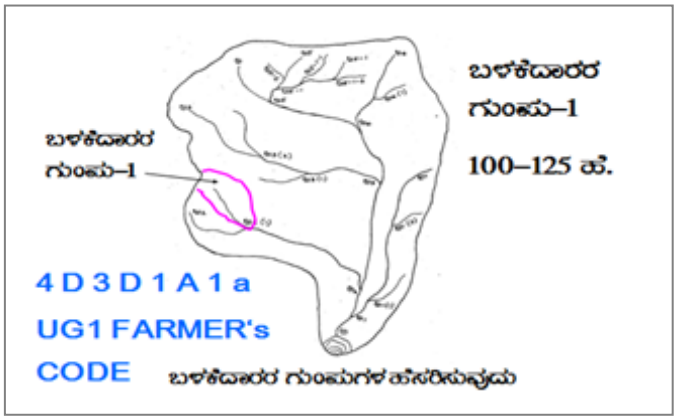
- **Available Phosphorus**: Available Phosphorus is low (<23 kg/ha) in an area of 71 ha (14%) andmedium (23-57 kg/ha) in an area of 412 ha (82%). For all the crops, 25% additional P needs to be applied where available P is low and medium.
- **Available Potassium:**Available Potassium is medium (145-337 kg/ha) in anarea of 316 ha (63%) and high (>337 kg/ha) in an area of 167 ha (33%) of the microwatershed. All the plots, where available potassium is lowand medium, for all the crops, additional 25 % potassium may be applied.
- **Available Sulphur:** Available sulphur is a very critical nutrient for oilseed crops, it is low in 212 ha (42%) andmedium in 271 ha (54%). Low and medium areas need to be applied with magnesium sulphate or gypsum or Factamphos (p) fertilizer (13% sulphur) for 2-3 years for the deficiency to be corrected.
- **Available Boron:** An area of 182ha (36%) is low, 268ha (54%)is medium and 32ha (6%) is high. For areas that arelow and medium,application of sodium borate @ 10 kg/ha as soil application or 0.2 % borax as foliar spray is recommended.
- **Available Iron:**Anarea of about 98 ha (19%) is deficient and 385 ha (77%) inthe microwatershedis sufficient in available iron.To manage iron deficiency, iron sulphate @ 25 kg/ha needs to be applied for 2-3 years.
- **Available Manganese:**An entire area of about 483 ha (96%) in the microwatershed is sufficient in available manganese.
- **Available Copper:** An entire area of about 483 ha (96%) in the microwatershedis sufficientin available copper.
- **Available Zinc:**An entire area of about 483 ha (96%) in the microwatershedisdeficient inavailable zinc content. Application of zinc sulphate @25 kg/ha is to be recommended for these areas**.**
- **Soil Alkalinity:** The entire microwatershedarea of450ha (90%) has soils that are slightly tovery strongly alkaline. These areas need application of gypsum and wherever calcium is in excess, iron pyrites and element sulphur can be recommended. Management practices like treating repeatedly with good quality water to drain out the excess salts and provision of subsurface drainage and growing of salt tolerant crops like Casuarina, Acacia, Neem, Ber etc, are recommended.
- **Land Suitability for various crops:** Areas that are highly, moderately and marginally suitable and also not suitable for growing various crops are indicated. Along with the suitability, various constraints that are limiting the productivity are also indicated. For example, in case of cotton, gravel content, rooting depth and salinity/alkalinity are the major constraints in various plots. With suitable management interventions, the productivity can be enhanced. In order to increase the water holding capacity of light textured soils, growing of green manure crops and application of organic manure is recommended.

Chapter 9

SOIL AND WATER CONSERVATION TREATMENT PLAN

For preparing soil and water conservation treatment plan for Narayanpet-3microwatershed, the land resource inventory database generated under Sujala-III project has been transformed as information through series of interpretative (thematic) maps using soil phase map as a base. The various thematic maps (1:7920 scale) generated were

- Soil depth
- Surface soil texture
- Available water capacity
- Soil slope
- Soil gravelliness
- Land capability
- Present land use and land cover
- Crop suitability
- Rainfall
- Hydrology
- Water Resources
- Socio-economic data



- Contour plan with existing features- network of waterways, pothissa boundaries, cut up/ minor terraces etc.
- Cadastral map (1:7920 scale)
- Satellite imagery (1:7920 scale)

Apart from these,Hand Level/ Hydro Marker/ Dumpy Level/ Total Station and Kathedars' List to be collected.

Steps for Survey and Preparation of Treatment Plan

The boundaries of Land User Groups' and Survey No. boundaries are traced in the field.

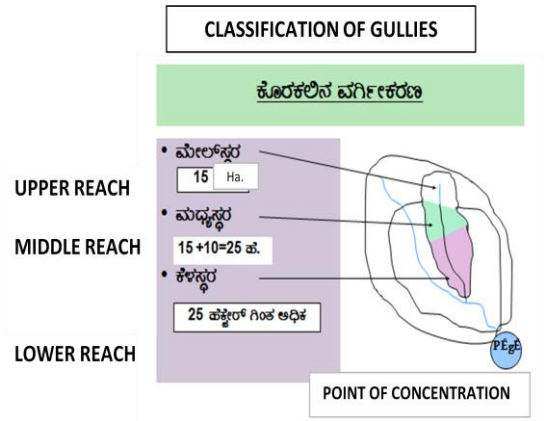
- Naming of user groups and farmers
- Identification of arable and non arable lands
- Identification of drainage lines and gullies
- Identification of non treatable areas
- Identification of priority areas in the arable lands
- Treatment plan for arable lands
- Location of water harvesting and recharge structures

9.1 Treatment Plan

The treatment plan recommended for arable lands is briefly described below

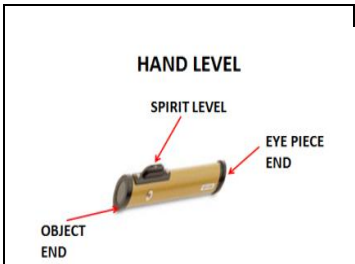
9.1.1 Arable Land Treatment

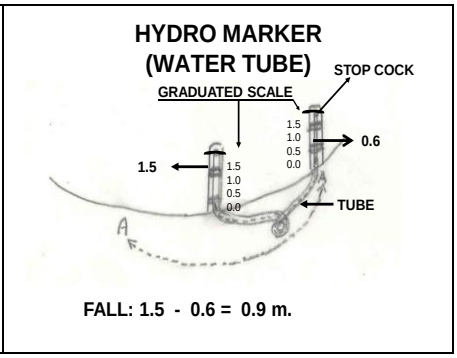
A. BUNDING

Steps for Survey and Preparation of Treatment Plan		USER GROUP-1
• Cadastral map (1:7920 scale) is enlarged to a scale of 1:2500 scale • Existing network of waterways, pothissa boundaries, grass belts, natural drainage lines/ watercourse, cut ups/ terraces are marked on the cadastral map to the scale • Drainage lines are demarcated into		
Small gullies	(up to 5 ha catchment)	
Medium gullies	(5-15 ha catchment)	
Ravines	(15-25 ha catchment) and	
Halla/Nala	(more than 25ha catchment)	

Measurement of Land Slope

Land slope is estimated or determined by the study and interpretation of contours or by measurement in the field using simple instruments like Hand Level or Hydromarker.





Vertical and Horizontal intervals between bunds as recommended by the Watershed Development Department.

Slope percentage	Vertical interval (m)	Corresponding Horizontal Distance (m)
2 - 3%	0.6	24
3 - 4%	0.9	21
4 - 5%	0.9	21
5 - 6%	1.2	21
6 - 7%	1.2	21

Note:(i) The above intervals are maximum.

(ii) Considering the slope class and erosion status (A1... A=0-1 % slope, 1= slight erosion)the intervals have to be decided.

Bund length recording:Considering the contour plan and the existing grass belts/partitions, the bunds are aligned and lengths are measured.

Section of the Bund

Bund section is decided considering the soil texture class and gravelliness class ($bg_{0...}$ b=loamy sand, g_0 = <15% gravel). The recommended Sections for different soils are given below.

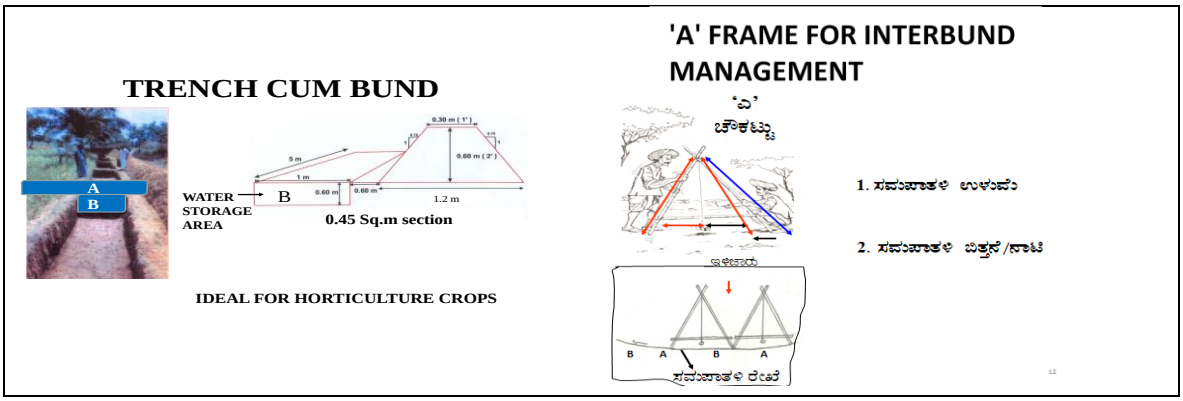
Recommended Bund Section

Top width (m)	Base width (m)	Height (m)	Side slope (Z:1;H:V)	Cross section (sq m)	Soil Texture	Remarks
0.3	0.9	0.3	01:01	0.18	Sandy loam	Vegetative bund
0.3	1.2	0.3	1.5:1	0.225	Sandy clay	
0.3	1.2	0.5	0.9:1	0.375	Red gravelly soils	
0.3	1.2	0.6	0.75:1	0.45		
0.3	1.5	0.6	01:01	0.54	Red sandy loam	
0.3	2.1	0.6	1.5:1	0.72	Very shallow black clayey soils	
0.45	2	0.75	01:01	0.92		
0.45	2.4	0.75	1.3:1	1.07	Shallow black clayey soils	
0.6	3.1	0.7	1.78:1	1.29	Medium black clayey soils	
0.5	3	0.85	1.47:1	1.49		

Formation of Trench cum Bund

Dimensions of the Borrow Pits/Trenches to be excavated (machinery are decided considering the Bund Section).

Details of Borrow Pit dimensions are given below:



Size of Borrow Pits/ Trench recommended for Trench cum Bund (by machinery)

Bund section	Bund length	Earth quantity	Pit				Berm (pit to pit)	Soil depth class
m^2	m	m^3	L(m)	W(m)	D(m)	Quantity (m^3)	m	
0.375	6	2.25	5.85	0.85	0.45	2.24	0.15	Shallow
0.45	6	2.7	5.4	1.2	0.43	2.79	0.6	Shallow
0.45	6	2.7	5	0.85	0.65	2.76	1	Moderately Shallow
0.54	5.6	3.02	5.5	0.85	0.7	3.27	0.1	Moderately shallow
0.54	5.5	2.97	5	1.2	0.5	3	0.5	Shallow
0.72	6.2	4.46	6	1.2	0.7	5.04	0.2	Moderately shallow
0.72	5.2	3.74	5.1	0.85	0.9	3.9	0.1	Moderately deep

B. Water Ways

1. Existing waterways are marked on the cadastral map (1:7920 scale) andtheir dimensions are recorded.
2. Considering the contour plan of the MWS, additional waterways/ modernization of the existing ones can be thought of.
3. The design details are given in the Manual.

C. Farm Ponds

Waterways and the catchment area will give an indication on the size of the Farm Pond. Location of the pond can be decided based on the contour plan/ field condition and farmers' need/desire.

D. Diversion Channel

Existing EPT/ CPT are marked on the cadastral map. Looking to the need, these can be modernized or fresh diversion channel can be proposed and runoff from this can be stored in *Gokatte*/ Recharge ponds.

9.1.2 Non-Arable Land Treatment

Depending on the gravelliness and crops preferred by the farmers, the concerned authorities can decide appropriate treatment plan. The recommended treatments may be Contour Trench, Staggered Trench, Crescent Bund, Boulder Bund or Pebble Bund.

9.1.3 Treatment of Natural Water Course/ Drainage Lines

a) The cadastral map has to be updated as regards the network of drainage lines (gullies/ *nalas/ hallas*) and existing structures are marked to the scale and storage capacity of the existing water bodies are documented (Fig. 9.1).

b) The drainage line will be demarcated into Upper Reach, Middle Reach and Lower Reach.

c) Considering the Catchment, *Nala* bed and bank conditions, suitable structures are decided.

d) Number of storage structures (Check dam/ *Nala* bund/ Percolation tank) will be decided considering the commitments and available runoff from water budgeting and quality of water in the wells and site suitability.

e) Detailed Levelling Survey using Dumpy Level / Total Station has to be carried out to arrive at the site-specific designs as shown in the Manual.

f) The location of ground water recharge structures are decided by examining the lineaments and fracture zones from geological maps.

g) Rainfall intensity data of the nearest Rain Gauge Station is considered for Hydrologic Designs.

h) Silt load to the Storage/Recharge Structures is reduced by providing vegetative, boulder and earthen checks in the natural water course. Location and design details are given in the Manual.

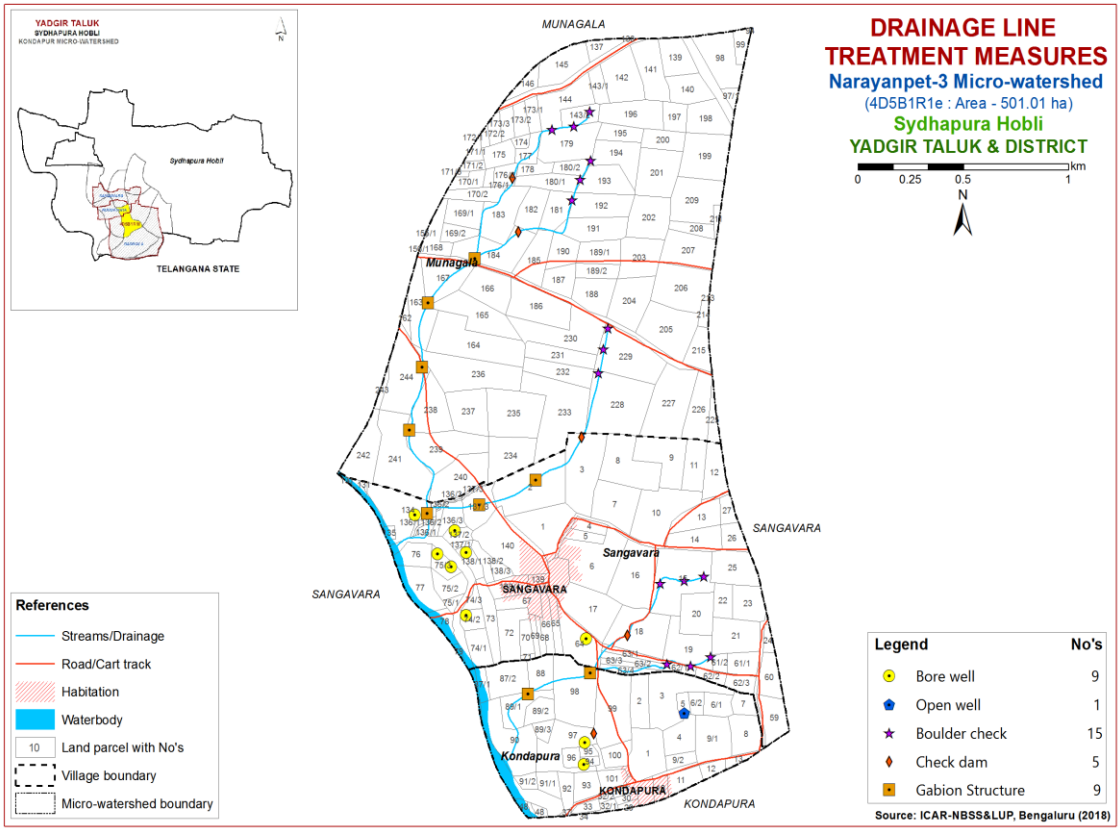


Fig. 9.1Drainage line treatment map of Narayanpet-3Microwatershed

9.2 Recommended Soil and Water Conservation Measures

The appropriate conservation structures best suited for each of the land parcel/ survey number (Appendix-I) are selected based on the slope per cent, severity of erosion, amount of rainfall, land use and soil type. The different kinds of conservation structures recommended are:

1. Graded / Strengthening of Bunds
2. Trench cum Bunds (TCB)
3. Trench cum Bunds / Strengthening
4. Crescent Bunds

A map (Fig. 9.2) showing soil and water conservation plan with different kinds of structures recommended has been prepared which shows the spatial distribution and extent of area. Anarea of about13 ha (3%) requires Trench cum Bunding,461 ha (92%) needs Graded Bundingand 8 ha (2%) requires strengthening of existing bunds.

The conservation plan prepared may be presented to all the stakeholders including farmers and after considering their suggestions, the conservation plan for the microwatershed may be finalised in a participatory approach.

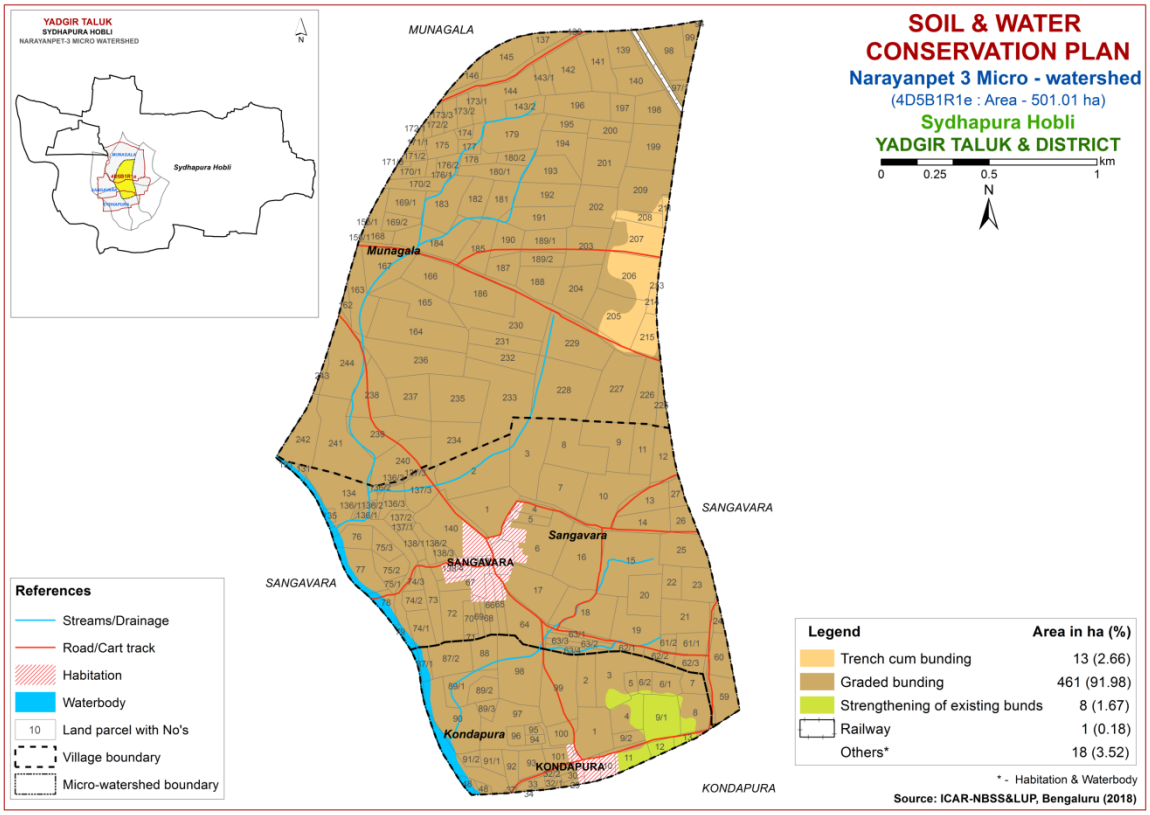


Fig. 9.2 Soil and Water Conservation Plan map of Narayanpet-3Microwatershed

9.3 Greening of Microwatershed

As part of the greening programme in the watersheds, it is envisaged to plant a variety of horticultural and other tree plants that are edible, economical and produce lot of biomass which helps to restore the ecological balance in the watersheds. The lands that

are suitable for greening programme are non-arable lands (land capability classes V, VI VII and VIII) and also the lands that are not suitable or marginally suitable and field bunds for growing annual and perennial crops. The method of planting these trees is given below.

It is recommended to open pits during the 1st week of March along the contour and heap the dugout soil on the lower side of the slope in order to harness the flowing water and facilitate weathering of soil in the pit. Exposure of soil in the pit also prevents spread of pests and diseases due to scorching sun rays. The pits should be filled with mixture of soil and organic manure during the second week of April and keep ready with sufficiently tall seedlings produced either in poly bags or in root trainer nurseries so that planting can be done during the 2nd or 3rd week of April depending on the rainfall.

The tree species suitable for the area considering rainfall, temperature and adaptability is listed below; waterlogged areas are recommended to be planted with species like Nerale (*Sizyziumcumini*) and Bamboo. Dry areas are to be planted with species like Honge, Bevu, Seetaphal*etc*.

Dry Deciduous Species			Temp (°C)	Rainfall (mm)
1.	Bevu	*Azadiracta indica*	21–32	400 –1,200
2.	Tapasi	*Holoptelia integrifolia*	20-30	500 - 1000
3.	Seetaphal	*Anona Squamosa*	20-40	400 - 1000
4.	Honge	*Pongamia pinnata*	20 -50	500– 2,500
5.	Kamara	*Hardwikia binata*	25 -35	400 - 1000
6.	Bage	*Albezzia lebbek*	20 - 45	500 - 1000
7.	Ficus	*Ficus bengalensis*	20 - 50	500–2,500
8.	Sisso	*Dalbargia Sissoo*	20 - 50	500 -2000
9.	Ailanthus	*Ailanthus excelsa*	20 - 50	500 - 1000
10.	Hale	*Wrightia tinctoria*	25 - 45	500 - 1000
11.	Uded	*Steriospermum chelanoides*	25 - 45	500 -2000
12.	Dhupa	*Boswella Serrata*	20 - 40	500 - 2000
13.	Nelli	*Emblica Officinalis*	20 - 50	500 -1500
14.	Honne	*Pterocarpus marsupium*	20 - 40	500 - 2000
Moist Deciduous Species			**Temp (°C)**	**Rainfall (mm)**
15.	Teak	*Tectona grandis*	20 - 50	500-5000
16.	Nandi	*Legarstroemia lanceolata*	20 - 40	500 - 4000
17.	Honne	*Pterocarpus marsupium*	20 - 40	500 - 3000
18.	Mathi	*Terminalia alata*	20 -50	500 - 2000
19.	Shivane	*Gmelina arboria*	20 -50	500 -2000
20.	Kindal	*T.Paniculata*	20 - 40	500 - 1500
21.	Beete	*Dalbargia latifolia*	20 - 40	500 - 1500
22.	Tare	*T. belerica*	20 - 40	500 - 2000
23.	Bamboo	*Bambusa arundinasia*	20 - 40	500 - 2500
24.	Bamboo	*Dendrocalamus strictus*	20 – 40	500 – 2500
25.	Muthuga	*Butea monosperma*	20 - 40	400 - 1500
26.	Hippe	*Madhuca latifolia*	20 - 40	500 - 2000
27.	Sandal	*Santalum album*	20 - 50	400 - 1000
28.	Nelli	*Emblica officinalis*	20 - 40	500 - 2000
29.	Nerale	*Sizyzium cumini*	20 - 40	500 - 2000
30.	Dhaman	*Grevia tilifolia*	20 - 40	500 - 2000
31.	Kaval	*Careya arborea*	20 - 40	500 - 2000
32.	Harada	*Terminalia chebula*	20 - 40	500 - 2000

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Appendix I

Narayanpet-3 Microwatershed

Soil Phase Information

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Kondapura	1	3.64	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Kondapura	2	2.14	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Redgram (Gn+Rg)	Not Available	IIes	Graded bunding
Kondapura	3	5.1	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Paddy+ Redgram (Gn+Pd+Rg)	Not Available	IIes	Graded bunding
Kondapura	4	2.18	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Kondapura	5	0.59	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	1 Open well	IIes	Graded bunding
Kondapura	6/1	1.38	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Kondapura	6/2	0.71	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kondapura	7	1.09	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kondapura	8	2.51	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kondapura	9/1	3.44	KDRhA1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram+Cotton (Rg+Ct)	Not Available	IIs	Strengthening of existing bunds
Kondapura	9/2	0.87	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Kondapura	10	0.72	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Kondapura	11	1.41	KDRhA1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Redgram+Cotton (Rg+Ct)	Not Available	IIs	Strengthening of existing bunds
Kondapura	12	0.74	KDRhA1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Jowar+Redgram (Jw+Rg)	Not Available	IIs	Strengthening of existing bunds
Kondapura	13	0.57	KDRhA1	LMU-1	Deep (100-150 cm)	Sandy clay loam	Non gravelly (<15%)	Very high (>200 mm/m)	Nearly level (0-1%)	Slight	Cotton (Ct)	Not Available	IIs	Strengthening of existing bunds
Kondapura	29	0.28	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Kondapura	30	0.39	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kondapura	31	0.29	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kondapura	32/1	0.41	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Kondapura	32/2	0.2	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Kondapura	33	0.55	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Kondapura	34	0.09	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kondapura	37	0.14	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Fallow land (Fl)	Not Available	IIIes	Graded bunding
Kondapura	48	0.66	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Fallow land (Fl)	Not Available	IIIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Kondapura	87/1	0.78	Waterbody	Others	Others	Others	Others	Others	Others	Others	Not Available (NA)	Not Available	Others	Others
Kondapura	87/2	2.93	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Kondapura	88	1.82	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kondapura	89/1	2.27	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Scrub land (Sl)	Not Available	IIIes	Graded bunding
Kondapura	89/2	1.41	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Scrub land (Sl)	Not Available	IIIes	Graded bunding
Kondapura	89/3	0.7	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Scrub land (Sl)	Not Available	IIIes	Graded bunding
Kondapura	90	5.18	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Scrub land (Sl)	Not Available	IIIes	Graded bunding
Kondapura	91/1	1.07	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Cotton (Ct)	Not Available	IIIes	Graded bunding
Kondapura	91/2	0.63	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Scrub land (Sl)	Not Available	IIIes	Graded bunding
Kondapura	92	1.06	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Redgram (Rg)	Not Available	IIIes	Graded bunding
Kondapura	93	1.49	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Kondapura	94	0.4	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	1 Bore well	IIes	Graded bunding
Kondapura	95	0.39	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Kondapura	96	0.75	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Kondapura	97	4.11	KDRiB3	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Severe	Redgram+Paddy (Rg+Pd)	1 Bore well,1 Check dam	IIIes	Graded bunding
Kondapura	98	5.88	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton+ Jowar (Rg+Ct+Jw)	Not Available	IIes	Graded bunding
Kondapura	99	5.45	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Redgram (Gn+Rg)	Not Available	IIes	Graded bunding
Kondapura	100	1.33	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Kondapura	101	1.07	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	94	0.03	BLDmB2	LMU-2	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	97/1	0.5	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	98	3.84	BLDmB2	LMU-2	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Munagala	99	0.99	BLDmB2	LMU-2	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	137	1.06	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Munagala	138	0	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	139	2.4	BLDmB2	LMU-2	Moderately shallow (50-75 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Munagala	140	2.43	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	141	3.36	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	142	3.77	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Munagala	143/1	1.11	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	143/2	1.5	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	144	3.48	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	145	3.16	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	146	1	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Munagala	155/1	0.04	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	156/1	0.03	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	162	0.48	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	163	3.35	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Munagala	164	6.55	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	165	4.14	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Munagala	166	3.3	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	167	3.61	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	168	1.97	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Munagala	169/1	2.06	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Munagala	169/2	1.11	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	170/1	1.04	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	170/2	1.58	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	171/1	0.57	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	171/2	0.51	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	171/3	0.15	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	172/1	0.34	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	172/2	0.76	JNKcB2	LMU-2	Moderately shallow	Sandy	Non gravelly	Low (51-100	Very gently	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
					(50-75 cm)	loam	(<15%)	mm/m)	sloping (1-3%)					
Munagala	173/1	0.92	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	173/2	0.97	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	173/3	0.93	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	174	0.46	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	175	1.55	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	176/1	0.38	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	176/2	1.02	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	177	1.11	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	178	0.89	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	179	4.19	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	180/1	2.06	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	180/2	1.09	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	181	2.04	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	182	2.23	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut+Redgram (Gn+Rg)	Not Available	IIes	Graded bunding
Munagala	183	3.67	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Groundnut (Gn)	Not Available	IIes	Graded bunding
Munagala	184	4.42	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Munagala	185	2.75	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	186	4.28	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Munagala	187	1.82	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	188	2.74	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	189/1	2.14	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	189/2	1.36	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	190	1.89	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	191	3.17	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	192	3.1	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Munagala	193	2.83	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	194	2.96	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	195	1.51	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	196	3.46	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	197	1.46	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	198	2.79	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	199	4.49	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	200	1.76	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	201	4.14	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	202	3.64	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	203	3.39	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	204	3.87	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	205	5.1	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Munagala	206	4.99	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Munagala	207	3.68	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Munagala	208	1.14	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Munagala	209	4.49	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	211	0.37	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Trench cum bunding
Munagala	213	0.02	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Munagala	214	0.51	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Trench cum bunding
Munagala	215	1.83	YLRbB2	LMU-3	Moderately shallow (50-75 cm)	Loamy sand	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow (Cf)	Not Available	IIes	Trench cum bunding
Munagala	225	0.92	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	226	2.97	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Munagala	227	5.94	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	228	7.45	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Munagala	229	5.6	JNKcB2	LMU-2	Moderately shallow	Sandy	Non gravelly	Low (51-100	Very gently	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
					(50-75 cm)	loam	(<15%)	mm/m)	sloping (1-3%)					
Munagala	230	5.23	KYTmB1	LMU-4	Shallow (25-50 cm)	Clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	Graded bunding
Munagala	231	2.4	KYTmB1	LMU-4	Shallow (25-50 cm)	Clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	Graded bunding
Munagala	232	2.58	KYTmB1	LMU-4	Shallow (25-50 cm)	Clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Redgram (Rg)	Not Available	IIs	Graded bunding
Munagala	233	7.46	KYTmB1	LMU-4	Shallow (25-50 cm)	Clay	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Slight	Cotton (Ct)	Not Available	IIs	Graded bunding
Munagala	234	3.69	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	235	5.43	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	236	6.07	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Munagala	237	3.59	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Munagala	238	3.76	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Munagala	239	4.85	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Scrub land (Sl)	Not Available	IIes	Graded bunding
Munagala	240	4.22	KYTcB2	LMU-4	Shallow (25-50 cm)	Sandy loam	Non gravelly (<15%)	Very low (<50 mm/m)	Very gently sloping (1-3%)	Moderate	Scrub land (Sl)	Not Available	IIes	Graded bunding
Munagala	241	6.94	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Current fallow+ Groundnut (Cf+Gn)	Not Available	IIes	Graded bunding
Munagala	242	3.47	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	243	0.45	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Munagala	244	5.32	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	1	4.37	RHNcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Sangavara	2	6.74	RHNcB2	LMU-1	Moderately deep (75-100 cm)	Sandy loam	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton+ Jowar (Rg+Ct+Jw)	Not Available	IIes	Graded bunding
Sangavara	3	5.77	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton+ Jowar (Rg+Ct+Jw)	Not Available	IIes	Graded bunding
Sangavara	4	0.87	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Sangavara	5	0.79	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Sangavara	6	5.78	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Sangavara	7	3.97	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Sangavara	8	4.88	JNKcB2	LMU-2	Moderately shallow (50-75 cm)	Sandy loam	Non gravelly (<15%)	Low (51-100 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton+ Jowar (Rg+Ct+Jw)	Not Available	IIes	Graded bunding
Sangavara	9	4.03	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton+ Jowar (Rg+Ct+Jw)	Not Available	IIes	Graded bunding
Sangavara	10	5.44	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Sangavara	11	2.32	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Sangavara	12	2.36	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Sangavara	13	2.36	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	14	2.48	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Sangavara	15	6.63	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	16	5.32	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton+Jowar+Groundnut (Ct+Jw+Gn)	Not Available	IIes	Graded bunding
Sangavara	17	4.66	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Sangavara	18	5.2	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton+Jowar+Groundnut (Ct+Jw+Gn)	Not Available	IIes	Graded bunding
Sangavara	19	3.56	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	20	2.94	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Sangavara	21	3.47	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	22	1.39	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Sangavara	23	2.35	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Redgram (Jw+Rg)	Not Available	IIes	Graded bunding
Sangavara	24	0.51	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Sangavara	25	3.22	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	26	1.34	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	27	0.85	RHNmB2	LMU-1	Moderately deep (75-100 cm)	Clay	Non gravelly (<15%)	Medium (101-150 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	59	2.32	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Sangavara	60	1.89	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Not Available (NA)	Not Available	IIes	Graded bunding
Sangavara	61/1	1.48	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	61/2	0.59	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	62/1	0.65	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	62/2	0.74	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	62/3	1.08	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	63/1	0.81	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	63/2	0.73	HGNmB2	LMU-1	Very deep (>150	Clay	Non gravelly	Very high	Very gently	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
					cm)		(<15%)	(>200 mm/m)	sloping (1-3%)					
Sangavara	63/3	0.62	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	63/4	0.79	HGNmB2	LMU-1	Very deep (>150 cm)	Clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	64	3.3	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	1 Bore well	IIes	Graded bunding
Sangavara	65	1.04	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	66	1.22	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Sangavara	67	1.86	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Sangavara	68	0.47	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	69	0.54	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	70	0.93	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	71	0.16	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	72	2.62	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar+Cotton (Jw+Ct)	Not Available	IIes	Graded bunding
Sangavara	73	2.11	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	74/1	1.76	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Jowar (Pd+Jw)	Not Available	IIes	Graded bunding
Sangavara	74/2	1	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	1 Bore well	IIes	Graded bunding
Sangavara	74/3	0.57	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram (Rg)	Not Available	IIes	Graded bunding
Sangavara	75/1	0.4	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Sangavara	75/2	1.52	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Sangavara	75/3	1.17	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	2 Bore well	IIes	Graded bunding
Sangavara	76	1.7	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	77	2.93	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding
Sangavara	78	1.15	Waterbody	Others	Others	Others	Others	Others	Others	Others	Paddy+Jowar (Pd+Jw)	Not Available	Others	Others
Sangavara	79	0.14	Waterbody	Others	Others	Others	Others	Others	Others	Others	Cotton+Jowar+Groundnut (Ct+Jw+Gn)	Not Available	Others	Others
Sangavara	131	0.24	Waterbody	Others	Others	Others	Others	Others	Others	Others	Jowar+Cotton (Jw+Ct)	Not Available	Others	Others
Sangavara	132	0	Waterbody	Others	Others	Others	Others	Others	Others	Others	Cotton (Ct)	Not Available	Others	Others
Sangavara	134	4.53	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Jowar (Pd+Jw)	1 Bore well	IIes	Graded bunding
Sangavara	135	0.31	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Sangavara	136/1	0.58	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding

Village	Survey No.	Total Area (ha)	Soil Phase	LMU	Soil Depth	Surface Soil Texture	Soil Gravelliness	Available Water Capacity	Slope	Soil Erosion	Current Land Use	WELLS	Land Capability	Conservation Plan
Sangavara	136/2	0.46	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Sangavara	136/3	1.43	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy (Pd)	Not Available	IIes	Graded bunding
Sangavara	137/1	0.27	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	Not Available	IIes	Graded bunding
Sangavara	137/2	0.82	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Cotton (Ct)	1 Bore well	IIes	Graded bunding
Sangavara	137/3	2.42	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Jowar (Jw)	Not Available	IIes	Graded bunding
Sangavara	138/1	0.94	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Jowar (Pd+Jw)	1 Bore well	IIes	Graded bunding
Sangavara	138/2	0.93	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Jowar (Pd+Jw)	Not Available	IIes	Graded bunding
Sangavara	138/3	0.65	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Paddy+Jowar (Pd+Jw)	Not Available	IIes	Graded bunding
Sangavara	138/4	1.54	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Sangavara	139	0.49	Habitation	Others	Others	Others	Others	Others	Others	Others	Habitation	Not Available	Others	Others
Sangavara	140	5.86	KDRiB2	LMU-1	Deep (100-150 cm)	Sandy clay	Non gravelly (<15%)	Very high (>200 mm/m)	Very gently sloping (1-3%)	Moderate	Redgram+Cotton (Rg+Ct)	Not Available	IIes	Graded bunding

Appendix II

Narayanpet-3 Microwatershed

Soil Fertility Information

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Kondapura	1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	3	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	4	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	5	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	6/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	6/2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	7	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	8	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	9/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	9/2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	10	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Kondapura	11	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	12	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	13	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	29	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	30	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	31	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	32/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	32/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	33	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	34	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	37	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	48	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	87/1	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Kondapura	87/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	88	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	89/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	89/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	89/3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	90	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	91/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	91/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	92	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	93	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	94	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	95	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	96	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	97	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	98	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	99	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	100	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Kondapura	101	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	94	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	97/1	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	98	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	99	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	137	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	138	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	139	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	140	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Munagala	141	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	142	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	143/1	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	143/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	144	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	145	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	146	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	155/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	156/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	162	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	163	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	164	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	165	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	166	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	167	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	168	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	169/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	169/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	170/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	170/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	171/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	171/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	171/3	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	172/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	172/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	173/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Munagala	173/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	173/3	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	174	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	175	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	176/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	176/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	177	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	178	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	179	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	180/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	180/2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	181	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	182	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	183	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	184	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	185	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	186	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	187	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	188	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	189/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	189/2	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	190	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	191	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	192	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	193	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	194	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Munagala	195	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	196	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Low (< 0.5 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	197	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	198	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	199	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	200	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	201	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	202	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	203	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	204	Neutral (pH 6.5 – 7.3)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	205	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	206	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	207	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	208	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	209	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	211	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	213	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	214	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	215	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	225	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	226	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	227	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	228	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	229	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	230	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	231	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Munagala	232	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	233	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	234	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	235	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	236	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	237	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	238	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	239	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	240	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	241	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	242	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	243	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Munagala	244	Very strongly alkaline (pH > 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	3	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	4	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	5	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	6	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	7	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	8	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	9	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	10	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	11	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	12	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	13	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Sangavara	14	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	15	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	16	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	17	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	18	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	19	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	20	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	21	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	22	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	23	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	24	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	25	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	26	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	27	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Low (< 0.5 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	59	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Low (< 0.5 %)	Low (< 23 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Low (< 0.5 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	60	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	61/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	61/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	62/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	62/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	62/3	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	Medium (145 – 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	63/1	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	63/2	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	63/3	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	63/4	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	64	Slightly alkaline (pH 7.3 – 7.8)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
Sangavara	65	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	66	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	67	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Sangavara	68	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	69	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	70	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	71	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	High (> 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	72	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	73	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	74/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Deficient (< 4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	74/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	74/3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	75/1	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	75/2	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	75/3	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	76	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	77	Moderately alkaline (pH 7.8 – 8.4)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	High (> 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	78	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Sangavara	79	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Sangavara	131	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Sangavara	132	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody	Waterbody
Sangavara	134	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	135	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Low (< 23 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	136/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	136/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	136/3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Low (<10 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	137/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	137/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	137/3	Strongly alkaline	Non saline	Medium (0.5	Medium (23	High (> 337	Medium (10	Medium (0.5	Sufficient	Sufficient (>	Sufficient	Deficient (<

Village	Survey No.	Soil Reaction	Salinity	Organic Carbon	Available Phosphorus	Available Potassium	Available Sulphur	Available Boron	Available Iron	Available Manganese	Available Copper	Available Zinc
		(pH 8.4 – 9.0)	(<2 dsm)	– 0.75 %)	– 57 kg/ha)	kg/ha)	– 20 ppm)	– 1.0 ppm)	(>4.5 ppm)	1.0 ppm)	(> 0.2 ppm)	0.6 ppm)
Sangavara	138/1	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	138/2	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	138/3	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)
Sangavara	138/4	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Sangavara	139	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation	Habitation
Sangavara	140	Strongly alkaline (pH 8.4 – 9.0)	Non saline (<2 dsm)	Medium (0.5 – 0.75 %)	Medium (23 – 57 kg/ha)	High (> 337 kg/ha)	Medium (10 – 20 ppm)	Medium (0.5 – 1.0 ppm)	Sufficient (>4.5 ppm)	Sufficient (> 1.0 ppm)	Sufficient (> 0.2 ppm)	Deficient (< 0.6 ppm)

Appendix III

Narayanpet-3 Microwatershed

Soil Suitability Information

Village	Survey No.	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulbery
Kondapura	1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	4	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	5	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	6/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	6/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	7	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	8	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	9/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	9/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	10	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kondapura	11	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	12	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	13	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	29	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	30	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	31	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	32/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	32/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	33	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	34	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	37	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	48	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	87/1	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Kondapura	87/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	88	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	89/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	89/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	89/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	90	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	91/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	91/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	92	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	93	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	94	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	95	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	96	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	97	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	98	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	99	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw

Village	Survey No.	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulbery
Kondapura	100	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Kondapura	101	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	94	N1rz	S3tz	S3rt	S2rz	S3rt	S2rw	N1rz	S3rz	S2rw	S3rw	S3rw	S2r	S3rt	S2r	N1tz	S3rz	S3rz	S3tw	S2r	S2tw	S3tw	S2rt	S2rt	S3rz	S2rt	S2rt	S2r	S3rz	S3rt
Munagala	97/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	98	N1rz	S3tz	S3rt	S2rz	S3rt	S2rw	N1rz	S3rz	S2rw	S3rw	S3rw	S2r	S3rt	S2r	N1tz	S3rz	S3rz	S3tw	S2r	S2tw	S3tw	S2rt	S2rt	S3rz	S2rt	S2rt	S2r	S3rz	S3rt
Munagala	99	N1rz	S3tz	S3rt	S2rz	S3rt	S2rw	N1rz	S3rz	S2rw	S3rw	S3rw	S2r	S3rt	S2r	N1tz	S3rz	S3rz	S3tw	S2r	S2tw	S3tw	S2rt	S2rt	S3rz	S2rt	S2rt	S2r	S3rz	S3rt
Munagala	137	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	138	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	139	N1rz	S3tz	S3rt	S2rz	S3rt	S2rw	N1rz	S3rz	S2rw	S3rw	S3rw	S2r	S3rt	S2r	N1tz	S3rz	S3rz	S3tw	S2r	S2tw	S3tw	S2rt	S2rt	S3rz	S2rt	S2rt	S2r	S3rz	S3rt
Munagala	140	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	141	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	142	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	143/1	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	143/2	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	144	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	145	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	146	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	155/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	156/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	162	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	163	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	164	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	165	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	166	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	167	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	168	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	169/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	169/2	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	170/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	170/2	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	171/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	171/2	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	171/3	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	172/1	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	172/2	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	173/1	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	173/2	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	173/3	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	174	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	175	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	176/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	176/2	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	177	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	178	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	179	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r

Village	Survey No.	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulbery
Munagala	180/1	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	180/2	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	181	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	182	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	183	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	184	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	185	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	186	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	187	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	188	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	189/1	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	189/2	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	190	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	191	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	192	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	193	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	194	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	195	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	196	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	197	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	198	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	199	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	200	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	201	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	202	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	203	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	204	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	205	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	206	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	207	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	208	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	209	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	211	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	213	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	214	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	215	N1r	S2r	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	S3r	S3r	S3r	S2r	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	225	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Munagala	226	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Munagala	227	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Munagala	228	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	229	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Munagala	230	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	231	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	232	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	233	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r

Village	Survey No.	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulbery
Munagala	234	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	235	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	236	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	237	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	238	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	239	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	240	N1r	S3r	N1r	S3r	N1r	S3r	N1r	N1r	S3r	N1r	N1r	S3r	N1r	S3r	N1r	N1r	N1r	S3r	S3r	S3r	S3r	S3r	S3r	N1r	S3r	S3r	S3r	N1r	N1r
Munagala	241	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	242	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	243	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Munagala	244	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	1	S3rt	S3tw	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	2	S3rt	S3tw	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	3	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	4	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	5	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	6	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	7	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	8	N1r	S2t	S3r	S2r	S3r	S2r	N1r	S3r	S2r	S3r	S3r	S2r	S3r	S2r	N1rt	S3r	S3r	S3t	S2r	S2r	S2r	S2r	S2r	S3r	S2r	S2r	S2r	S3r	S3r
Sangavara	9	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	10	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	11	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	12	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	13	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	14	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	15	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	16	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	17	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	18	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	19	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	20	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	21	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	22	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	23	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	24	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	25	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	26	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	27	S3rt	S2t	S3t	S1	S3t	S2rw	S3r	S2rz	S1	S2rw	S2rt	S2tz	S3t	S1	N1tz	S3rt	S2rz	S3tw	S1	S2tw	S3tw	S2tw	S2tw	S2rt	S2t	S1	S1	S2rt	S3tw
Sangavara	59	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	60	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	61/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	61/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	62/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	62/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	62/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw

Village	Survey No.	Mango	Maize	Sapota	Sorgham	Guava	Cotton	Tamarind	Lime	Bengalgram	Sunflower	Redgram	Amla	Jackfruit	Custard apple	Cashew	Jamun	Musambi	Groundnut	Onion	Chilly	Tomato	Marigold	Chrysanthemum	Pomegranate	Bajra	Brinjal	Bhendi	Drumstick	Mulbery
Sangavara	63/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	63/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	63/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	63/4	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S3t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	64	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	65	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	66	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	67	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	68	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	69	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	70	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	71	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	72	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	73	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	74/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	74/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	74/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	75/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	75/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	75/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	76	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	77	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	78	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	79	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	131	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	132	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	134	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	135	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	136/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	136/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	136/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	137/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	137/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	137/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	138/1	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	138/2	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	138/3	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw
Sangavara	138/4	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	139	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others	Others
Sangavara	140	S3t	S2t	S3t	S1	S3t	S1	S2t	S1	S1	S1	S2tw	S1	S3t	S1	N1tz	S2t	S1	S3tw	S2t	S2tw	S3tw	S2tw	S2tw	S2t	S2t	S2t	S2t	S2tw	S3tw

PART-B

SOCIO-ECONOMIC STATUS OF FARM HOUSEHOLDS

CONTENTS

LIST OF TABLES

Chapter 1

FINDINGS OF THE SOCIO-ECONOMIC SURVEY

- *The survey was conducted in Narayanpet-3 is located at North latitude 16^0 33' 1.89" and 16^0 31' 0.128" and East longitude 77^0 16' 10.075" and 77^0 14' 49.22" covering an area of about 500.78 ha coming unde Munagala, Sangavara and Kondapura villages of Yadagiri taluk.*
- *Socio-economic analysis of Narayanpet-3 micro watersheds of Mungal sub-watershed, Yadgiri taluk & District indicated that, out of the total sample of 34 farmers were sampled in Narayanpet-3 micro-watershed among households surveyed 12 (35.29%) were marginal, 8 (23.53%) were small, 7 (20.59 %) were semi medium and 1 (2.94 %) were medium farmers. 6 landless farmers were also interviewed for the survey.*
- *The population characteristics of households indicated that, there were 81 (62.31%) men and 49 (37.69 %) were women. The average population of landless was 3.7, marginal farmers 4, small farmers were 3.1, semi medium farmers were 4 and medium farmers were 7.*
- *Majority of the respondents (32.31%) were in the age group of 16-35 years.*
- *Education level of the sample households indicated that, there were 48.46 per cent illiterates, 0.77 percent were functional literates, 53.08 per cent pre university education and 2.31 per cent attained graduation.*
- *About, 67.65 per cent of household heads practicing agriculture and 17.65 per cent of the household heads were engaged as agricultural labourers.*
- *Agriculture was the major occupation for 55.38 per cent of the household members.*
- *In the study area, 70.59 per cent of the households possess katcha house and 14.71 per cent possess pucca house.*
- *The durable assets owned by the households showed that, 91.18 per cent possess TV, 23.53 per cent possess mixer grinder, 88.24 per cent possess mobile phones and 26.47 per cent possess motor cycles.*
- *Farm implements owned by the households indicated that, 35.29 per cent of the households possess plough, 2.94 per cent possess tractor, 29.41 per cent possess bullock cart and 11.76 per cent possess sprayer.*
- *Regarding livestock possession by the households, 11.76 per cent possess local cow.*
- *The average labour availability in the study area showed that, own labour men available in the micro watershed was 1.63, women available in the micro watershed was 1.37, hired labour (men) available was 8.58 and hired labour (women) available was 10.65.*
- *Out of the total land holding of the sample respondents 90.73 per cent (39.98 ha) of the area is under dry condition and the remaining 4.25 per cent area is irrigated land.*

- *The major crops grown by sample farmers are Red gram, Cotton, Groundnut, Sorghum and Paddy and cropping intensity was recorded as 91.49 per cent.*
- *Out of the sample households 32.35 percent possessed bank account and 2.94 per cent of them have savings in the account.*
- *About 32.35 per cent of the respondents borrowed credit from various sources.*
- *Among the credit borrowed by households and 27.27 per cent from co-operative/Grameena bank.*
- *Majority of the respondents (100.00%) have borrowed loan for agriculture purpose.*
- *Regarding the opinion on institutional sources of credit, 25.00 per cent of the households opined that credit helped to perform timely agricultural operations.*
- *The per hectare cost of cultivation for Red gram, Cotton, Groundnut, Sorghum and Paddy was Rs.31255.33 , 37268.89, 36375.24, 22806.82 and 44325.40 with benefit cost ratio of 1:1.50, 1: 1.40, 1: 2.10, 1: 1.40 and 1:2.10 respectively.*
- *Further, 38.24 per cent of the households opined that dry fodder was adequate and 17.65 per cent of the households have opined that the green fodder was adequate.*
- *The average annual gross income of the farmers was Rs. 79470.59 in micro-watershed, of which Rs. 47705.88 comes from agriculture.*
- *Sampled households have grown 20 horticulture trees and 45 forestry trees together in the fields and back yards.*
- *Households have an average investment capacity of Rs. 3338.24 for land development.*
- *Source of funds for additional investment is concerned, 11.76 per cent depends on own funds and 38.24 per cent depends on bank loan for land development activities.*
- *Regarding marketing channels, 58.82 per cent of the households have sold agricultural produce to the local/village merchants, while, 14.71 per cent have sold in regulated markets.*
- *Further, 70.59 per cent of the households have used tractor for the transport of agriculture commodity.*
- *Majority of the farmers (61.76%) have experienced soil and water erosion problems in the watershed and 73.53 per cent of the households were interested towards soil testing.*
- *Fire was the major source of fuel for domestic use for 88.24 per cent of the households and 11.76 per cent households has LPG connection.*
- *Piped supply was the major source for drinking water for 73.53 per cent of the households.*
- *Electricity was the major source of light for 97.06 per cent of the households.*
- *In the study area, 76.47 per cent of the households possess toilet facility.*
- *Regarding possession of PDS card, 97.06 per cent of the households possessed BPL card.*

- *Households opined that, the requirement of cereals (85.29%), pulses (88.24%) and oilseeds (32.35%) are adequate for consumption.*
- *Farming constraints experienced by households in the micro watersheds were lower fertility status of the soil (79.41%) wild animal menace on farm field (76.47%), frequent incidence of pest and diseases (61.76%), inadequacy of irrigation water (2.94%), high cost of fertilizers and plant protection chemicals (73.53%), high rate of interest on credit (47.06%), low price for the agricultural commodities (61.76%), lack of marketing facilities in the area (61.76%) and lack of transport for safe transport of the agricultural produce to the market (50.00%) and Less rainfall (11.76%).*

Chapter 2

INTRODUCTION

Soil and water are the two precious natural resources which are essential for crop production and existence of life on earth. Rainfed agriculture is under severe stress due to various constraints related to agriculture like uneven and erratic distribution of rainfall, indiscriminate use of fertilizers, chemicals and pesticides, adoption of improper land management practices, soil erosion, decline in soil fertility, decline in ground water resources leading to low crop productivity. The area under rainfed agriculture has to be managed effectively using the best available practices to enhance the production of food, fodder and fuel. This is possible if the land resources are characterized at each parcel of land through detailed land resource inventory using the best available techniques of remote sensing, GPS and GIS. The watershed development programs are aimed at the sustainable distribution of its resources and the process of creating and implementing plans, programs, and projects to sustain and enhance watershed functions that affect the plant, animal and human communities within a watershed boundary.

World Bank funded KWDP II, SUJALA III project was implemented in with Broad objective of demonstrating more effective watershed management through greater integration of programmes related to rain-fed agriculture, innovative and science based approaches and strengthen institutional capacities and If successful, it is expected that the systems and tools could be mainstreamed into the overall IWMP in the State of Karnataka and in time, throughout other IWMP operations in India. With this background the socio-economic survey has been carried out with following specific objectives:

1. To understand the demographic features of the households in the micro-watershed
2. To understand the extent of family labour available and additional employment opportunities available within the village.
3. To know the status of assets of households in the micro-watershed for suggesting possible improvements.
4. To study the cropping pattern, cropped area and productivity levels of different households in micro-watershed.
5. To determine the type and extent of livestock owned by different categories of HHs
6. Availability of fodder and level of livestock management.

Scope and importance of survey

Survey helps in identification of different socio-economic and resource use-patterns of farmers at the Micro watershed. Household survey provides demographic features, labor force, and levels of education; land ownership and asset position (including livestock and other household assets) of surveyed households; and cropping patterns, input intensities, and average crop yields from farmers' fields. It also discusses crop utilization and the degree of commercialization of production in the areas; farmers'

access to and utilization of credit from formal and informal sources; and the level of adoption and use of soil, water, and pest management technologies.

Chapter 3

METHODOLOGY

The description of the methods, components selected for the survey and procedures followed in conducting the baseline survey are furnished under the following heads.

1. Description of the study area

Yadgir District is one of the 30 districts of Karnataka state in southern India. This district was carved out from the erstwhile Gulbarga district as the 30th district of Karnataka on 10 April 2010. Yadgir town is the administrative headquarters of the district. The district comprises of 3 taluks namely, Shahapur, Yadgiri and Shorapur (There are 16 hoblies, 117 Gram Panchayats, 4 Municipalities,8 Towns/ Urban agglomeration and 487 inhabited & 32 un-inhabited villages The district occupies an area of 5,160.88 km².

Yadgir district is the second smallest district in the state, area wise is very rich in cultural traditions. The vast stretch of fertile black soil of the district is known for bumper red gram and jowar crops. The district is a "Daal bowl" of the state. The district is also known for cluster of cement industries and a distinct stone popularly known as "Malakheda Stone". Two main rivers, Krishna and Bhima, and a few tributaries flow in this region. Krishna and Bhima Rivers drain the district. They constitute the two major river basins of the district. Kagna and Amarja are the two sub - basins of Bhima River, which occur within the geographical area of the district

According to the 2011 census Yadgir district has a population of 1, 172,985, roughly equal to the nation of Timor-Lesteor the US state of Rhode Island. This gives it a ranking of 404th in India (out of a total of 640). The district has a population density of 224 inhabitants per square kilometre (580/sq mi). Its population growth rate over the decade 2001-2011 was 22.67%. Yadgir has a sex ratio of 984 females for every 1000 males, and a literacy rate of 52.36%.

2. Locale of the survey and description of the micro-watershed and

The study was conducted in Narayanpet-3 micro-watershed (Mungal sub-watershed, Yadgiri taluk & District) is located at North latitude 16^0 33’ 1.89” and 16^0 31' 0.128" and East longitude 77^0 16’ 10.075" and 77^0 14’ 49.22”covering an area of about 500.78 ha bounded by unde Munagala, Sangavara and Kondapura Villages.

3. Selection of the respondents for the study

The micro-watershed is marked with 320 square meters grids. One farmer from every alternate grid in the micro-watershed was selected for the study and interviewed for socio-economic data. Totally 34 households were interviewed for the survey.

4. The parameters considered for socio-economic survey of households

Two forms of data were collected from the micro-watershed which includes primary data from the farm households and secondary data about the villages under the micro-watershed jurisdiction.

The following parameters were considered for the primary data collection about the socio-economic data of the households, (1) Demographic information, (2) Farm and durable assets owned by households, (3) Livestock possession, (4) Labour availability, (5) Level of migration in the village, Land holding, (7) Cropping pattern, (8) Source of irrigation, (9) Borrowing status, (10) Cost of cultivation of major crops, (11) Economics of subsidiary activities, (12) Fodder availability, (13) Family annual income from different sources, (14) Horticulture and forestry species grown, (15) Additional investment capacity, (16) Marketing practices, (17) Status of soil and water conservation structure, (18) Access to basic needs and (19) Constraints and suggestion.

The following parameters were considered for the secondary data regarding the villages under the micro-watershed jurisdiction, (1) Number of villages in each micro-watershed jurisdiction, (2) Village wise number of households, (3) Geographical area of the villages, (4) Cultivable are a including rainfed and irrigated, (5) Number and type of house in each village, (6) Human and livestock population, (7) Facilities in the village such as roads, transport facility for conveyance, drinking water supply, street light and (8) Community based organizations in the villages.

5. Development of interview schedule and data collection

Taking into the consideration the objectives of the survey, an interview schedule was prepared after thorough consultation with the experts in the field of social sciences. A comprehensive interview schedule covering all the major parameters for measuring the socio-economic situation was developed.

6. Tools used to analyze the data

The statistical components such as frequency and percentage were used to analyze the data.

Abbreviations used in the report

LL=Landless
MF=Marginal Farmers
SF=Small farmers
SMF=Semi medium farmers
MDF=Medium farmers
LF=Large Farmers

Chapter 4

FINDINGS OF THE SURVEY

This chapter deals with systematic presentation of results of the survey. Keeping in view the objectives, the salient features of the survey are presented under the following headings.

Households sampled for socio-economic survey: The data on households sampled for socio economic survey in Narayanpet-3 Micro watershed is presented in Table 1 and it indicated that 34 farmers were sampled in Narayanpet-3 micro-watershed among households surveyed 12 (35.29%) were marginal, 8 (23.53%) were small, 7 (20.59 %) were semi medium and 1 (2.94 %) were medium farmers. 6 landless farmers were also interviewed for the survey.

Table 1. Households sampled for socio economic survey in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farmers	6	17.7	12	35.3	8	23.5	7	20.6	1	2.94	34	100

Population characteristics: The population characteristics of households sampled for socio-economic survey in Narayanpet-3 Micro watershed is presented in Table 2. The data indicated that, there were 81 (62.31%) men and 49 (37.69%) were women. The average population of landless was 3.7, marginal farmers 4, small farmers were 3.1, semi medium farmers were 4 and medium farmers were 7.

Table 2. Population characteristics in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (22)		MF (48)		SF (25)		SMF (28)		MDF (7)		All (130)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Men	13	59.1	32	67	16	64	16	57.1	4	57.1	81	62.3
2	Women	9	40.9	16	33	9	36	12	42.9	3	42.9	49	37.7
Total		22	100	48	100	25	100	28	100	7	100	130	100
Average		3.7		4.0		3.1		4.0		7.0		3.8	

Age wise classification of population: The age wise classification of household members in Narayanpet-3 Micro watershed is presented in Table 3. The indicated that, 22 (16.92%) of population were 0-15 years of age, 42 (32.31%) were 16-35 years of age, 51(39.23%) were 36-60 years of age and 15 (11.54 %) were above 61 years of age.

Table 3: Age wise classification of members of the household in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (22)		MF (48)		SF (25)		SMF (28)		MDF (7)		All (130)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	0-15 years of age	5	22.7	12	25	3	12	2	7.14	0	0	22	16.92
2	16-35 years of age	9	40.9	11	22.9	7	28	11	39.29	4	57	42	32.31
3	36-60 years of age	7	31.8	22	45.8	10	40	10	35.71	2	29	51	39.23
4	> 61 years	1	4.55	3	6.25	5	20	5	17.86	1	14	15	11.54
Total		22	100	48	100	25	100	28	100	7	100	130	100

Education level of household members: Education level of household members in Narayanpet-3 Micro watershed is presented in Table 4. The results indicated that, there were 48.46 per cent of illiterates, 0.77 per cent of functional literate, 20.77 per cent of them had primary school education, 3.85 per cent middle school education, and 14.62 per cent high school education, 6.92 per cent of them had PUC education, 2.31 per cent attained graduation and 1.54 them had other education.

Table 4. Education level of members of the household in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (22)		MF (48)		SF (25)		SMF (28)		MDF (7)		All (130)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Illiterate	10	45.5	22	45.8	15	60	10	35.7	6	85.71	63	48.5
2	Functional Literate	0	0	1	2.08	0	0	0	0	0	0	1	0.77
3	Primary School	8	36.4	10	20.8	4	16	5	17.9	0	0	27	20.8
4	Middle School	1	4.55	1	2.08	2	8	1	3.57	0	0	5	3.85
5	High School	2	9.09	7	14.6	2	8	7	25	1	14.29	19	14.6
6	PUC	1	4.55	3	6.25	2	8	3	10.7	0	0	9	6.92
7	ITI	0	0	1	2.08	0	0	0	0	0	0	1	0.77
8	Degree	0	0	3	6.25	0	0	0	0	0	0	3	2.31
9	Others	0	0	0	0	0	0	2	7.14	0	0	2	1.54
Total		22	100	48	100	25	100	28	100	7	100	130	100

Occupation of head of households: The data regarding the occupation of the household heads in Narayanpet-3 Micro watershed is presented in Table 5. The results indicate that, 67.65 per cent of households heads were practicing agriculture, 17.65 per cent of the household heads were agricultural Labour and housewife (2.94%).

Table 5: Occupation of heads of households in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	1	17	9	75	7	87.5	5	71	1	100	23	67.65
2	Agricultural Labour	3	50	2	17	0	0	1	14	0	0	6	17.65
3	General Labour	2	33	0	0	1	12.5	0	0	0	0	3	8.82
4	Housewife	0	0	1	8.3	0	0	0	0	0	0	1	2.94
Total		6	100	12	100	8	100	6	100	1	100	33	100

Table 6: Occupation of members of the household in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (22)		MF (48)		SF (25)		SMF (28)		MDF (7)		All (130)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Agriculture	3	13.6	23	47.9	16	64	23	82.14	7	100	72	55.4
2	Agricultural Labour	3	13.6	5	10.4	0	0	3	10.71	0	0	11	8.46
3	General Labour	6	27.3	0	0	2	8	0	0	0	0	8	6.15
4	Private Service	0	0	1	2.08	0	0	0	0	0	0	1	0.77
5	Student	7	31.8	14	29.2	4	16	0	0	0	0	25	19.2
6	Housewife	3	13.6	4	8.33	3	12	0	0	0	0	10	7.69
7	Children	0	0	1	2.08	0	0	2	7.14	0	0	3	2.31
Total		22	100	48	100	25	100	28	100	7	100	130	100

Occupation of the members of the household: The data regarding the occupation of the household members in Narayanpet-3 Micro watershed is presented in Table 6. The results indicate that, agriculture was the major occupation for 55.38 per cent of the household members, 8.46 per cent were agricultural labour, 6.15 per cent were general labour, 19.23 per cent were working in pursuing education, 7.69 per cent were involved as housewife and 2.31 per cent were children.

Institutional Participation of household members: The data regarding the institutional participation of the household members in Narayanpet-3 Micro watershed is presented in Table 7. The results show that, out of the total family members in the households 0.77 per cent of them were participating in raitha sangha.

Table 7: Institutional Participation of household member in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (22)		MF (48)		SF (25)		SMF (28)		MDF (7)		All (130)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Raitha Sangha	0	0	0	0	0	0	1	3.57	0	0	1	0.77
2	No Participation	22	100	48	100	25	100	27	96.4	7	100	129	99.2
Total		22	100	48	100	25	100	28	100	7	100	130	100

Type of house owned: The data regarding the type of house owned by the households in Narayanpet-3 Micro watershed is presented in Table 8. The results indicate that, 14.71 percent possess thatched house, 70.59 per cent of the households possess katcha house, 14.71 per cent possess pacca house.

Table 8. Type of house owned by households in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Thatched	1	17	2	17	0	0	1	14.3	1	100	5	14.71
2	Katcha	5	83	8	67	6	75	5	71.4	0	0	24	70.59
3	Pucca/RCC	0	0	2	17	2	25	1	14.3	0	0	5	14.71
Total		6	100	12	100	8	100	7	100	1	100	34	100

Durable assets owned by the households: The data regarding the Durable Assets owned by the households in Narayanpet-3 Micro watershed is presented in Table 9. The results shows that, 91.18 per cent possess TV, 23.53 per cent possess mixer grinder, 26.47 per cent possess motor cycle, 88.24 per cent possess mobile phones and 5.88 per cent possess Computer/Laptop.

Table 9. Durable assets owned by households in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Television	6	100	11	92	8	100	5	71	1	100	31	91.18
2	Mixer/Grinder	1	17	5	42	0	0	1	14	1	100	8	23.53
3	Motor Cycle	1	17	4	33	1	12.5	3	43	0	0	9	26.47
4	Auto	0	0	1	8.3	0	0	0	0	0	0	1	2.94
5	Mobile Phone	4	67	11	92	8	100	6	86	1	100	30	88.24
6	Computer/Laptop	0	0	1	8.3	0	0	1	14	0	0	2	5.88
7	Blank	1	17	0	0	0	0	0	0	0	0	1	2.94

Average value of durable assets: The data regarding the average value of durable assets owned by the households in Narayanpet-3 Micro watershed is presented in Table 10. The result shows that, the average value of television was Rs.6806.00, mixer grinder was Rs.3250.00, motor cycle was Rs. 47222.00, mobile phone was Rs.2116.00 and Computer/Laptop was Rs 8500.00.

Table 10. Average value of durable assets owned in Narayanpet-3 micro-watershed

Average Value (Rs.)

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
1	Television	4500	7818	7750	6400	4000	6806
2	Mixer/Grinder	15000	1600	0	1000	2000	3250
3	Motor Cycle	55000	32500	150000	30000	0	47222
4	Auto	0	40000	0	0	0	40000
5	Mobile Phone	1666	1687	2535	3187	2000	2116
6	Computer/Laptop	0	15000	0	2000	0	8500

Farm implements owned: The data regarding the farm implements owned by the households in Narayanpet-3 Micro watershed is presented in Table 11. About 29.41 per cent of the households possess Bullock Cart, 35.29 per cent possess plough and 5.88 per cent possess Seed/Fertilizer Drill and Sprinkler, 11.76 per cent possess Sprayer, 11.76 per cent possess Weeder and 2.94 per cent possess tractor.

Table 11. Farm implements owned in Narayanpet-3 micro-watershed

Sl. No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock Cart	1	17	6	50	2	25	1	14.3	0	0	10	29.41
2	Plough	1	17	5	41.7	3	37.5	3	42.9	0	0	12	35.29
3	Seed/Fertilizer Drill	0	0	0	0	1	12.5	1	14.3	0	0	2	5.88
4	Tractor	0	0	0	0	0	0	1	14.3	0	0	1	2.94
5	Sprayer	0	0	2	16.7	0	0	2	28.6	0	0	4	11.76
6	Weeder	1	17	1	8.33	1	12.5	1	14.3	0	0	4	11.76
7	Blank	5	83	6	50	5	62.5	3	42.9	1	100	20	58.82

Average value of farm implements: The data regarding the average value of farm Implements owned by the households in Narayanpet-3 Micro watershed is presented in Table 12. The results show that the average value of plough was Rs.2678.00, bullock Cart was Rs.15909.00, seed/fertilizer drill was Rs.1800.00, sprayer and weeder was Rs.33.00 and tractor Rs. 700000.

Table 12. Average value of farm implements in Narayanpet-3 micro-watershed

Average Value (Rs.)

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
1	Bullock Cart	18000	15285	20000	10000	0	15909
2	Plough	1500	4400	2333	1400	0	2678
3	Seed/Fertilizer Drill	0	0	2000	3000	0	2500
4	Tractor	0	0	0	700000	0	700000
5	Sprayer	0	2000	0	1600	0	1800
6	Weeder	25	50	50	25	0	33

Livestock possession by the households: The data regarding the Livestock possession by the households in Narayanpet-3 Micro watershed is presented in Table 13. The results indicate that, 29.41 per cent of the households possess bullocks and 11.76 per cent possess local cow.

Table 13. Livestock possession by households in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Bullock	1	17	5	42	1	12.5	3	43	0	0	10	29.41
2	Local cow	0	0	1	8.3	0	0	3	43	0	0	4	11.76
3	blank	5	83	7	58	7	87.5	3	43	1	100	23	67.65

Average Labour availability: The data regarding the average labour availability in Narayanpet-3 Micro watershed is presented in Table 14. The indicated that, own labour men available in the micro watershed was 1.63, women available in the micro watershed was 1.37, hired labour (men) available was 8.58 and hired labour (women) available was 10.65.

Table 14. Average labour availability in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
		N	N	N	N	N	N
1	Hired labour Female	0	9.8	14.29	10	9	10.65
2	Own Labour Female	1	1.1	1.25	1.86	2	1.37
3	Own labour Male	3	1.2	1.63	1.86	3	1.63
4	Hired labour Male	0	8.4	8.71	10	8	8.58

Adequacy of hired labour: The data regarding the adequacy of hired labour in Narayanpet-3 Micro watershed is presented in Table 15. The results indicate that, 82.35 per cent of the household opined that hired labour was adequate.

Table 15. Adequacy of hired labour in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate	1	17	10	83.3	9	113	7	100	1	100	28	82.4

Distribution of land (ha): The data regarding the distribution of land (ha) in Narayanpet-3 Micro watershed is presented in Table 16. The results indicate that, 36.27 ha (90.73%) of dry land and 1.70 ha (4.25 %) of irrigated land.

Table 16. Distribution of land (ha) in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Dry	0	0	7.44	88.2	9.96	90.78	14.42	89.45	4.45	100	36.27	90.73
2	Irrigated	0	0	0	0	0	0	1.7	10.55	0	0	1.7	4.25
3	Permanent Fallow	0	0	1	11.8	1.01	9.22	0	0	0	0	2.01	5.02
Total		0	100	8.44	100	10.98	100	16.12	100	4.45	100	39.98	100

Average value of land (ha): The data regarding the average land value (Rs./ha) in Narayanpet-3 Micro watershed is presented in Table 17. The results show that the average value of dry land was Rs.330417.27 and the average value of irrigated land was Rs.470476.21.

Table 17. Average value of land (ha) in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
		N	N	N	N	N	N
1	Dry	0	582914.6	351137.3	218430.7	224545.5	330417.3
2	Irrigated	0	0	0	470476.2	0	470476.2
3	Permanent Fallow	0	376524.4	247000	0	0	311239.9

Cropping pattern: The data regarding the cropping pattern in Narayanpet-3 Micro watershed is presented in Table 18. The results indicate that, farmers have grown Red gram (16.27 ha), Cotton (6.64 ha), Groundnut (5.00 ha), Sorghum (3.09 ha) Paddy (2.39 ha) and Cotton (0.40 ha).

Table 18. Cropping pattern in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
1	Kharif - Red gram (togari)	0	1.23	2.76	7.82	4.45	16.27
2	Kharif - Cotton	0	2.02	1.26	3.36	0	6.64
3	Kharif - Groundnut	0	1.76	1.21	2.02	0	5
4	Kharif - Sorghum	0	1.38	1.71	0	0	3.09
5	Kharif - Paddy	0	0.69	0	1.7	0	2.39
6	Rabi - Cotton	0	0	0.4	0	0	0.4
Total		0	7.09	7.34	14.91	4.45	33.79

Cropping intensity: The data regarding the cropping intensity in Narayanpet-3 Micro watershed is presented in Table 19. The results indicate that, the cropping intensity was 91.49 per cent.

Table 19. Cropping intensity (%) in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
1	Cropping Intensity	0	93.18	73.68	100	100	91.49

Possession of bank account and savings: The results (Table 20) indicate that, 32.35 cent of the households posses bank account and 2.94 per cent of them have savings.

Table 20. Possession of Bank account and savings in Narayanpet-3 micro-watershed

Sl. No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Account	1	16.67	2	16.67	3	37.5	5	71.43	0	0	11	32.35
2	Savings	1	16.67	0	0	0	0	0	0	0	0	1	2.94

Table 21. Borrowing status in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Credit Availed	1	16.67	2	16.67	3	37.5	5	71.4	0	0	11	32.35

Borrowing status: The results (Table 21) indicate that, 32.35 percent of the sample farmers have borrowed credit from different sources.

Source of credit: The results (Table 22) show that, 9.09 per cent have borrowed loan from Cooperative bank, 27.27 per cent have borrowed loan from Grameena Bank, 9.09 per cent have borrowed loan from money lender.

Table 22. Source of credit borrowed by households in Narayanpet-3 micro-watershed

Sl. No.	Particulars	LL (1)		MF (2)		SF (3)		SMF (5)		MDF (0)		All (11)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cooperative Bank	0	0	0	0	1	33.3	0	0	0	0	1	9.09
2	Grameena Bank	0	0	0	0	1	33.3	2	40	0	0	3	27.27
3	Money Lender	0	0	0	0	0	0	1	20	0	0	1	9.09

Avg. Credit amount: The results (Table 23) show that, farmers have borrowed Avg. Credit of Rs.21818.18 from different sources.

Table 23. Avg. Credit amount in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (1)	MF (2)	SF (3)	SMF (5)	MDF (0)	All (11)
		N	N	N	N	N	N
1	Average Credit	0	0	25000	33000	0	21818.2

Purpose of credit borrowed (institutional Source): The results (Table 24) indicate that, 100.00 per cent of the households have borrowed loan for agriculture.

Table 24. Purpose of credit borrowed (institutional Source) by households in Narayanpet-3 micro-watershed

SN	Particulars	SF (2)		SMF (2)		MDF (0)		All (4)	
		N	%	N	%	N	%	N	%
1	Agriculture production	2	100	2	100	0	0	4	100

Purpose of credit borrowed (Private Source): The results (Table 25) indicate that, 100.00 per cent of the households have borrowed loan for agriculture.

Table 25. Purpose of credit borrowed (Private Source) by households in Narayanpet-3 micro-watershed

Sl.No.	Particulars	SMF (1)		MDF (0)		All (1)	
		N	%	N	%	N	%
1	Agriculture production	1	100	0	0	1	100

Repayment status of household (institutional Source): The results (Table 26) indicate that, 100.00 per cent have unpaid.

Table 26. Repayment status of household (institutional Source) in Narayanpet-3 micro-watershed

Sl.No.	Particulars	SMF (1)		MDF (0)		All (1)	
		N	%	N	%	N	%
1	Un paid	2	100	0	0	4	100

Opinion regarding institutional sources of credit: The results (Table 27) indicate that, 25.00 per cent of the households opined that credit helped to perform timely agricultural operations and 25.00 per cent higher rate of interest.

Table 27. Opinion regarding institutional sources of credit in Narayanpet-3 micro-watershed

Sl. No.	Particulars	SF (2)		SMF (2)		MDF (0)		All (4)	
		N	%	N	%	N	%	N	%
1	Helped to perform timely agricultural operations	1	50	0	0	0	0	1	25
2	Higher rate of interest	0	0	1	50	0	0	1	25

Cost of Cultivation of Red gram: The data regarding the cost of cultivation (Rs/ha) of Red gram in Narayanpet-3 micro watershed is presented in Table 28.a. The results indicate that, the total cost of cultivation (Rs/ha) for Red gram was Rs. 31255.33. The gross income realized by the farmers was Rs. 47853.26. The net income from Red gram cultivation was Rs.16597.93, thus the benefit cost ratio was found to be 1:1.50.

Table 28(a). Cost of Cultivation of Red gram in Narayanpet-3 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	32.63	5759.83	18.43
2	Bullock		Pairs/day	1.88	1179.41	3.77
3	Tractor		Hours	5.27	4897.12	15.67
4	Machinery		Hours	0.97	514.64	1.65
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	12.37	1636.27	5.24
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	1.48	1778.4	5.69
8	Fertilizer + micronutrients		Quintal	3.15	5535.74	17.71
9	Pesticides (PPC)		Kgs / liters	1.65	1522.07	4.87
11	Repairs			0	277.78	0.89
13	Depreciation charges			0	154.74	0.5
14	Land revenue and Taxes			0	3.29	0.01
II	**Cost B1**					
16	Interest on working capital				1299.36	4.16
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				24558.65	78.57
III	**Cost B2**					
18	Rental Value of Land				318.52	1.02
19	**Cost B2 = (Cost B1 + Rental value)**				24877.17	79.59
IV	**Cost C1**					
20	Family Human Labour			14.94	3181.21	10.18
21	**Cost C1 = (Cost B2 + Family Labour)**				28058.38	89.77
V	**Cost C2**					
22	Risk Premium				355.56	1.14
23	**Cost C2 = (Cost C1 + Risk Premium)**				28413.94	90.91
VI	**Cost C3**					
24	Managerial Cost				2841.39	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				31255.33	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		10.11	47727.89	
		b) Main Crop Sales Price (Rs.)			4722.22	
	By Product	e) Main Product (q)		1.13	125.37	
		f) Main Crop Sales Price (Rs.)			111.11	
b.	Gross Income (Rs.)				47853.26	
c.	Net Income (Rs.)				16597.93	
d.	Cost per Quintal (Rs./q.)				3092.42	
e.	Benefit Cost Ratio (BC Ratio)				1:1.5	

Cost of Cultivation of Cotton: The data regarding the cost of cultivation (Rs/ha) of Cotton in Narayanpet-3 micro watershed is presented in Table 28.b. The results indicate that, the total cost of cultivation (Rs/ha) for Cotton was Rs. 37268.89. The gross income realized by the farmers was Rs. 51306.72. The net income from Cotton cultivation was Rs.14037.83, thus the benefit cost ratio was found to be 1:1.40.

Table 28(b). Cost of Cultivation of Cotton in Narayanpet-3 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	41.76	7603.88	20.4
2	Bullock		Pairs/day	1.46	729.56	1.96
3	Tractor		Hours	3.93	2876.15	7.72
4	Machinery		Hours	0.88	350.89	0.94
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	6.41	4215.24	11.31
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	4.94	5928	15.91
8	Fertilizer + micronutrients		Quintal	3.41	3123.32	8.38
9	Pesticides (PPC)		Kgs / liters	2.52	2764.77	7.42
10	Irrigation		Number	0.62	154.38	0.41
13	Depreciation charges			0	37	0.1
14	Land revenue and Taxes			0	2.82	0.01
II	**Cost B1**					
16	Interest on working capital				1947.76	5.23
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				29733.78	79.78
III	**Cost B2**					
18	Rental Value of Land				295.24	0.79
19	**Cost B2 = (Cost B1 + Rental value)**				30029.01	80.57
IV	**Cost C1**					
20	Family Human Labour			17.17	3651.8	9.8
21	**Cost C1 = (Cost B2 + Family Labour)**				33680.81	90.37
V	**Cost C2**					
22	Risk Premium				200	0.54
23	**Cost C2 = (Cost C1 + Risk Premium)**				33880.81	90.91
VI	**Cost C3**					
24	Managerial Cost				3388.08	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				37268.89	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		11.22	51306.72	
		b) Main Crop Sales Price (Rs.)			4571.43	
b.	Gross Income (Rs.)				51306.72	
c.	Net Income (Rs.)				14037.83	
d.	Cost per Quintal (Rs./q.)				3320.66	
e.	Benefit Cost Ratio (BC Ratio)				1:1.4	

Cost of Cultivation of Groundnut: The data regarding the cost of cultivation (Rs/ha) of Groundnut in Narayanpet-3 micro watershed is presented in Table 28.c. The results indicate, the total cost of cultivation (Rs/ha) for Groundnut was Rs.36375.24. The gross income realized by the farmers was Rs. 74646.85. The net income from Groundnut cultivation was Rs. 38271.61, thus the benefit cost ratio was found to be 1:2.10.

Table 28(c). Cost of Cultivation of Groundnut in Narayanpet-3 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	58.25	10516.68	28.91
2	Bullock		Pairs/day	0.77	386.71	1.06
3	Tractor		Hours	4.81	4811.17	13.23
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	37.36	5203.39	14.3
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	1.8	2156.76	5.93
8	Fertilizer + micronutrients		Quintal	3.35	2579.28	7.09
9	Pesticides (PPC)		Kgs /liters	1.8	2156.76	5.93
10	Irrigation		Number	0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	376.87	1.04
14	Land revenue and Taxes			0	5.35	0.01
II	**Cost B1**					
16	Interest on working capital				1451.54	3.99
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				29644.52	81.5
III	**Cost B2**					
18	Rental Value of Land				400	1.1
19	**Cost B2 = (Cost B1 + Rental value)**				30044.52	82.6
IV	**Cost C1**					
20	Family Human Labour			15.12	3023.88	8.31
21	**Cost C1 = (Cost B2 + Family Labour)**				33068.4	90.91
V	**Cost C2**					
22	Risk Premium				0	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				33068.4	90.91
VI	**Cost C3**					
24	Managerial Cost				3306.84	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				36375.24	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		17.56	74646.85	
		b) Main Crop Sales Price (Rs.)			4250	
b.	Gross Income (Rs.)				74646.85	
c.	Net Income (Rs.)				38271.61	
d.	Cost per Quintal (Rs./q.)				2071.02	
e.	Benefit Cost Ratio (BC Ratio)				1:2.1	

Cost of Cultivation of Sorghum: The data regarding the cost of cultivation (Rs/ha) of Sorghum in Narayanpet-3 micro watershed is presented in Table 28.d. The results indicate that, the total cost of cultivation (Rs/ha) for Sorghum was Rs. 22806.82. The gross income realized by the farmers was Rs.30907.39. The net income from Sorghum cultivation was Rs. 8100.56, thus the benefit cost ratio was found to be 1:1.40.

Table 28(d). Cost of Cultivation of Sorghum in Narayanpet-3 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	42.97	7311.59	32.06
2	Bullock		Pairs/day	1.36	681.71	2.99
3	Tractor		Hours	3.07	3070.62	13.46
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	15.1	1812.17	7.95
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	0	0	0
8	Fertilizer + micronutrients		Quintal	4.48	3742.46	16.41
9	Pesticides (PPC)		Kgs / liters	0	0	0
10	Irrigation		Number	0	0	0
11	Repairs			0	0	0
13	Depreciation charges			0	85.66	0.38
14	Land revenue and Taxes			0	4.94	0.02
II	**Cost B1**					
16	Interest on working capital				666.56	2.92
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				17375.71	76.19
III	**Cost B2**					
18	Rental Value of Land				422.22	1.85
19	**Cost B2 = (Cost B1 + Rental value)**				17797.93	78.04
IV	**Cost C1**					
20	Family Human Labour			14.18	2935.55	12.87
21	**Cost C1 = (Cost B2 + Family Labour)**				20733.48	90.91
V	**Cost C2**					
22	Risk Premium				0	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				20733.48	90.91
VI	**Cost C3**					
24	Managerial Cost				2073.35	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				22806.82	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		11.59	30907.39	
		b) Main Crop Sales Price (Rs.)			2666.67	
b.	Gross Income (Rs.)				30907.39	
c.	Net Income (Rs.)				8100.56	
d.	Cost per Quintal (Rs./q.)				1967.76	
e.	Benefit Cost Ratio (BC Ratio)				1:1.4	

Cost of Cultivation of Paddy: The data regarding the cost of cultivation (Rs/ha) of Paddy in Narayanpet-3 micro watershed is presented in Table 28.e. The results indicate that, the total cost of cultivation (Rs/ha) for Paddy was Rs.44325.40. The gross income realized by the farmers was Rs. 91613.13. The net income from Paddy cultivation was Rs. 47287.73, thus the benefit cost ratio was found to be 1:2.10.

Table 28(e). Cost of Cultivation of Paddy in Narayanpet-3 micro-watershed

Sl.No	Particulars		Units	Phy Units	Value(Rs.)	% to C3
I	**Cost A1**					
1	Hired Human Labour		Man days	69.07	11845.79	26.72
2	Bullock		Pairs/day	0	0	0
3	Tractor		Hours	6.57	6572.83	14.83
4	Machinery		Hours	0	0	0
5	Seed Main Crop (Establishment and Maintenance)		Kgs (Rs.)	36.67	6752.72	15.23
6	Seed Inter Crop		Kgs.	0	0	0
7	FYM		Quintal	0	0	0
8	Fertilizer + micronutrients		Quintal	4.08	3265.66	7.37
9	Pesticides (PPC)		Kgs / liters	2.04	2449.24	5.53
10	Irrigation		Number	2.35	0	0
11	Repairs			0	0	0
12	Msc. Charges (Marketing costs etc)			0	0	0
13	Depreciation charges			0	4465.96	10.08
14	Land revenue and Taxes			0	5.76	0.01
II	**Cost B1**					
16	Interest on working capital				1496.11	3.38
17	**Cost B1 = (Cost A1 + sum of 15 and 16)**				36854.08	83.14
III	**Cost B2**					
18	Rental Value of Land				466.67	1.05
19	**Cost B2 = (Cost B1 + Rental value)**				37320.75	84.2
IV	**Cost C1**					
20	Family Human Labour			14.88	2975.07	6.71
21	**Cost C1 = (Cost B2 + Family Labour)**				40295.82	90.91
V	**Cost C2**					
22	Risk Premium				0	0
23	**Cost C2 = (Cost C1 + Risk Premium)**				40295.82	90.91
VI	**Cost C3**					
24	Managerial Cost				4029.58	9.09
25	**Cost C3 = (Cost C2 + Managerial Cost)**				44325.4	100
VII	**Economics of the Crop**					
a.	Main Product	a) Main Product (q)		55.52	91613.13	
		b) Main Crop Sales Price (Rs.)			1650	
b.	Gross Income (Rs.)				91613.13	
c.	Net Income (Rs.)				47287.73	
d.	Cost per Quintal (Rs./q.)				798.32	
e.	Benefit Cost Ratio (BC Ratio)				1:2.1	

Adequacy of fodder: The data regarding the adequacy of fodder in Narayanpet-3 Micro watershed is presented in Table 29. The results indicate that, 38.24 per cent of the households opined that dry fodder was adequate and 5.88 per cent of them opined dry fodder was inadequate. With respect to green fodder availability, 17.65 percent of them opined it was sufficient.

Table 29. Adequacy of fodder in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Adequate-Dry Fodder	0	0	5	41.67	2	25	5	71.4	1	100	13	38.24
2	Inadequate-Dry Fodder	0	0	1	8.33	1	12.5	0	0	0	0	2	5.88
3	Adequate-Green Fodder	0	0	3	25	0	0	3	42.9	0	0	6	17.65

Average annual gross income: The data regarding the annual gross income in Narayanpet-3 Micro watershed is presented in Table 30. The results indicate that, the farmers have annual gross income of Rs. 79470.59 in micro-watershed, of which Rs. 47705.88 is from agriculture itself.

Table 30. Average annual gross income in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Service/salary	0	6666.67	0	0	0	2352.94
2	Business	0	0	0	35714.3	0	7352.94
3	Wage	13333.3	19166.7	31250	24285.7	0	21470.6
4	Agriculture	0	36083.3	71750	80714.3	50000	47705.9
5	Dairy Farm	0	0	0	2857.14	0	588.24
Income(Rs.)		13333.3	61916.7	103000	143571	50000	79470.6

Average annual Expenditure: The data regarding the average annual expenditure in Narayanpet-3 Micro watershed is presented in Table 31. The results indicate that, the farmers have annual gross expenditure of Rs. 277347.62 in micro-watershed, of which Rs. 15676.47 is from agriculture itself.

Table 31. Average annual Expenditure in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Business	0	0	0	120000	0	3529.41
2	Wage	25000	10500	7333.33	25333.3	0	5500
3	Agriculture	0	25714.3	35666.7	27800	0	15676.5
Total		25000	36214.3	43000	173133	0	277348

Horticulture species grown: The data regarding horticulture species grown in Narayanpet-3 Micro watershed is presented in Table 32. The results indicate that, the total number of horticultural trees grown (both field and backyard) by the sampled households were coconut (6), clustered apple (10), Guava (2) and Mango (2).

Table 32. Horticulture species grown in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Coconut	0	0	3	1	2	0	0	0	0	0	5	1
2	Custard apple	0	0	0	0	0	10	0	0	0	0	0	10
3	Guava	0	0	0	0	2	0	0	0	0	0	2	0
4	Mango	0	0	1	0	1	0	0	0	0	0	2	0

***F= Field B=Back Yard**

Forest species grown: The data regarding forest species grown in Narayanpet-3 Micro watershed is presented in Table 33. The results indicate that, households have planted 5 teak trees, 35 neem trees, 5 tamarind trees together in both field and backyard.

Table 33. Forest species grown in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		F	B	F	B	F	B	F	B	F	B	F	B
1	Teak	0	0	3	0	2	0	0	0	0	0	5	0
2	Neem	0	0	13	1	18	1	2	0	0	0	33	2
3	Tamarind	0	0	1	0	3	0	1	0	0	0	5	0

***F= Field B=Back Yard**

Average additional investment capacity: The data regarding average additional investment capacity in Narayanpet-3 Micro watershed is presented in Table 34. The results indicate that, households have an average investment capacity of Rs. 3338.24 for land development, Rs.500.00 for adoption of improved livestock breeds, Rs.147.06 for adoption of improved crop production activities.

Table 34. Average additional investment capacity of households in Narayanpet-3 micro-watershed

Sl. No.	Particulars	LL (6)	MF (12)	SF (8)	SMF (7)	MDF (1)	All (34)
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1	Land development	0	5541.67	3250	2000	7000	3338.24
2	Improved crop production	0	1416.67	0	0	0	500
3	Improved livestock management	0	416.67	0	0	0	147.06

Source of funds for additional investment: The data regarding source of funds for additional investment in Narayanpet-3 Micro watershed is presented in Table 35. The results indicate that, the sources of finance raised from bank as a loan and from own sources for land development were 38.24.

Table 35. Source of funds for additional investment in Narayanpet-3 micro-watershed

Sl. No	Item	Land development		Irrigation facility		Improved crop production		Improved livestock management	
		N	%	N	%	N	%	N	%
1	Loan from bank	13	38.24	0	0	3	8.82	1	2.94

Marketing of agricultural produce: The data regarding marketing of the agricultural produce in Narayanpet-3 Micro watershed is presented in Table 36. The results indicated that, 100.00 percent of output of Cotton was sold in the market with average price of Rs. 4571.43; 81.93 percent of output of Groundnut was sold in the market with average price of Rs. 4250.00; 61.54 percent of output of Paddy was sold in the market with average price of Rs. 1650.00 and 80.00 percent of output of Red gram was sold in the market with average price of Rs. 4722.22.

Table 36. Marketing of agricultural produce in Narayanpet-3 micro-watershed

Sl.No	Crops	Output obtained (q)	Output retained (q)	Output sold (q)	Output sold (%)	Avg. Price obtained (Rs/q)
1	Cotton	85	0	85	100	4571
2	Groundnut	83	15	68	82	4250
3	Paddy	130	50	80	62	1650
4	Red gram	125	25	100	80	4722
5	Sorghum	41	15	26	63	2667

Marketing channels used for sale of agricultural produce: The data regarding marketing channels used for sale of agricultural produce in Narayanpet-3 Micro watershed is presented in Table 37. The results indicated that, 58.82 cent of the households have sold agricultural produce to the local/village merchants and 14.71 per cent of regulated market.

Table 37. Marketing channels used for sale of agricultural produce in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Local/village Merchant	0	0	10	83	5	62.5	4	57.1	1	100	20	58.82
2	Regulated Market	0	0	0	0	2	25	3	42.9	0	0	5	14.71

Mode of transport of agricultural produce: The data regarding mode of transport of agricultural produce in Narayanpet-3 Micro watershed is presented in Table 38. The results indicated that, 70.59 cent of the households have used tractor, 2.94 per cent have used Cart for the transport of agriculture commodity.

Table 38. Mode of transport of agricultural produce in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cart	0	0	0	0	1	12.5	0	0	0	0	1	2.94
2	Tractor	0	0	10	83	6	75	7	100	1	100	24	70.59

Incidence of soil and water erosion problems: The data regarding incidence of incidence of soil and water erosion problems in Narayanpet-3 Micro watershed is presented in Table 39. The results indicate that, 61.76 per cent of the households have experienced soil and water erosion problems.

Table 39. Incidence of soil and water erosion problems in Narayanpet-3 micro-watershed

Sl. No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Soil and water erosion problems in the farm	0	0	8	67	5	62.5	7	100	1	100	21	61.76

Interest towards soil testing: The data regarding Interest shown towards soil testing in Narayanpet-3 Micro watershed is presented in Table 40. The results indicated that, 73.53 per cent of the households were interested towards soil testing.

Table 40. Interest regarding soil testing in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Interest in soil test	0	0	10	83	7	87.5	7	100	1	100	25	73.53

Soil and water conservation practices and structures adopted: The data regarding soil and water conservation practices and structures adopted in Narayanpet-3 Micro watershed is presented in Table 41. The results indicated that 100 per cent of farmers practicing summer ploughing as soil and water conservation practice.

Table 41. Soil and water conservation practices and structures adopted in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Farm Pond	0	0	1	8.3	0	0	0	0	0	0	1	2.94
2	Contour Cultivation	0	0	1	8.3	2	25	0	0	0	0	3	8.82

Status of soil and water conservation structures: The data regarding status soil and water conservation structures adopted in Narayanpet-3 Micro watershed is presented in Table 42. The results indicated that, the households have adopted field bunding as a soil and water conservation structures out of which 100.00 per cent was in good condition.

Table 42. Status of soil and water conservation structures in Narayanpet-3 micro-watershed

Sl. No	Item	Good		Slightly Damaged		Severely Damaged		Full Replacement Required	
		N	%	N	%	N	%	N	%
1	Farm Pond	1	100	0	0	0	0	0	0

Agencies involved in the soil and water conservation structures: The data regarding Agencies involved in the soil and water conservation structures adopted in Narayanpet-3 Micro watershed is presented in Table 43. The results indicated that, 11.76 per cent of the households have adopted by their own.

Table 43. Agencies involved in the soil and water conservation structures in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Own	0	0	2	17	2	25	0	0	0	0	4	11.76

Usage pattern of fuel for domestic use: The data on usage pattern of fuel for domestic use in Narayanpet-3 Micro watershed is presented in Table 44. The results indicated that, firewood was the major source of fuel for domestic use for 88.24 per cent of the households followed by LPG (11.76%).

Table 44. Usage pattern of fuel for domestic use in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Fire Wood	5	83.3	10	83.3	7	87.5	7	100	1	100	30	88.24
2	LPG	1	16.7	2	16.7	1	12.5	0	0	0	0	4	11.76

Source of drinking water: The data on source of drinking water in Narayanpet-3 Micro watershed is presented in Table 45. The results indicated that, piped waters supply was the major source for drinking water for 73.53 per cent of the households.

Table 45. Source of drinking water in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Piped supply	4	66.67	9	75	5	62.5	6	85.7	1	100	25	73.53
2	Bore Well	1	16.67	3	25	3	37.5	1	14.3	0	0	8	23.53
3	RO water	1	16.67	0	0	0	0	0	0	0	0	1	2.94

Source of light: The data on source of light in Narayanpet-3 Micro watershed is presented in Table 46. The results indicated that, electricity was the major source of light for 97.06 per cent of the households.

Table 46. Source of light in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Electricity	6	100	12	100	8	100	7	100	0	0	33	97.1

Existence of sanitary toilet facility: The data on availability of toilet facility in Narayanpet-3 Micro watershed is presented in Table 47. The results indicated that, 76.47 per cent of the households possess toilets.

Table 47. Existence of sanitary toilet facility in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Sanitary toilet facility	6	100	12	100	1	12.5	7	100	0	0	26	76.5

Possession of PDS card: The data regarding possession of PDS card in Narayanpet-3 Micro watershed is presented in Table 48. The results indicated that, 97.06per cent of the households possessed BPL card.

Table 48. Possession of PDS card in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	BPL	6	100	12	100	8	100	7	100	0	0	33	97.06

Participation in NREGA programme: The data regarding Participation in NREGA programme in Narayanpet-3 Micro watershed is presented in Table 49. The results indicated that, only 32.35 per cent of the households have participated in NREGA programme.

Table 49. Participation in NREGA programme in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)	
		N	%	N	%	N	%	N	%	N	%
1	Participation in NREGA programme	1	16.7	4	33.3	4	50	1	14.3	1	100

Adequacy of food items: The data regarding adequacy of food items in Narayanpet-3 Micro watershed is presented in Table 50. The results indicated that, the extent of adequacy of food items for cereals, pulses, Oilseeds and vegetables were 85.29, 88.24, 32.35, 11.76 per cent respectively, similarly for milk (2.94%).

Table 50. Adequacy of food items in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	6	100	10	83.3	5	62.5	7	100	1	100	29	85.29
2	Pulses	6	100	10	83.3	6	75	7	100	1	100	30	88.24
3	Oilseed	2	33.3	3	25	2	25	4	57.1	0	0	11	32.35
4	Vegetables	1	16.7	3	25	0	0	0	0	0	0	4	11.76
5	Milk	0	0	1	8.33	0	0	0	0	0	0	1	2.94

Inadequacy of food items: The data regarding in adequacy of food items in Narayanpet-3 Micro watershed is presented in Table 51. The results indicated that, the extent of in adequacy of food items for cereals, pulses, Oilseeds and vegetables were 14.71, 8.82, 58.82, 82.35 and 91.18 per cent respectively, similarly for fruits (88.24%), milk (91.18%), egg (91.18%) and meat (91.18%).

Table 51. Inadequacy of food items in Narayanpet-3 micro-watershed

Sl.No.	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Cereals	0	0	1	8.33	4	50	0	0	0	0	5	14.71
2	Pulses	0	0	1	8.33	2	25	0	0	0	0	3	8.82
3	Oilseed	3	50	7	58.3	6	75	3	42.9	1	100	20	58.82
4	Vegetables	4	66.7	8	66.7	8	100	7	100	1	100	28	82.35
5	Fruits	4	66.7	11	91.7	7	87.5	7	100	1	100	30	88.24
6	Milk	5	83.3	10	83.3	8	100	7	100	1	100	31	91.18
7	Egg	4	66.7	11	91.7	8	100	7	100	1	100	31	91.18
8	Meat	5	83.3	11	91.7	8	100	6	85.7	1	100	31	91.18

Farming constraints: The data regarding farming constraints experienced by households in Narayanpet-3 Micro watershed is presented in Table 52. The results indicated that, lower fertility status of the soil was the constraint experienced by (79.41 %) per cent of the households, wild animal menace on farm field (76.47%), frequent incidence of pest and diseases (61.76%), inadequacy of irrigation water (2.94%), high cost of fertilizers and

plant protection chemicals (73.53%), high rate of interest on credit (47.06%), low price for the agricultural commodities (61.76 %), lack of marketing facilities in the area (61.76%), lack of transport for safe transport of the agricultural produce to the market (50.00%) and less rainfall (11.76%).

Table 52. Farming constraints experienced in Narayanpet-3 micro-watershed

SN	Particulars	LL (6)		MF (12)		SF (8)		SMF (7)		MDF (1)		All (34)	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Lower fertility status of the soil	0	0	10	83.33	8	100	7	100	1	100	27	79.41
2	Wild animal menace on farm field	0	0	10	83.33	7	87.5	7	100	1	100	26	76.47
3	Frequent incidence of pest and diseases	0	0	7	58.33	5	62.5	7	100	1	100	21	61.76
4	Inadequacy of irrigation water	0	0	0	0	0	0	0	0	1	100	1	2.94
5	High cost of Fertilizers and plant protection chemicals	0	0	9	75	7	87.5	7	100	1	100	25	73.53
6	High rate of interest on credit	0	0	5	41.67	6	75	3	42.86	1	100	16	47.06
7	Low price for the agricultural commodities	0	0	8	66.67	5	62.5	7	100	0	0	21	61.76
8	Lack of marketing facilities in the area	0	0	8	66.67	6	75	6	85.71	0	0	21	61.76
9	Lack of transport for safe transport of the Agril produce to the market.	0	0	6	50	5	62.5	4	57.14	1	100	17	50
10	Less rainfall	0	0	2	16.67	2	25	0	0	0	0	4	11.76

Chapter 5

SUMMARY AND IMPLICATIONS

In order to assess the socio-economic condition of the farmers in the watershed 34 households located in the micro watershed were interviewed for the survey. The study was conducted in Narayanpet-3 micro-watershed (Mungal sub-watershed, Yadgiri taluk & District) is located at North latitude 16^0 33' 1.89" and 16^0 31' 0.128" and East longitude 77^0 16' 10.075" and 77^0 14' 49.22"covering an area of about 500.78 ha bounded by unde Munagala, Sangavara and Kondapura Villages.

Socio-economic analysis of Narayanpet-3 micro watersheds of Mungal sub-watershed, Yadgiri taluk & District indicated that, out of the total sample of 34 farmers were sampled in Narayanpet-3 micro-watershed among households surveyed 12 (35.29%) were marginal, 8 (23.53%) were small, 7 (20.59 %) were semi medium and 1 (2.94 %) were medium farmers. 6 landless farmers were also interviewed for the survey. The population characteristics of households indicated that, there were 81 (62.31%) men and 49 (37.69 %) were women. The average population of landless was 3.7, marginal farmers 4, small farmers were 3.1, semi medium farmers were 4 and medium farmers were 7. Majority of the respondents (32.31%) were in the age group of 16-35 years.

Education level of the sample households indicated that, there were 48.46 per cent illiterates, 0.77 percent were functional literates, 53.08 per cent pre university education and 2.31 per cent attained graduation. About, 67.65 per cent of household heads practicing agriculture and 17.65 per cent of the household heads were engaged as agricultural labourers.

Agriculture was the major occupation for 55.38 per cent of the household members. In the study area, 70.59 per cent of the households possess katcha house and 14.71 per cent possess pucca house. The durable assets owned by the households showed that, 91.18 per cent possess TV, 23.53 per cent possess mixer grinder, 88.24 per cent possess mobile phones and 26.47 per cent possess motor cycles.

Farm implements owned by the households indicated that, 35.29 per cent of the households possess plough, 2.94 per cent possess tractor, 29.41 per cent possess bullock cart and 11.76 per cent possess sprayer. Regarding livestock possession by the households, 11.76 per cent possess local cow.

The average labour availability in the study area showed that**,** own labour men available in the micro watershed was 1.63, women available in the micro watershed was 1.37, hired labour (men) available was 8.58 and hired labour (women) available was 10.65.

Out of the total land holding of the sample respondents 90.73 per cent (39.98 ha) of the area is under dry condition and the remaining 4.25 per cent area is irrigated land.

The major crops grown by sample farmers are Red gram, Cotton, Groundnut, Sorghum and Paddy and cropping intensity was recorded as 91.49 per cent. Out of the sample households 32.35 percent possessed bank account and 2.94 per cent of them have savings in the account.

About 32.35 per cent of the respondents borrowed credit from various sources. Among the credit borrowed by households and 27.27 per cent from co-operative/Grameena bank. Majority of the respondents (100.00%) have borrowed loan for agriculture purpose.

Regarding the opinion on institutional sources of credit, 25.00 per cent of the households opined that credit helped to perform timely agricultural operations. The per hectare cost of cultivation for Red gram, Cotton, Groundnut, Sorghum and Paddy was Rs.31255.33 , 37268.89, 36375.24, 22806.82 and 44325.40 with benefit cost ratio of 1:1.50, 1: 1.40, 1: 2.10, 1: 1.40 and 1:2.10 respectively.

Further, 38.24 per cent of the households opined that dry fodder was adequate and 17.65 per cent of the households have opined that the green fodder was adequate. The average annual gross income of the farmers was Rs. 79470.59 in micro-watershed, of which Rs. 47705.88 comes from agriculture. Sampled households have grown 20 horticulture trees and 45 forestry trees together in the fields and back yards.

Households have an average investment capacity of Rs. 3338.24 for land development. Source of funds for additional investment is concerned, 11.76 per cent depends on own funds and 38.24 per cent depends on bank loan for land development activities.

Regarding marketing channels, 58.82 per cent of the households have sold agricultural produce to the local/village merchants, while, 14.71 per cent have sold in regulated markets. Further, 70.59 per cent of the households have used tractor for the transport of agriculture commodity. Majority of the farmers (61.76%) have experienced soil and water erosion problems in the watershed and 73.53 per cent of the households were interested towards soil testing.

Fire was the major source of fuel for domestic use for 88.24 per cent of the households and 11.76 per cent households has LPG connection. Piped supply was the major source for drinking water for 73.53 per cent of the households. Electricity was the major source of light for 97.06 per cent of the households.

In the study area, 76.47 per cent of the households possess toilet facility. Regarding possession of PDS card, 97.06 per cent of the households possessed BPL card. Households opined that, the requirement of cereals (85.29%), pulses (88.24%) and oilseeds (32.35%) are adequate for consumption.

Farming constraints experienced by households in the micro watersheds were lower fertility status of the soil (79.41%) wild animal menace on farm field (76.47%), frequent incidence of pest and diseases (61.76%), inadequacy of irrigation water (2.94%), high cost of fertilizers and plant protection chemicals (73.53%), high rate of interest on credit (47.06%), low price for the agricultural commodities (61.76%), lack of marketing facilities in the area (61.76%) and lack of transport for safe transport of the agricultural produce to the market (50.00%), Less rainfall (11.76%).

Implications of the survey

- ✓ Result indicated that, there were 48.46 per cent were illiterate hence, extension methodologies such as demonstration, street play, drama, video shows will be effective in dissemination of the technologies in the micro watershed.
- ✓ The data indicate that, 70.59 per cent of the households possess katcha house. Hence, the development department while implementing the watershed plan should focus on agriculture to enhance the productivity of major crops in the area to increase the income of the farmers.
- ✓ Results indicated that the local institutional participation of the household members in the micro watershed is minimal hence, activities like membership campaign, awareness creation about the benefits of membership in local institutions and strengths of organized groups must be conveyed.
- ✓ Majority of the households in the watershed have experience in use of mobile phones, and television hence, these mass media can be effectively utilized for transfer of technology as well as for information dissemination.
- ✓ The farm machinery/implement possession in the micro watershed was found to be minimum the reasons may lack of knowledge or lack of financial ability which can be addressed through training on use of different farm implements, providing information on different sources of finance for purchase of farm implements.
- ✓ The possession of livestock such as crossbred cow found is less hence, farmers must be made aware of the benefits of crossbred cow in increased milk production.
- ✓ The possession of livestock such as sheep, goat and poultry was found to be low hence, farmers may be informed the role of subsidiary enterprises in enhancing the income and information on financial support for subsidiary activities.
- ✓ The data indicate that, job/work was the reason for all the migrants hence, farmers may be trained on profitable agriculture or self employment such has animal husbandry, plate making, sheep rearing, goat rearing, rabbit rearing with suitable information on sources of financial support.
- ✓ The results indicate that there was a change in quality of life due to migration hence, the developmental departments should take actions to arrest migration and to improve the quality of the life in rural areas.

- ✓ Households possess 36.27ha (90.73 %) of dry land and 1.70ha (4.25 %) of irrigated land hence, the availability of the dry land agricultural technologies such as short duration crops, high yielding drought resistance crop varieties, drip irrigation technology and subsidy information will be helpful for the farmers to enhance the productivity of land and as well as farmers income.
- ✓ Few of the bore well in micro watershed found non functional hence, farmers may be trained on possibility of bore well rejuvenation.
- ✓ Bore well was major source of irrigation for 0.00 per cent of the households. hence, in order to increase the area under irrigation as well as to increase the water use efficiency farmers may trained on drip irrigation and provide the information on subsidy for drip irrigation equipment's along with the information on different agencies which provides the financial assistance for drip irrigation.
- ✓ The cropping intensity in the micro watershed was found to be (91.49 %) hence, care must be taken by the implementing agency to bring uncultivated land into cultivation through suitable measures.
- ✓ Many of the household members have borrowed loan from cooperative banks which has higher rate of interest hence, farmers may be sensitized on the different sources of credit with lesser interest rate such SHGs etc.
- ✓ The results indicated the non availability of both green and dry fodder throughout the year hence, fodder development activities can be taken up in the micro watershed.
- ✓ The average annual gross income of the households Rs.47705.88 from agriculture, Rs.7352.94 from business and Rs. 21470.59 from wages and. Agriculture was found to be the major source of income for households hence; the development activities should focus on productivity enhancement, marketing arrangements and agricultural technology dissemination to have a direct impact on the farmers.
- ✓ The cultivation of forest species is found minimal hence, information and production technology related to agro-forestry and integrated farming system.
- ✓ The data indicated that, 61.76 per cent of the households have experienced soil and water erosion problems. Hence, those farmers who reported the soil and water erosion problems may be given attention while implementation of the watershed development plan.
- ✓ The data indicated that, 73.53 per cent of the households have interest in soil testing hence, farmers must be provided with the information on various institutions which are involved in soil testing for the benefit of the farmers.
- ✓ Except summer ploughing the adoption of other soil and water conservation structures is minimum hence, the farmers in the micro watershed should be sensitized on the use of different conservation structures for soil water conservation.
- ✓ Cereals and pulses found be adequate for per cent of the households respectively hence, farm households and the farm women must be trained on importance of balanced nutrition and role of vegetable, milk, egg, meat in balanced diet.

- ✓ Lower fertility status of the soil (79.41%), wild animal menace on farm field (76.47%), frequent incidence of pest and diseases (61.76%), high cost of fertilizers and plant protection chemicals (73.53%), high rate of interest on credit (47.06%), low price for the agricultural commodities (61.76%), lack of marketing facilities in the area (61.76%), lack of transport for safe transport of the agricultural produce to the market (50.00%) were the major farming constraints experienced hence, these constraints must be addressed immediately for the welfare of the farmers. Awareness to be created among the farmers to approach nearest KVKs/RSKs and other developmental departments for technical and for subsidized inputs and utilize the well established regulated markets, approaching the contract firms, direct markets to avoid the involvement of middlemen.